# Site Servicing & Stormwater Management Report

## New Campus Development for The Ottawa Hospital
## Phase 4: Main Hospital Project
## Ottawa, Ontario

**January 12th, 2026**
**(Issued for SPC Resubmission)**

**Prepared by WSP Canada Inc.**

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# SITE SERVICING AND STORMWATER MANAGEMENT REPORT
## New Campus Development for The Ottawa Hospital
## Phase 4: Main Hospital

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# 1.0 SITE INFORMATION

## 1.1 Site Location

The Ottawa Hospital has retained WSP Canada Inc. to provide Civil Engineering Services as part of a Joint Venture with PCL-ED in support of the development of a New Civic Campus development, located in Ottawa, Ontario, Canada. The New Civic Campus is a 20-hectare (ha) development located at 930 and 850 Carling Avenue, occurring at the intersection of Preston Street Carling Avenue, adjacent to Dow's Lake, in the heart of the National Capital Region. The new Civic Hospital is part of a multi-phased development that includes a multi-storey parking garage, a new research facility, a future University of Ottawa Heart Institute, a new Main Hospital Building, and a Central Utility Plant to power the site.

The site is bordered by federally owned land to the east, as well as Dow's Lake and the Rideau River, Carling Avenue to the north, federally owned land (Agri-Canada) to the west, and Prince of Wales drive to the South.

The location of the site is noted in Figure 1.1-1.

Figure 1.1-1: Proposed Development Site

## 1.2 Existing Conditions

### 1.2.1 Environmentally and Culturally Significant Areas

The proposed development site is located adjacent to Dow's Lake on the Rideau River, which is the upstream turning basin for the last leg of Rideau Canal locks, located within the City of Ottawa. The Rideau Canal also is home to the Rideau Canal Skateway during the winter months, owned and operated through Park's Canada and the National Capital Commission. As the Skateway is considered an iconic piece of local culture and heritage, there are a number of specific requirements relating to the Skateway that must be considered. The proposed development site utilizes the existing federally owned stormwater sewer outlet point into Dow's Lake for discharge of proposed works which is covered in Section 5.0 -

Stormwater Management. Erosion and sediment control mitigations must be provided and followed during construction to ensure that stormwater that discharges to the Dow's Lake outlet point is clean and within acceptable levels of turbidity.

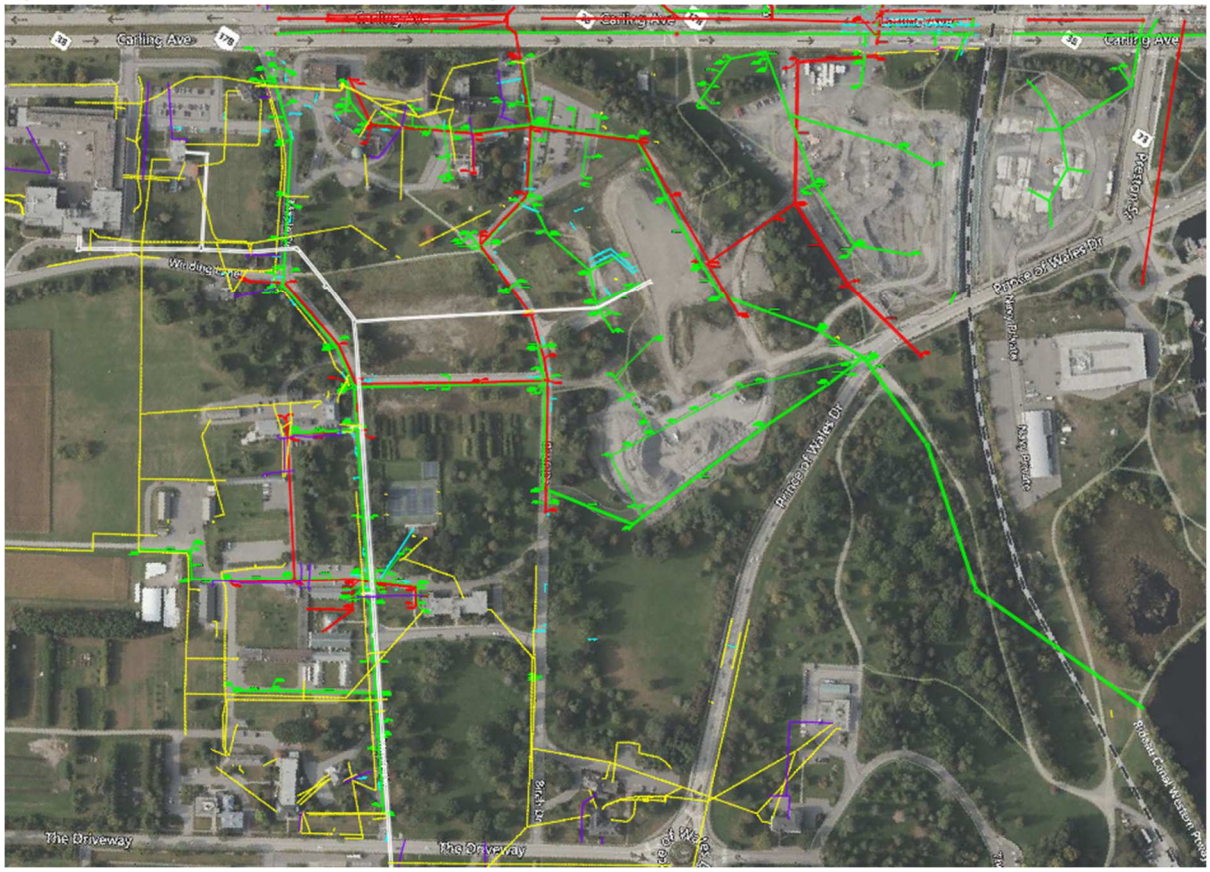
The CCME Canadian Water Quality Guidelines for Protection of Aquatic Life must be met. The discharge of water during construction should also be monitored for signs of scouring and ensure there is no suspension of contaminated settlement.

For further information relating to wildlife and the ecological significance of the proposed development site, please refer to the Wildlife Mitigation and Monitoring Plan (WSP, 2025) as well as the Environmental Effects Evaluation and Tree Conservation Report Memorandum Update (WSP, 2025).

### 1.2.2 Existing Utilities

There are a variety of private and publicly owned utilities located within the development site including several existing privately owned utilities which are owned and operated by Agri-Food Canada, Natural Resources Canada, as well as Public Works and Procurement Canada. These utilities include private watermains, storm and sanitary sewers, telecommunications duct banks, hydro duct banks and natural gas piping. Many of these utilities are being removed and/or rerouted as a part of the Advanced Works 1.0 Contract. See below figure 1.2.2-1 for a high-level overview of the existing utilities on site. For the removals occurring as part of Advanced Works please refer to drawings C205 through C213 from the *The Ottawa Hospital - Civic Campus Redevelopment (Parsons, September 2024)* drawing package. For the removals as part of the DPA contract please refer to the C0-300 series drawings from *The Ottawa Hospital New Campus Development, Civil Drawing Package (September, 2025).*

Figure 1.2.2-1: Proposed Development Site Existing Utilities


Carling Ave
Carling Ave
Carling Ave
Carling Ave
Carling Ave
Windsor Dr
Prince of Wales Dr
Prince of Wales Dr
Navy Private
Navy Private
Navy Private
Preston St
Preston St
Preston St

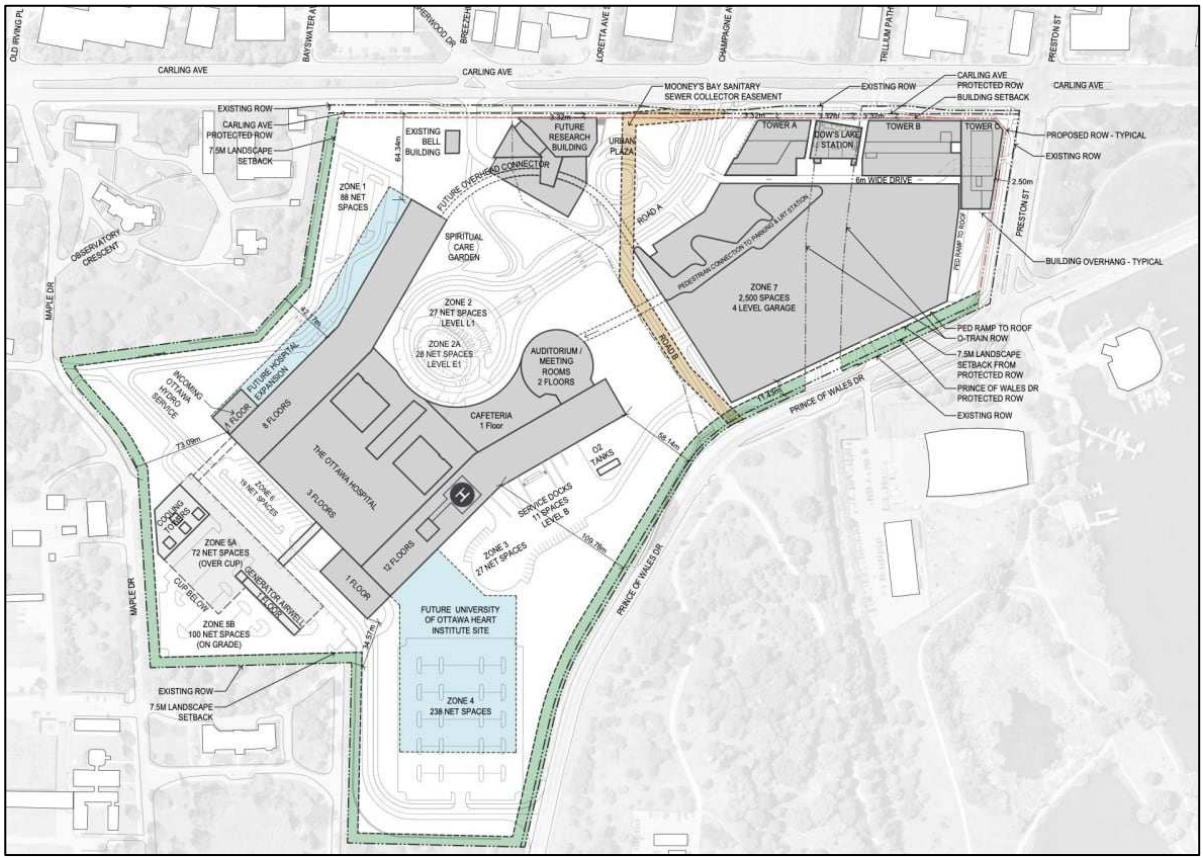
## 1.3 Proposed Development

### 1.3.1 Overview

When the new Hospital opens it will be one of the largest and most advanced hospitals in all of Canada, providing healthcare services for Eastern Ontario, Western Quebec, and portions of Nunavut. The facility will be state-of-the-art, feature Canada's most advanced trauma center, one of the most innovative neuroscience research programs in the world and will be a national leader in advanced healthcare digital technology.

The main hospital building, which includes inpatient and outpatient clinics as well as the Emergency Department, will sit on the natural escarpment across from Dow's Lake, the head of the Rideau Canal Skateway. Additional medical offices, clinical space, as well as research and education buildings, will all sit on the lower portion of the site, with direct access to the nearby LRT station. A key plan of the site can be seen in Figure 1.3-1. Note that this is the Indicative Schematic Design version of the site plan depicted by The Ottawa Hospital to demonstrate site phasing, and some alterations to the Main Hospital Building footprint have been undertaken.

Figure 1.3-1: ISD Proposed Development Site Plan



The New Civic Development will occur in various phases, as outlined in Figure 1.3-2. Phase 2 consists of the design and construction of the accompanying parking garage, Phase 3 is the Central Utility Plant, and Phase 4 is the Main Hospital Building and the surrounding roads and landscaped regions. As there are multiple developments proposed within the site, each occurring on different timelines, The Ottawa Hospital, in coordination with PCL-ED, a Joint venture, has developed an early works construction stage to allow for the design, development, and construction of the backbone utility infrastructure required on the site to handle proposed stormwater, sanitary, and watermain requirements from each of the different phases.

This early works package, herein referred to as Advanced Works (AW), encompasses the required utility relocations to facilitate development of the site. It also includes the mainline watermain, sanitary, and storm sewers that run in the ring road surrounding the main hospital building. The Parking Garage, Central Utility Plant, Advanced Works, and the Main Hospital Building site are delineated as separate contracts and are to be treated as separate projects. However, each of the four (4) projects interface with each other through utilities, primarily Stormwater and Watermain. The Advanced Works contract encompasses the mainline utilities that are utilized by the Main Hospital Building, Central Utility Plant, and Parking Garage.

The Ottawa Hospital, via Parsons Corporation, has completed utility and stormwater management design for the mainline utilities contained in the Advanced Works contract. The design capacities of these utilities consider the buildout of the Parking Garage, Central Utility Plant, and Main Hospital Building. However, since the Advanced Works project is on an accelerated timeline, approximations were used for the buildout of the Main Hospital Building, as the design of that contract had not yet been completed. The Civil design of the Main Hospital Building (Phase 4 of the overall Project) is the design responsibility of WSP. The purpose of this Site Servicing and Stormwater Management report is to validate the design assumptions used by Parsons in the Advanced Works design for the full design and final buildout of the Main Hospital Building and Site.

The design report *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)* should be referenced, with this report being treated as an accompanying report covering the detailed design of the Main Hospital Building. The Parking Garage contract, also separate, has a designated site servicing and stormwater management report. Please refer to *Site Servicing and Stormwater Management Report, New Civic Development for The Ottawa Hospital Phase 2 Parking Garage Project, (May 2023)*, prepared by Parsons.

The design information contained within this Site Servicing Report, as well as the accompanying Engineering Servicing drawings, relates only to Phase 4 of the Development Phase and excludes the works associated with Advanced Works, Parking Garage, or Central Utility Plant. This design scope consists of the water, sanitary, and storm service connections, the overall site grade finished grading strategy, the main hospital building stormwater management strategy, and the erosion and sediment control required for Phase 4.

Refer to Figure 1.3-2 for and overview of the various New Civic Development phases.

Figure 1.3-2: Proposed Development Phases

### 1.3.2 Land Use and Development

The following land use approvals were granted in relation to the proposed site:

- June 2017: Federal Land Use and Transaction Approval (FLUDTA)
- May 2018: City of Ottawa Official Plan and Zoning By-Law Amendments
- May 2018: Preston-Carling District Secondary Plan

The updates to these land use planning policy documents were aimed at approving 20-ha of federal land for a new hospital development for The Ottawa Hospital by redesignating lands in the Central Experimental Farm. The Preston-Carling District Secondary Plan amendment was to allow for a new hospital area by way of a character area policy. Lastly, the City of Ottawa planning amendments rezoned the lands to Major Institutional Zone.

### 1.3.3 Application Codes, Regulations, and Standards

The following criteria, design standards, codes, specifications and best practice measures shall be used for the site servicing design:

- City of Ottawa Design Guidelines – Water Distribution 2010 and Technical Bulletins.
- City of Ottawa Design Guidelines – Sewer Design Guidelines 2012 and Technical Bulletins
- City of Ottawa Accessibility Design Standards
- City of Ottawa CADD Standards Manual
- City of Ottawa Slope Stability Guidelines for Development Applications
- City of Ottawa Standard Tender Documents for Unit Price Contracts, Volume 1, 2 and 3 City of Ottawa Stormwater Management
- Facility Design Guidelines
- Drainage Act, 1990 (Ontario)
- MOE Design Guidelines for Drinking-Water Systems Ontario Ministry of the Environment (MOE), 2008
- MOE Design Guidelines for Sewage Works
- MOE Stormwater Management Planning and Design Guidelines (MOE), 2003
- MTO Culvert Assessment Guide
- MTO Drainage Management Manual MTO, 1997
- MTO Gravity Pipe Design Guidelines for Circular Culverts and Storm Sewers, 2014
- MTO Guide for Preparing Hydrology Reports for Water Crossings
- MTO Highway Drainage Design Standards, 2008
- MTO Stormwater Management Ponds Inspection Report
- National Transportation Communications for ITS Protocol (NTCIP)
- National Building Code of Canada (NBC 2020)
- Occupational Health and Safety Act (OHSA)
- OC Transpo Transitway and Station Design Guidelines June 2013
- Ontario Fire Code (OFC)
- Ontario Provincial Standard for Roads and Public Works (OPS)
- Ontario Provincial Standard Drawings (OPSD)
- Ontario Provincial Standards Specifications
- Pinecrest/Centrepointe Stormwater Management Criteria Study
- TC E-10 Standards Respecting Pipeline
- Crossings Under Railway Transport Canada (TC), October 2002

### 1.3.4 Relevant Studies and Consultations

*Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)*

A previous Site Servicing and Stormwater Management report has been developed and distributed by Parsons that encompasses all the Advanced Works design. This report includes approximations and assumptions for upstream design such as service connections to account for that scope within the Advanced Work design elements. This document also covers all the proposed utility relocations required for the development. It does not include the Parking Garage, Central Utility Plant, or other future phases.

*New Civic Development for The Ottawa Hospital – Master Servicing Plan (Parsons, July 2021)*

Additionally, a Master Site Servicing Report for the entire phased development was prepared for The Ottawa Hospital by Parsons. This report extensively covers the site background as well as an overview of all the site servicing required for the various phases.

In addition, the following documents and studies, provided as background information by The Ottawa Hospital, are also relevant:

- Geotechnical Data Report (GDR) – New Ottawa Hospital Development, WSP Canada, August 2023
- Geotechnical and Hydrogeological Investigation – New Ottawa Hospital Development, Phase 1 – New Parkade Structure, Golder Associates Ltd., August 2021
- Phase Two Environmental Site Assessment, New Civic Development for the Ottawa Hospital, Golder Associates Ltd, October 2021
- Environmental Investigation of Subsurface Conditions, Proposed New Hospital Campus, Paterson Group Inc, September 2017
- New Campus Development, Hospital and Central Utility Plant, Environmental Effects Evaluation, Parsons, November 2022
- Transportation Impact Assessment and Mobility Study, Parsons, July 2021
- Preliminary Groundwater Inflow Estimate, Ottawa Hospital Expansion, WSP Canada, February 2023

In addition to this, the following mapping sources are referenced for context in the development of the report.

- GeoOttawa – City of Ottawa Water Distribution System Interactive Map, City of Ottawa Sanitary, Storm, and Combined System Interactive Map
- City of Ottawa 1:1000 Topography Mapping
- City of Ottawa Utility Coordinating Committee (UCC) Mapping
- Public Service and Procurement Canada Utility Mapping
- Annis, O'Sullivan, Vollebekk Limited Surveys of the New Ottawa Hospital Site Civic Campus

# 2.0 PROPOSED DESIGN

## 2.1 Objectives and Criteria

The overall objective is to provide Site Servicing, Stormwater Management, and Site Grading design in accordance with local, federal, and project specific requirements to allow for the development and construction of the New Civic Development of The Ottawa Hospital. This report should be read in conjunction with the provided 95% Detailed Design Civil Engineering Drawings covering Site Servicing, Site Grading, Erosion & Sediment Control, and Stormwater Management.

In addition to the City of Ottawa and Ministry of Environment, Conservation, and Parks requirements for Stormwater Sewers, Sanitary Sewers, Watermains, and Stormwater Management Facilities, the following project-specific requirements should be noted for compliance:

- Sanitary Sewers, Watermains, and Storm Sewers shall be designed for the ultimate buildout of the Hospital building including the future Heart Institute
- The designs of the Sanitary, Storm, and Watermain shall adhere to the capacity of the NCD site main sewer and watermains that will be completed under a separate contract.
- Sanitary and Storm sewers shall be designed and constructed to drain via gravity
- No trees shall be planted on top of storm, sanitary, and watermain service connections
- Sanitary and Storm manholes shall not be installed within pedestrian plazas or accessible pedestrian routes leading to building entrances and public areas
- Watermain valves shall not be installed in pedestrian plazas, accessible pedestrian routes leading to entrances, parking stalls, parking areas, and all loading dock bays

### 2.1.1 Impacts on Private and Nearby Infrastructure

The proposed infrastructure within the scope of this document is limited to the proposed service connections of the main hospital building and the future University of Ottawa Heart Institute. The connection of proposed utilities to any existing public infrastructure is within the scope of Advanced Works, as the mainline watermain, storm, and sanitary sewers that connect to existing public and private infrastructure is the scope of Advanced Works.

There are no impacts or implications to private or external public infrastructure because of the proposed utilities within these works.

## 2.2 Geotechnical Consideration

Please refer to the geotechnical report prepared by *Paterson Group – Geotechnical Report – The Ottawa Hospital, Civic Campus Redevelopment Project (September 19, 2025)* as part of the 95% Developed Design submission for detailed geotechnical considerations relating to the site.

Most pertinent is the information contained in Section 6.4 – Pipe Bedding and Backfill. A minimum of 150mm of OPSS Granular A will be used for pipe bedding for proposed watermains and sewers, in accordance with the most recent Material Specifications and Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa. The bedding should extend to the springline of the pipe and cover material should consist of OPSS Granular A or Granular B Type II, maximum size 25mm, extending to 300mm above the obvert of the pipe. All bedding should be compacted to 99% SPMDD.

In areas where service connections, watermains, and proposed sewers are in subgrade that consists of soil transitioning to bedrock, it is recommended in the Geotechnical report that the founding medium be inspected in the field to determine

how steeply the bedrock surface drops off. In these locations the bedrock should be excavated and a minimum 500mm thick layer of bedding be installed to provide a 3H:1V transition from bedrock to soil.

## 2.3 Advanced Works

Please refer to *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)* for information regarding the mainline utilities on the site that are contained under the Advanced Works project.

The proposed works associated with Phase 4 of the Hospital building by DPA are being designed in conjunction with the constraints and limitations of the Advanced Works utilities. Both separate design teams are coordinating through The Ottawa Hospital and other project partners to minimize disruption, changes, and inefficiencies in the design.

- Roadway catchbasins have been designed and developed through the Advanced Works Scope. DPA has maintained the catchbasin design and overall grading approach on the roadways and parking lots. To suit the development of the main hospital building, various curb and road adjustments have taken place. The DPA team has worked to maintain catchbasin types and locations according to the Advanced Works but has noted minor grade changes and adjustments that will be required at each. It is assumed that these changes would likely be accommodated with minor adjustments to the riser sections of the catchbasins. A check of lead sizing and spacing has been completed and included as an appendix to this report.
- Sanitary, Storm, and Sanitary service connection adjustments from those originally depicted in the Advanced Works design have undergone iteration and coordination between Advanced Works and DPA to suit the current build out of the Main Hospital Building.
- Hydrant locations have been updated from the original Advanced Works design to suit the current roadway alignment and main hospital build-out by DPA.

## 2.4 Site Grading

In existing conditions, the approximate 20ha site adjacent to Dow's Lake has a wooded escarpment that runs north/south through the western half of the site. The southern edge of the proposed Main Hospital Building intersects the escarpment. The portion of site behind the escarpment, on the western edge, is relatively flat and is a continuation of the Ottawa Central Experimental Farm. The eastern half of the site, the lower side of the escarpment, is also relatively flat and slopes towards Dow's Lake, where the Phase 2 parking garage is located.

In the proposed site plan development, the eastern edge of the Main Hospital Building is home to the loading dock area. Due to internal building elevations, this loading dock area is significantly lower than the surrounding area. The result is the requirement of a retaining wall to hold back a sloped ridge that gains in elevation towards Prince of Wales Drive.

Similar sloping and a retaining wall are required at the north-west corner of the site, immediately north of the contemplative garden and to the west of Road A. In this region, a future research facility is planned for a later phase of the project. In current conditions of Phase 4, this area will slope back down towards a construction stormwater pond as part of Phase 2. This condition is intended to remain as-is until development of the future research building begins later.

The Main entryway features two lower ramps to the emergency access E1 level, with the entrance ramp lying on the west and the exit ramp on the east. The overall main entryway is a raised buried structure, with access drive aisles gently sloping up to the main entrance. The pedestrian walkways from Carling, along Road A, to the main entrance feature gentle switchbacks to allow for a gradual increase at 5% slope, with retaining walls occurring throughout to maintain the 3:1 side sloping limit.

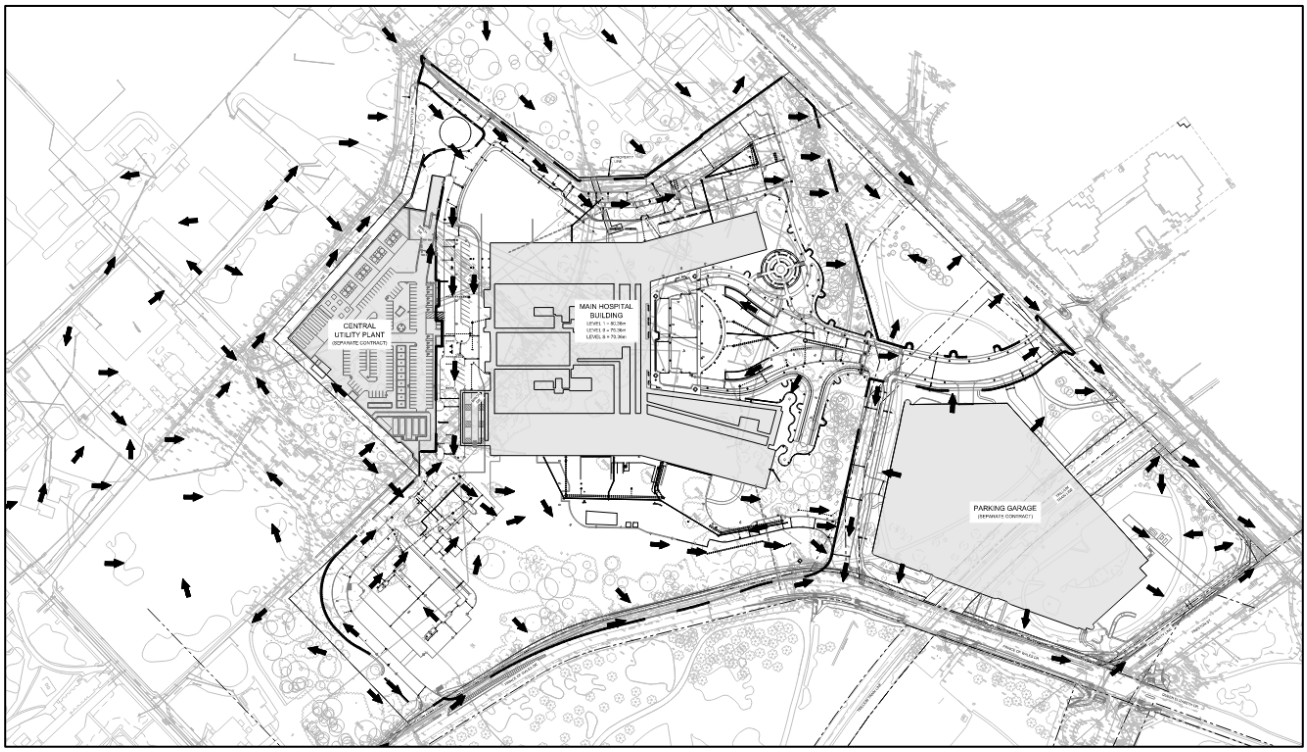
The accompanying site grading drawings, provided as part of the 95% Developed Design submittal, show critical grade elevations, proposed contours, overland flow, and other grading features.

Please note the following additional requirements and constraints of the site grading design:

- The maximum slope allowable on site is 3:1
- Grade shall slope away from all building entrances
- Surface drainage over and across adjacent sidewalks and accessible routes, multi-use pathways, and cycle tracks shall be minimized
- Road grades for OC Transpo designated roads shall not exceed 6% slope

Refer to Figure 2.4-1 for proposed overland flow routes.

Figure 2.4-1: Proposed Overland Flow Route




## 2.5 Composite Utility Plans

Composite utilities, such as civil, gas, electrical, communications, etc. currently exist within the development site. All proposed utilities will connect to existing and new infrastructure within the site. The available design information, including alignment and sizes, of on-site utilities have been shown on the site Composite Utility Plans. Please refer to the associated Engineering Drawings submitted as part of the 95% detailed design submittal.

Third Party Owned utilities including but not limited to Hydro Ottawa Limited and Enbridge Gas services for the proposed development are currently under coordination by The Ottawa Hospital, DPA, and the respective Third-Party Owners. The preliminary alignment of the Hydro Ottawa Limited ductbank is shown along Road E, with permanent and temporary ducts running from Prince of Wales Drive to Maple Drive. The preliminary alignment of the Enbridge Gas Service is under development and is intended to enter the CUP from Maple Drive. The design currently shows the gas service terminating at a proposed gas train at the southwest corner of the site with the connection to be designed by CUP.

# 3.0 WATERMAIN SERVICE DESIGN

## 3.1 Design Overview

### 3.1.1 Background and Site Constraints

The New Civic Development will be serviced by a 300mm watermain mainline loop that will connect to the existing 406mm public existing watermain at the intersection of Carling Avenue and future Road A, near Champagne Avenue South, as well as to the existing 406mm public existing watermain at Carling Avenue and Sherwood Drive. The proposed 300mm watermain mainline forms a loop around the Main Hospital Building, with a proposed extension up future Road A to form the connection to existing.

The proposed development site utilizes the existing 406mm distribution watermain as a connection location and shall not be connected to the existing 1067mm diameter backbone watermain, located between the eastbound and westbound lanes of Carling Avenue. This 1067mm backbone watermain is sourced from the Lemieux Island Water Purification Plant and is not available for any connection opportunities, as per the project specific output requirements.

Another constraint of the site is the elevation differences between the connections to the City of Ottawa main and the hydrants as well as the service connections. This difference in elevation could result in difficulty achieving adequate pressures and flows required as per the City of Ottawa Guidelines for Watermain Design, Tech Bulletin ISTB-2018-02 and the Fire Underwriter's Survey. This is shown to be an issue as mentioned in *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)* as low pressure is noted in comments 1 through 6 below Table 12 of that report.

### 3.1.2 Advanced Works Scope Delineation

The design, pressures, parameters and responsibility of the 300mm watermain mainline loop are contained within the design scope of Advanced Works. Please refer to *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)* for information regarding that design and the design of any of the relocated watermains that are required to facilitate Phase 3 of the New Civic Development works.

The proposed watermain service connections, the on-site hydrants and hydrant leads, the Central Utility Plant service connections, as well as the service connection for the future University of Ottawa Heart Institute are contained within the scope of this report. As these service connections and hydrants will connect and be sourced from the 300mm Advanced Works private watermain line, the hydraulic analysis, pressure parameters, and overall design details from the Parsons design will be used to finalize the hydraulic output and design of the service connections.

Given that the Advanced Works watermain scope is on an accelerated timeline from the rest of the Phase 3 works, the private 300mm watermain mainline loop that will be designed and constructed as part of the Advanced Works contract will be treated as a design constraint. The Advanced Works watermain mainline generally in alignment with the intent outlined in the *Master Servicing Plan – New Civic Development for The Ottawa Hospital (Parsons, July 2021).*

In addition, there are several existing privately owned watermains located within the development site that are owned and operated by Agri-Food Canada, Natural Resources Canada, as well as Public Works and Procurement Canada. The relocation and finalized design of these private watermains are contained within the Advanced Works scope.

Note that there are several design constraints on the overall watermain servicing design of the Main Hospital Building and the overall New Civic Development site as listed below in Table 3.1-1.

Table 3.1-1: Water System Pressure Criteria

| Operating Conditions | kPa | psi |
|---|---|---|
| Average Daily Demand –Limits | 276-552 | 40-80 |
| Average Daily Demand – Desirable Range | 350-480 | 50-70 |
| Max Hourly Demand – Limits | 276-552 | 40-80 |
| Max Hourly Demand – Desirable Range | 350-480 | 50-70 |
| Maximum Daily Demand + Fire Flow – Limits | 140 | 20 |

- The eastern parcel of the development site will need to be serviced from the 1W Pressure Zone
- If the demand of the Main Hospital Building and/or the Central Utility Plant are greater than 50m3/day, each building shall be serviced by 2 (two) service connections, separated by an isolation valve, to prevent the creation of a vulnerable service zone

### 3.1.3 Boundary Conditions

The New Civic Development occurs in the 1W pressure zone as defined by the City of Ottawa Water Distribution System Facilities & Feedermains Map.

Boundary conditions were provided by the City of Ottawa for the overall site development as part of the Phase 2 Parking Garage works. The Advanced Works watermain hydraulic design has been completed utilizing these available boundary conditions. However, please note that these boundary conditions are based on preliminary assumptions and estimations of domestic and fire flow, completed prior to the detailed design of the Central Utility Plant and the Main Hospital Building. These boundary conditions were then reconfirmed with the City of Ottawa in April 2025. See Appendix L for correspondence with the City regarding the boundary conditions.

The proposed watermain services scope associated with this Report connect into the Advanced Works mainline 300mm private watermain loop, and therefore the Advanced Works loop as well as the demands from the CUP and Parking Garage Contracts were included in the hydraulic modeling of the hospital services. It is not anticipated that there will be significant variation in the flow demands or the availably pressure in the existing main as the designs reach their final stages.

Boundary condition pressures are denoted in Table 3.1-2: Boundary Conditions Summary.

Table 3.1-2: Boundary Conditions Summary

| | Minimum HGL | | | Maximum HGL | | | Maximum Day + Fire Flow | | |
|---|---|---|---|---|---|---|---|---|---|
| | m | psi | KPa | m | psi | KPa | m | psi | KPa |
| 406mm Watermain on Carling (Parking Garage) | 107.1 | 60 | 414 | 114.6 | 71 | 487 | 107.8 | 61 | 421 |
| 406mm Watermain on Carling (Parking Garage and Hospital) | 107.1 | 60 | 414 | 114.6 | 71 | 487 | 107.6 | 71 | 419 |

Note that the existing watermain on Carling Avenue occurs at an existing grade elevation of approximately 64.84m, which was used for the psi and KPa calculations.

The provided boundary conditions note an available pressure range from approximately 60psi to 70psi, which is within the normal operating window conditions for public watermains within the City of Ottawa. The boundary conditions occupy the greatest constraint on the proposed private system.

## 3.2 Proposed Development Demands

### 3.2.1 Domestic Demands

Domestic Water Demand for the Main Hospital Building, the Central Utility Plant, as well as the future University of Ottawa Heart Institute have been determined in accordance with Section 4.2.8 of the City of Ottawa Water Distribution Guidelines and the latest Technical Bulletins. The demand type has been defined as the following values for the three load locations:

- Main Hospital Building: Commercial Industrial – Hospital = 900L/(bed/d)
  - A meeting was held with the City of Ottawa on December 15th, 2025, to discuss the water demands for the New Civic Development. It was discussed in the meeting that Water In (water demand) will be less than Water Out (sanitary demand) based on the latest City of Ottawa Water Design Guidelines issued December 8th, 2025, which has 900L/Bed/Day for water demand but 1400L/Bed/Day for sanitary demand.
- Future University of Ottawa Heart Institute: Industrial, Heavy = 55000L/gross ha/d
- Central Utility Plant: Industrial, Heavy = 55000L/gross ha/d

Table 3.2-1: Site Statistics

| Location | Bed Count | Gross Floor Area (ha) |
|---|---|---|
| Main Hospital Building Design Build-Out (1) | 689 | 11.68 |
| Main Hospital Building Ultimate Build-Out (1) | 1147 | 14.28 |
| Future University of Ottawa Heart Institute (2) | ~250 | 9.29 |

(1) Bed Count and Gross Floor areas received from Parkin on 2025-12-04. Final campus build-out ~1400 beds.
(2) GFA value received from TOH for the Future University Heart Institute during T17 UGM R8

Table 3.2-2 summarizes the proposed domestic demands in accordance with Section 4.2.8 of the City of Ottawa Water Distribution Guidelines using the above demand categorizations. Please refer to Appendix A for calculation details. It has been confirmed that 900 L/Bed/Day is the most up to date value to be used as per the December 2025 design release of the Ottawa Water Distribution Guidelines. As mentioned above this will make the calculated water demand flow less than the 1400 L/Bed/Day flow which is used for sanitary demand calculations.

The Future University of Ottawa Heart Institute does not classify outright as a Hospital as per the City of Ottawa Water Distribution Guidelines and therefore should not be classified by number of beds. Instead, the demand was calculated using the value for heavy industrial from the City of Ottawa Water Distribution Guidelines of 55,000 L/gross ha/day. This value was used as it is the best approximation for the usage category within the design guidelines that the Future University of Ottawa Heart Institute would fall under. Using the assumed future gross floor area received from TOH shown in Table 3.2-1, the demands were calculated and are summarized in Table 3.2-2 below.

Historical records from the existing The Ottawa Hospital – Civic Campus list a measured consumption at 2.0m3/m2/year, and an Amenity Space Flow of 5.0L/m2/d, as per the *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)* . These values were also used to provide an approximation of demands of the Future Heart Institute however it was determined that the calculation as per the City of Ottawa guidelines provided a more conservative estimate, refer to Appendix A for the calculations. These values have not been used to calculate the demands of the new Main Hospital Building either, as previous water usage for an existing hospital is not reflective of the new state-of-the-art facility. The more conservative flow rate direct from the City of Ottawa Water Distribution Guidelines for Hospitals will be used to ensure adequate pressure and requirement compliance.

Table 3.2-2: Proposed Domestic Demands

| Location | Average Daily Demand (L/s) | Maximum Daily Demand (L/s) | Max Hourly Demand (L/s) |
|---|---|---|---|
| Main Hospital Building Design Build-Out | 7.18 | 10.77 | 19.38 |
| Main Hospital Building Ultimate Build-Out | 11.95 | 17.92 | 32.26 |
| Central Utility Plant (1) | 15.19 | 22.78 | 41.00 |
| Future University of Ottawa Heart Institute | 5.91 | 8.87 | 15.97 |
| Parking Garage (2) | 1.14 | 1.70 | 3.07 |

(1) The Central Utility Plant calculations are provided in *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)*. CUP flows remain the same as provided in this report until newer information is available from that project.

(2) The Parking Garage calculations are provided in *Site Servicing and Stormwater Management Report, New Civic Development for The Ottawa Hospital Phase 2 Parking Garage Project, (Parsons, May 2023)*

### 3.2.2 Fire Flow Demands

The Fire Flow Demand, based on the Fire Underwriters Survey, is calculated as per Section 4.2.8 of the City of Ottawa Water Distribution Guidelines (December 2025), as well as the Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (2020). These parameters, including combustion type, sprinkler configurations, etc., have been assumed based on the provided documentation. When assumptions have been made regarding these parameters, WSP has deferred to the most conservative approach.

Please refer to Table 3.2-3 and to Appendix B for calculation details.

Table 3.2-3: Fire Flow Demands

| Location | Fire Flow Demand (L/min) | Fire Flow Demand (L/s) | Fire Flow Demand (US gpm) |
|---|---|---|---|
| Main Hospital Building | 15 000 | 250 | 3 963 |
| Pavilion | 12 000 | 200 | 3 170 |
| Central Utility Plant (1) | 13 000 | 217 | 3 439 |

(1) The Central Utility Plant calculations are provided in *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)*.

Therefore, the Max Day + Fire Flow demand can be calculated using Table 3.2-2 and Table 3.2-3. The results are tabulated in Table 3.2-4. It is worth noting that the Max Day + Fire Flow for the Main Hospital Building includes both the Max Day demand for the Main Hospital as well as the demands for the Future University of Heart Institute.

Table 3.2-4: Fire Flow Demand

| Location | Max Day + Fire Flow (L/s) |
|---|---|
| Main Hospital Building + UOHI | 276.79 |
| Central Utility Plant | 182.91 |

## 3.3 Proposed Design

### 3.3.1 Service Connection Locations

The City of Ottawa Watermain Distribution Guidelines require two service connections for any development or facility that has a demand greater than 50m3/day to not create a vulnerable service area. As such, both the Central Utility Plant and the Main Hospital Building require two or more service connections. Hydraulic analysis was undertaken by DPA to validate pressure modifications to ensure that modifications made through the design development of the Main Hospital Building do not negatively impact the Advanced Works watermain.

The Central Utility Plant will be serviced with three 200mm diameter PVC water service connections to the mainline Advanced Works 300mm watermain, located on Road E between the Central Utility Plant and the Main Hospital Building. The three service connections are separated by a valve, as per City of Ottawa Requirements. For more information on the Central Utility Plant watermain servicing, please refer to The Ottawa Hospital New Civic Development Central Utility Plant Site Servicing Plans (C303-1, C303-2).

The Main Hospital Building will also be serviced by two 300mm diameter PVC water service connections to the mainline Advanced Works 300mm watermain, located further north on Road E between the Central Utility Plant and the Main Hospital Building. The connection locations remain at the southwest corner of the new hospital building in coordination with the Mechanical consultant for this design submission.

There are also two service connections within the front entryway of the hospital, one 300mm and one 150mm service, connecting the E1 level of the emergency underground parking to the mainline 300mm Advanced Works watermain to the immediate north, crossing perpendicular to Road A. These service connections allow for the two hydrants placed within the parking garage structure, open to grade at the main entrance level, can be looped to ensure no service pressure drops. As such, the Mechanical consultant will service the hydrants within the building structure, back to the two service connections.

The Parking Garage is serviced by a single 150mm watermain service connection connected to the Advanced Works main underneath Road B.

Additional proposed hydrants and hydrant leads are located around the site, sourced from the Advanced Works main.

### 3.3.2 Hydrant Placement

There are a total of 17 proposed hydrants for Phase 3 of the New Civic Development, providing fire hydrant coverage across the site and including the areas of the Main Hospital Building, the Central Utility Plant, and the future University of Ottawa Heart Institute.

These are categorized by the following:

- 7 hydrants on sidewalks or adjacent to roadways: H-4, H-4A, H-6, H-10, H-11, H-12, H-20
- 3 hydrants within parking areas: H-7, H-9, H-15
- 2 hydrants adjacent to the CUP: H-3, H-14
- 1 hydrant in the Main Entryway: H-18
- 2 hydrants in the Loading Dock area: H-8, H-13,
- 2 hydrants in the Main Parking structure: H-16, H-17

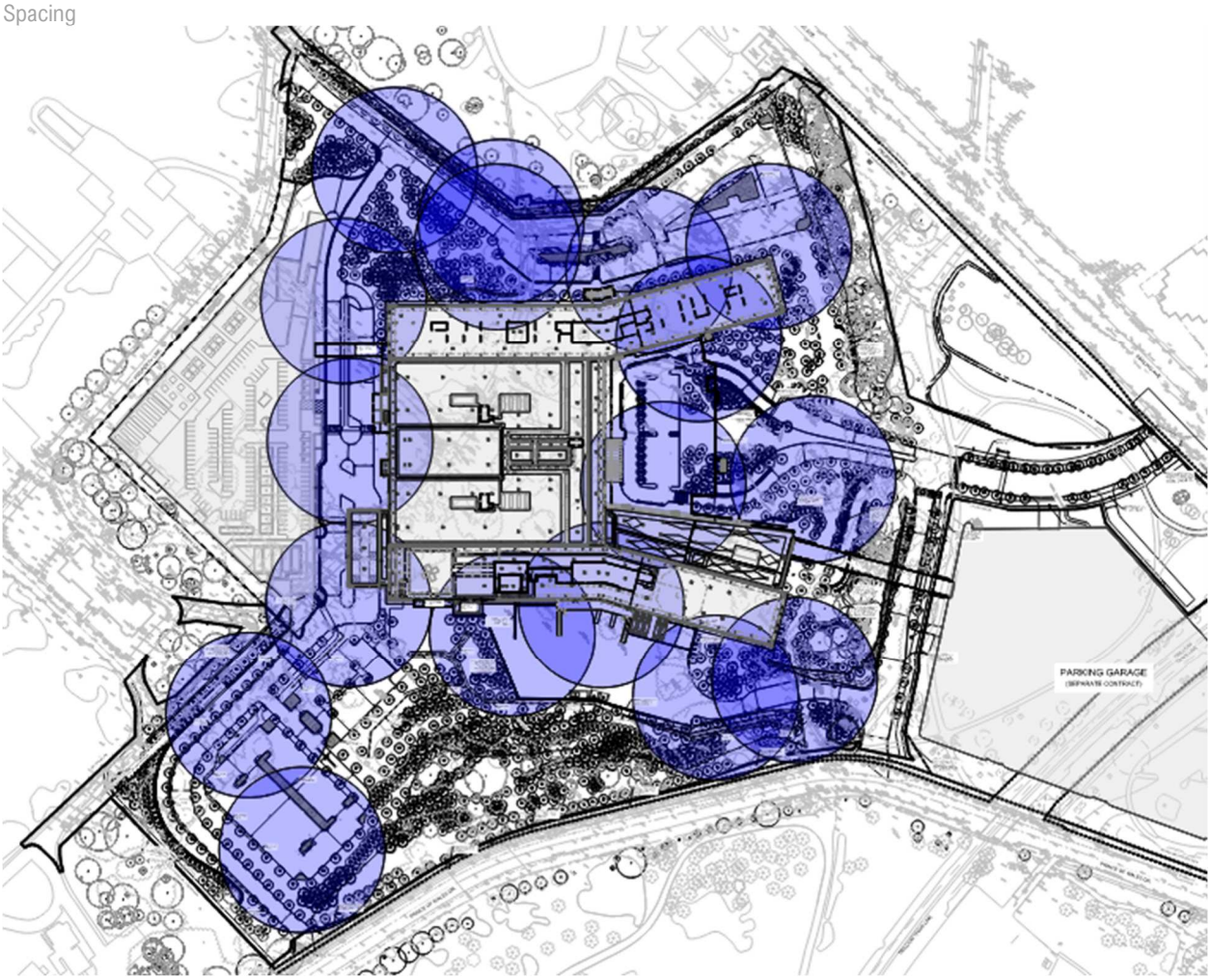
Table 3.3-1 denotes the contribution of each hydrant in terms of allowable capacity to the Central Utility Plan, Future Heart Institute, and Main Hospital Building.

Table 3.3-1: Fire Flow Contributions from Nearby Hydrants

| Location | Full Flow (95 L/s) | Partial Contribution (63 L/s) |
|---|---|---|
| Tower A | H-3, H-4, H-4A, H-6, H-7, H-14, H-15, H-16 | H-11, H-17, H-18 |
| Tower B | H-13, H-3, H-8, H-11, H-12, H-17, H-18, H-20 | H-10, H-14, H-16 |
| Podium | H-3, H-11, H-14, H-16, H-17 | H-6, H-10, H-18 |
| Entry | H-16, H-17, H-18 | H-7, H-12, H-20 |
| Central Utility Plant | H-3, H-11, H-14 | H-13, H-4, H-6, H-10 |
| Future University of Ottawa Heart Institute | H-13, H-9, H-10, H-11 | H-3, H-8 |
| Pavilion | H-16, H-17, H-18 | H-7, H-12, H-20 |

Table 4.9 – Fire Hydrant Spacing Guidelines from the City of Ottawa Watermain Distribution Guidelines denotes that hydrant spacing along roadways should not exceed 90m for classifications of institutional, commercial, industrial apartments and high-density areas, for which the hospital would be applicable. Figure 3.3-1 denotes the proposed hydrant spacing of the development, including existing hydrants, with circles of 45m radius to represent 90m intervals.

Figure 3.3-1: Proposed Hydrant Spacing



### 3.3.3 Fire Routes

The Project Specific Output Requirements dictate that Project Co. shall construct emergency access for fire trucks on-site as follows:

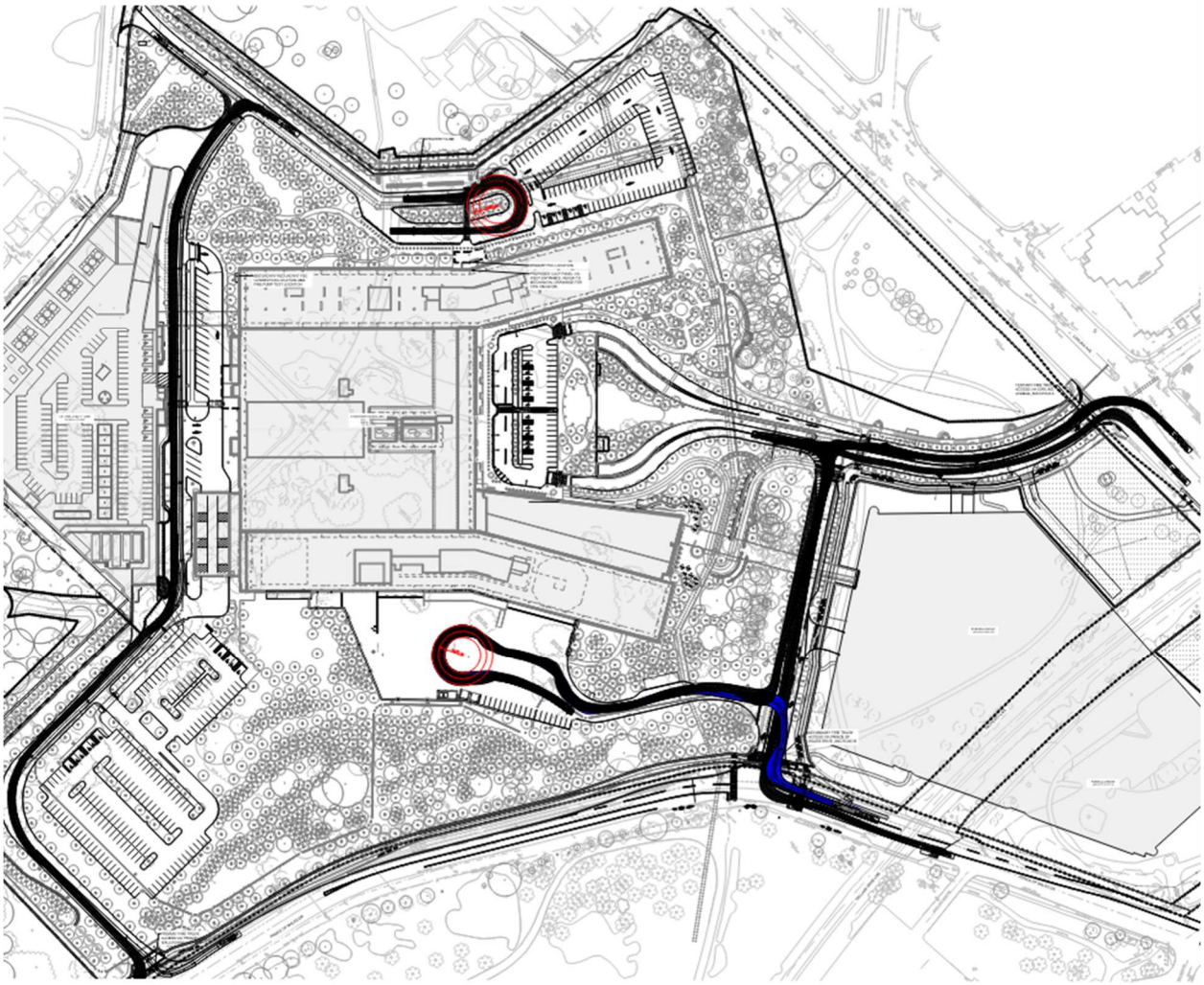
- The fire truck route shall provide primary fire access from Maple Drive and Prince of Wales Drive, via Roads D and E, to the CACF fire panel at the Facility's West Entrance on Level E1.
- The secondary fire access route shall be to the Facility's loading docks via new Roads B and L.
- The tertiary fire truck route to the north side of the Facility's pavilion shall be via Road A.

Article 3.2.5.16 of the Ontario Building Code notes that a fire department connection shall be located so that the distance from the connection to a hydrant is not more than 45m and is unobstructed. In addition, Article 3.2.5.5. of the Ontario Building Code notes that Access routes required by Article 3.2.5.4. shall be located so that the principal entrance and every access opening is required by Articles 3.2.5.1. and 3.2.5.2. are located not less than 3 m and not more than 15 m from the closest portion of the access route required for fire department use, measured horizontally from the face of the building. For a building provided with a fire department connection, a fire department pumper vehicle can be located adjacent to the hydrants. For a building not provided with a fire department connection, a fire department pumper vehicle can be located so that the length of the access route from a hydrant to the vehicle plus the unobstructed path of travel for the firefighter from the vehicle to the building is not more than 90 m, and the unobstructed path of travel for the firefighter from the vehicle to the building is not more than 45 m.

As such, the main fire department connection is on the west side of Tower A, requiring a hydrant within 45m, this requirement is satisfied by H-15. This corresponds to the primary fire truck access route. For the secondary and tertiary fire truck access routes, there are no additional fire department connections and therefore a fire department pumper vehicle must be able to access a hydrant within 45m of parked location and have access to the building face not outside of 45m. Figure 3.3-2 denotes fire routes with the applicable turning movements by the fire truck design vehicle.

The project team and Ottawa Fire Services (OFS) conducted multiple meetings between 65DD and 95DD to confirm the acceptability of the proposed fire routes. OFS requested that a 12m turning radius circle with 6m clear width be provided in design and shown on the drawings. Use of the drop off spots with appropriate signage and a drop curb to the west of the primary access was deemed to be an acceptable solution by OFS and is being provided for 95DD. This was documented in the Building Code Services Meeting 12 Minutes for the meeting held August 12, 2025. See 95DD drawings T3-301 for more details and Figure 3.3-2 below for a schematic representation of the fire routes. Please refer to the Traffic Impact Assessment Report for additional information.

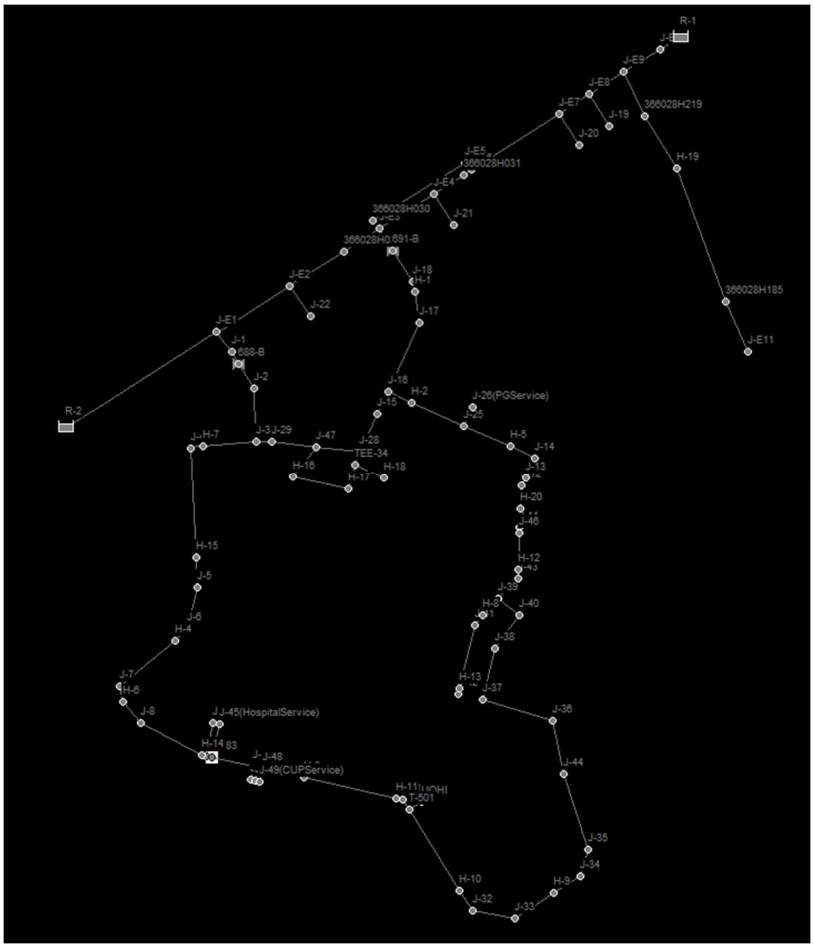
Figure 3.3-2: Fire Access Routes and Hydrants



### 3.3.4 Hydraulic Model and Outputs

Using a hydraulic model of the watermain, the domestic distribution demands and the fire flow demands have been analyzed using the provided boundary conditions from the City of Ottawa to evaluate hydraulic performance under various demand scenarios. Please refer to Appendix C for the complete hydraulic analysis for the proposed water pipe network ensuring compliance with Ottawa Water Distribution Design Guidelines section 4.4.2, along with a summary of the results and a figure identifying EPANET nodes. A schematic representation of the model is shown in Figure 3.3-3.

Figure 3.3-3: Watermain Distribution Model




There are three cases evaluated to determine compliance with City of Ottawa watermain distribution guidelines.

1. Maximum Day + Fire Flow: Checks the maximum daily distribution demand, plus the fire flow demand from hydrants, with the minimum HGL provided by the City during MD+FF demands. This is a check for low pressure in the system.
    a. Multiple scenarios in this demand are checked, assuming different fire flow contribution from different hydrants around the site.
2. Maximum Hour: Checks the maximum hourly demand from the site with the lowest available HGL from the City. This is a check for low pressure in the system.
3. Basic Day: Checks the lowest daily demand from the site with the highest available HGL from the City. This is a check for high pressure in the system.

The purpose of the first two evaluation cases is to determine if high or low pressure is found in the proposed watermain service connections, given the available boundary conditions that define the available pressure in the Advanced Works 300mm watermain. The cases that achieved pressures closest to the minimum and maximum limits are shown in Table 3.3-2. This is a simplification of the tables in Appendix D which shows the pressure at each node in each case for a more complete understanding of the pressure in the network. For the purposes of the modelling the Ultimate Build-Out demands were used solely as we wanted to ensure the system had adequate capacity for the final design build of the Hospital.

For the overall site hydraulic model, the Parking Garage demands are sourced from the *Site Servicing and Stormwater Management Report, New Civic Development The Ottawa Hospital Phase 2: Parking Garage Project (Parsons, May 2023).*

Table 3.3-2: EPANET Results Summary

| Scenario | Sub-Scenario | Service - Main Hospital 1 | Service - Main Hospital 2 | Service - CUP 1 | Service - CUP 2 | Service - CUP 3 | Service - UOHI | System Low |
|---|---|---|---|---|---|---|---|---|
| Case 1 - Max Day + Fire Flow | Fire @ CUP | 35.79 | 35.76 | 40.01 | 40.14 | 40.28 | 38.10 | 32.68 |
| | Fire @ Front Entryway | 39.64 | 39.66 | 44.34 | 44.51 | 44.68 | 42.69 | 31.86 |
| | Fire @ Pavilion | 47.74 | 47.74 | 44.61 | 44.78 | 44.95 | 44.49 | 29.03 |
| | Fire @ Podium | 39.19 | 39.17 | 36.03 | 36.18 | 36.35 | 36.64 | 27.05 |
| | Fire @ Tower A | 41.88 | 41.89 | 38.83 | 39.02 | 39.20 | 39.36 | 29.03 |
| | Fire @ Tower B | 44.88 | 44.83 | 41.63 | 41.79 | 41.96 | 41.28 | 28.41 |
| | Fire @ UOHI | 39.36 | 39.24 | 35.77 | 35.89 | 36.00 | 35.05 | 24.33 |
| Case 2 - Peak Hour | | 41.26 | 41.26 | 45.92 | 46.09 | 46.26 | 44.19 | 37.25(1) |
| Case 3 - Basic Day | | 53.32 | 53.33 | 58.01 | 58.18 | 58.35 | 56.35 | 48.93 |

(1) The pressure falls below 40psi (minimum City of Ottawa requirement) due to site constraints. All building services and hydrants still achieve minimum pressures as per City of Ottawa guidelines. Please refer to *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)* Table 12-5, notes 1 through 6, for commentary on the pressure results.

Please refer to Appendix D for full summary of the pressures. Please refer to Attachment 1.1-1 Watermain Model.

### 3.3.5 Reliability Analysis

The proposed watermain installation consists of PVC SDR-35 pressure rated piping, which will connect to the existing 400mm unlined cast iron watermain on Carling Avenue which was installed in 1913. The existing cast iron pipe has exceeded its typical service life of 75-100 years and is likely subject to internal corrosion, tuberculation and reduced hydraulic capacity. Historical data for similar infrastructure in Ottawa suggests a higher risk of structural failure and water quality degradation due to iron leaching.

The proposed PVC SDR-35 pipe complies with CSA B182.2 and ASTM D3034 standards, offering high resistance to corrosion, chemical damage and biological growth. It is expected to provide a service life of 50-100 years under standard operating conditions. The pipe's flexibility and impact resistance make it suitable for Ottawa's freeze-thaw cycles and various soil conditions which may be present on site. The connection between PVC and cast iron should be achieved using the appropriate restraints and dielectric barriers to mitigate galvanic corrosion as a part of works completed by others (advance works). The interface should also be monitored for differential movement and joint integrity. Environmental factors such as soil type, groundwater levels and traffic loads have been considered in the design. The pipe's stiffness rating ensures adequate resistance to deformation under the burial conditions.

To further assess the reliability of the proposed network, a break analysis was conducted to simulate potential failure scenarios within the watermain system. This analysis models pipe breaks at critical locations to evaluate how the network performs under these conditions. The break locations are illustrated in Figure 3.3-4, which maps the break locations, and the results are summarized in Table 3.3-3, which presents the pressure readings at the building connection under these

simulated break conditions. These outputs help identify vulnerable areas and can help inform mitigation strategies such as valve placement and redundancy. Three breaks were analyzed on Carling Ave, and five break locations were analyzed within the site.

Overall, the proposed internal site infrastructure demonstrates high reliability, with significantly lower failure risk compared to the aging cast iron mainline. Mitigation measures, including robust jointing and corrosion protection will ensure long term performance and service continuity.

Figure 3.3-4: Watermain Break Analysis Locations

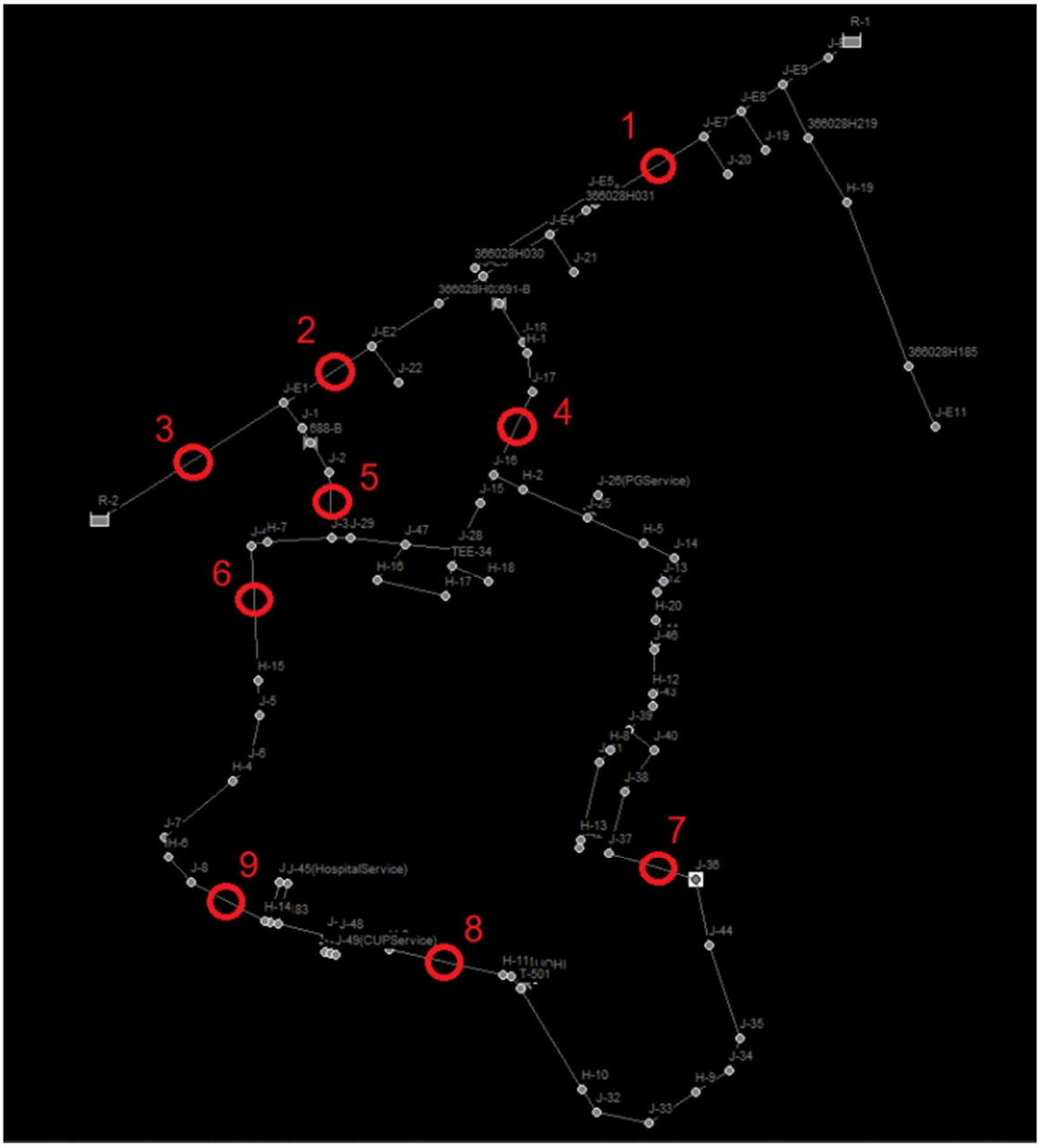


Table 3.3-3: EPANET Results at Break Locations

| Scenario | Break Location | Service - Main Hospital 1 | Service - Main Hospital 2 | Service - CUP 1 | Service - CUP 2 | Service - CUP 3 | Service - UOHI | Service - PG |
|---|---|---|---|---|---|---|---|---|
| Case 3 - Basic Day (Break Analysis) | BREAK LOCATION 1 | 53.44 | 53.46 | 58.14 | 58.31 | 58.48 | 56.52 | 62.51 |
| | BREAK LOCATION 2 | 53.44 | 53.46 | 58.14 | 58.31 | 58.48 | 56.50 | 62.51 |
| | BREAK LOCATION 3 | 53.37 | 53.37 | 58.05 | 58.22 | 58.39 | 56.43 | 62.42 |
| | BREAK LOCATION 4 | 53.37 | 53.39 | 58.07 | 58.24 | 58.41 | 56.43 | 62.42 |
| | BREAK LOCATION 5 | 53.30 | 53.32 | 58.00 | 58.17 | 58.34 | 56.37 | 62.38 |
| | BREAK LOCATION 6 | 52.95 | 52.96 | 57.64 | 57.81 | 57.98 | 56.08 | 62.46 |
| | BREAK LOCATION 7 | 53.30 | 53.30 | 57.98 | 58.15 | 58.32 | 56.33 | 62.54 |
| | BREAK LOCATION 8 | 53.32 | 53.32 | 58.00 | 58.17 | 58.34 | 56.62 | 62.54 |
| | BREAK LOCATION 9 | 52.95 | 52.96 | 57.64 | 57.81 | 57.98 | 56.08 | 62.46 |

In summary, the internal site infrastructure provides a reliable network to support the planned and future buildings on site. The biggest risk to the system is the Carling watermain which has exceeded the intended service life of ductile iron. The network is only connected to the Carling watermain and as such a replacement or shutdown of that watermain will need to be coordinated to ensure that flows are maintained to the internal site infrastructure.

# 4.0 SANITARY SERVICE DESIGN

## 4.1 Design Overview

### 4.1.1 Background and Site Constraints

The New Civic development campus (Main Build, CUP and Future Buildings) will be serviced by a 300mm and 375mm mainline Sanitary Sewer that runs parallel to the Advanced Works mainline watermain, running in a loop through the site around the main hospital building. The proposed Advanced Works sanitary sewer will connect into the Mooney's Bay Collector at the proposed Road B and Road L intersection.

The Mooney's Bay Collector is an existing public 1050mm concrete sanitary sewer that runs through the western parcel of the site via an existing easement before eventually outletting into the West Nepean Collector. The *Master Servicing Plan – New Civic Development for The Ottawa Hospital (Parsons, July 2021)* notes that the existing Mooney's Bay Collector has no available capacity and is sufficiently surcharged during large rainfall events, with significant risk of flooding in the vicinity of the sewer during such events. At the time of the master servicing study it was anticipated that the peak sanitary demand for the main hospital building would be 34.24 L/s.

The approved Parsons advanced works site servicing report stated an estimated peak flow of 63.07 L/s from the full campus ultimate build-out, with a note to ask the city how much capacity there was in the Mooney's Bay Collector sewer, which the advanced works sewer connects into.

As per the meeting held on December 15th, 2025, with the City of Ottawa it was confirmed through preliminary review that the Mooney's Bay Collector may be able to take up to 140 L/s. This will be confirmed in the City modelling once finalized flows are received and reviewed.

As a part of the approved Advanced Works Scope of this project the three furthest downstream pipes at the time of this report are designed as 375mm with slopes of 0.32%, 1.00% and 1.00% respectively. At 0.32%, the 375mm pipe between AW MHSA 11 and AW MHSA 10 will limit the outgoing flow by gravity at 103 L/s. As-Builts from the installation of these pipes will be confirmed once provided to validate the installed slopes and resulting capacity of the pipes.

Furthermore, as per recommendations and findings from the site geotechnical report, as well as previous findings in the *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital (Parsons, October 2024)* report by Parsons, the project development site is subject to particularly high groundwater levels. High groundwater levels can influence extraneous flows into sanitary sewers, and additional considerations and allowances have been made to the DPA design of the sanitary services to account for this.

The Advanced Works Mainline sanitary sewer has input flows from two existing external sewer systems. The first occurs at MHSA 36, connecting the existing Central Experimental Farm outlet with a new proposed manhole and a run of 250mm sanitary sewer that flows west before connecting into the new proposed 300mm mainline sanitary sewer that is part of Advanced Works at MHSA 32. The second connection occurs at MHSA 40, further to the north-west where a relocated sanitary sewer intersects the proposed Advanced Works stormwater management tanks to connect into the Advanced Works mainline 300mm Sanitary Sewer at MHSA 27. Sanitary flows for both connections have been accounted for, sourced from the Central Experimental Farm Ottawa, Ontario Master Servicing Plan Volume 2: Sanitary and Storm Systems (2008).

### 4.1.2 Advanced Works Scope Delineation

The design and parameters of the 300mm/375mm sanitary sewer mainline are contained within the design scope of Advanced Works. Please refer to *Site Servicing and Stormwater Management Report – New Campus Development for The*

*Ottawa Hospital (Parsons, October 2024)* for information regarding that design and the design of any of the relocated sanitary sewers, public and private, that are required to facilitate Phases 3 and 4 of the New Civic Development works.
The proposed sanitary service connections for the main hospital building, the central utility plant, and the future University of Ottawa Heart Institute are contained within the scope of this report. The design parameters of the Advanced Works Sanitary sewer that are available at the time of this report, including size, slope, location, invert, and material, will be utilized to generate sanitary sewer design sheets and will be treated as design constraint.

The internal building delineation, as well as approximations of buildings flows, that are provided in the *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)* report will be updated to suit current Phase 3 and 4 design considerations internal and external to the building. The previous report classifies the flow from the main entryway and underground parking area at level E1 to be negligible; however, this flow has been included in the updated drainage area delineation. Flows from the fixtures within the building including the sanitary sump flows have been provided by the Mechanical Consultant.

The sanitary sewer design sheets also take into consideration the flow from the Parking Garage, as well as the Central Utility Plant. Please see Appendix E for Sanitary Flow calculations and Appendix F for the Sanitary Sewer Design Sheets.

## 4.2 Sanitary Flows

At the conceptual design stage of the Main Hospital Building, the projected sanitary flows were estimated according to Section 4.4.1 of the City of Ottawa Sewer Design Guidelines – September 2025, and the latest Technical Bulletins. And were therefore classified as Institutional to determine the correct peaking factor and subsequent peak design flows.

The City of Ottawa Sewer Design Guidelines indicate that the sanitary flow can be calculated by four different methods:

1. Gross floor area of the building multiplied by the usage of the building.
2. Bed counts can be used specifically for Hospitals.
3. Existing flows from similar buildings that can be used to approximate the flow.
4. The fourth and final option, completed by the mechanical team is to use the methodology in the Ontario Building Code which utilizes the fixture flows in order to determine the flow rate at each service connection, based on the fixtures attached to each service.

Given the size, complexity and duration of this project it is reasonable to expect that the calculated flows will vary over time based on the selected methodology used and design development over time.

In Section 4.4.1.2 of the City of Ottawa Sewer Design Guidelines, it is noted that the sewage flows from commercial and institutional establishments vary greatly with the conditions of the site, and that for individual institutional uses, the sewage flow rates commonly used for design at the site plan level can be found in Appendix 4-A. As such, the design flows for the sanitary sewer have been calculated using the provided demand for Hospitals – Including Laundry, at 1400L/day per bed. Predetermined inlet flows for the Central Utility Plant were sourced from the *Site Servicing and Stormwater Management Report, New Campus Development for The Ottawa Hospital, Parsons (October 2024)* report. Inlet flows for the future University of Ottawa Heart Institute have been estimated according to Section 4.4.1 of the City of Ottawa Sewer Design Guidelines and can be found in Appendix F. 1400 L/Bed/Day was used for the sanitary demands for the hospital whereas 900 L/Bed/Day is used for the water demands as previously discussed in this report.

The total number of hospital beds for the main building (689 for the design build-out and 1147 for the ultimate build-out) has been broken down by the governing sanitary service connection based on the connection's location within the hospital.

Additional peaking factors and infiltration flows have been added in accordance with the City of Ottawa Sewer Design Guidelines. The full sanitary sewer design sheet per MOE guidelines can be found in Appendix F.

The flows as calculated by mechanical using the Ontario Building Code were provided based on the delineation within the building. A breakdown of how these were calculated provided by the mechanical designer is included in Appendix P of this report. In most cases the flows from the Ontario Building Code provided a more conservative approach, so at each connection it was ensured that the service connection could account for the largest peak flow expected by either the City Guidelines or the Building Code. It was found in most cases that the flows generated by the Ontario Building Code for the fixtures on top of the peak flows expected from the sanitary sumps within the building resulted in higher flows and therefore the design for 65DD was adjusted with this in mind. Through coordination with mechanical and through review of the sanitary design sheet it was ensured that all of the upstream legs of the service connections have sufficient capacity to handle the maximum flows as calculated by the OBC as well as the other methods as described above. Review of overall flows and site conditions remain ongoing through conversations with the City initiated December 15th, 2025.

Allocations for infiltration by gross hectare have been included in the sanitary sewer design sheet, direct from the *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)* report. Additional external flows from off-site were sourced from the relevant report and have also been included and noted.

In coordination with the Mechanical consultant, the sanitary delineation zones can be seen in Figure 4.2-1. Each of the delineation zones corresponds to a single service connection.

Table 4.2-1: Site Statistics – Main Hospital Building

| Location | Bed Count | Gross Floor Area (ha) |
|---|---|---|
| Main Hospital Building Design Build-Out (1) | 689 | 11.68 |
| Main Hospital Building Ultimate Build-Out (1) | 1147 | 14.28 |
| Future University of Ottawa Heart Institute (2) | ~250 | 9.29 |

(1) Bed Count and Gross Floor areas received from Parkin on 2025-12-04. Final campus build-out ~1400 beds.
(2) GFA value received from TOH for the Future University Heart Institute during T17 UGM R8

Figure 4.2-1: Sanitary Delineation Zones

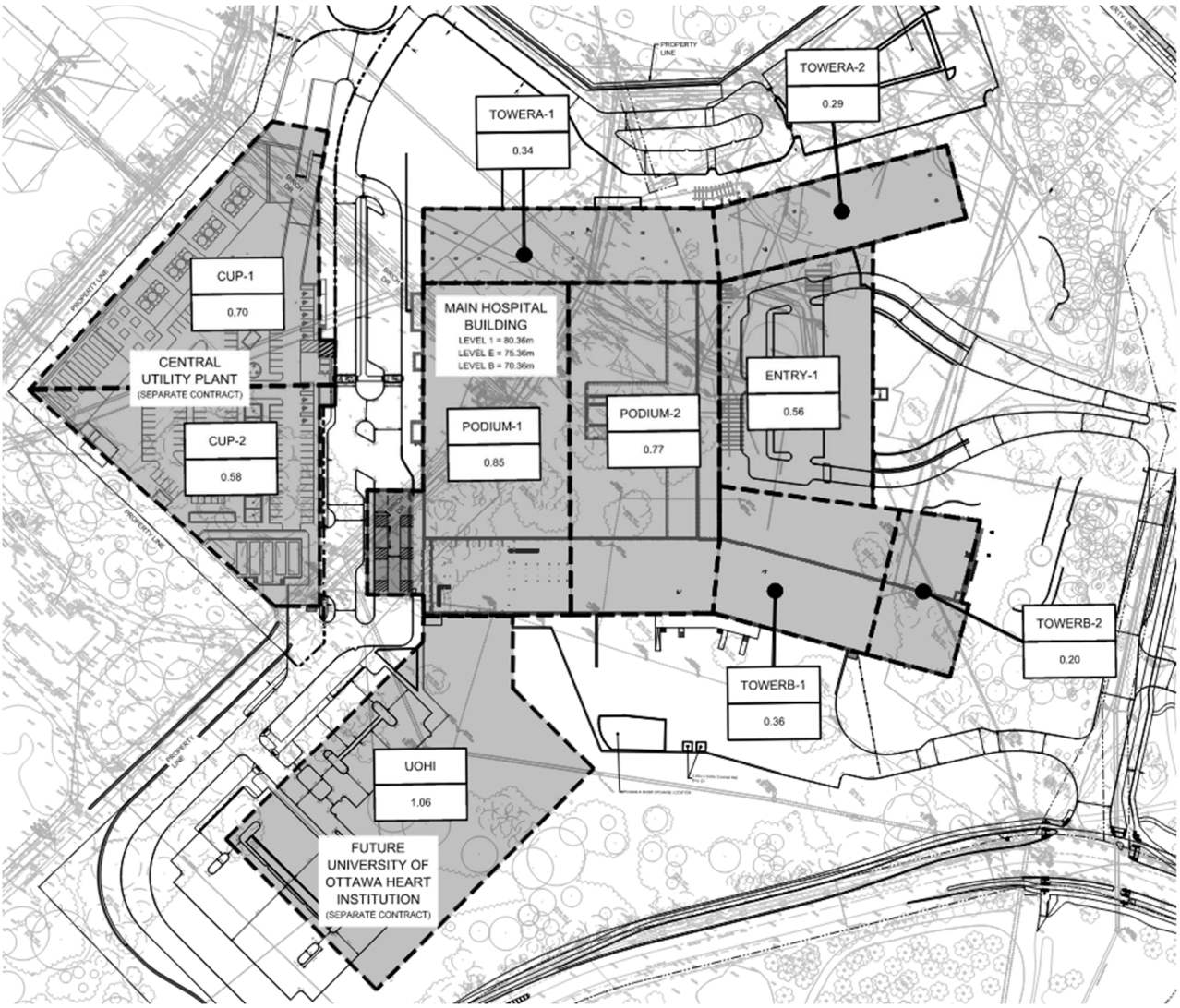



Table 4.2-2 summarizes the proposed sanitary sewer flows in accordance with Section 4.4.1 of the City of Ottawa Sewer Design Guidelines – 2012. The Central Utility Plant will have two proposed sanitary service connections as per the Central Utility Plant design drawings available at the time of print, and the future University of Ottawa Heart Institute will have a single proposed service connection, made as provision for future works. The flows for these three service connections are denoted in Table 4.2-2, with full calculations available in Appendix E. The flows below are broken down into four sections, the Average Daily Flow is the flow leaving each service connection, the Peak Daily Flow shows those same flows but with the relevant peaking factor applied, the next column breaks down the Peak Extraneous Flow for each service connection resulting from infiltration and inflow. Lastly, the Total Peak Design Flow denotes the total accumulated flow including the estimated extraneous flow at the end of each service leg.

Table 4.2-2: Sanitary Design Flows - Main Hospital Building

| Sanitary Delineation Zone ID | Average Daily Flow (L/s) | Peak Daily Flow (L/s) | Peak Extraneous Flow (L/s) | Total Peak Design Flow (L/s) |
|---|---|---|---|---|
| TOWER A-1 | 4.59 | 6.88 | 0.11 | 6.99 |
| TOWER A-2 | 4.13 | 6.20 | 0.10 | 6.29 |
| UOHI | 3.01 | 4.52 | 0.35 | 4.87 |
| MAIN ENTRY | 0.18 | 0.27 | 0.18 | 0.46 |
| CUP-1 | - | 7.25 | 0.23 | 7.48 |
| CUP-2 | - | 7.25 | 0.19 | 7.44 |
| TOWER B-1 | 5.14 | 7.70 | 0.12 | 7.82 |
| TOWER B-2 | 3.42 | 5.13 | 0.07 | 5.19 |
| PODIUM-1 | 0.73 | 1.10 | 0.28 | 1.38 |
| PODIUM-2 | 0.81 | 1.22 | 0.25 | 1.47 |

Therefore, based on comparing the total flow from the system including infiltration and inflow the resulting flow is estimated to be 51.35 L/s at the outlet of the advanced works sewer.

## 4.3 Proposed Design

### 4.3.1 Service Connection Locations

The proposed sanitary delineation zones, as per constraints and allowable sanitary drainage within the Main Hospital Building, define the locations of the proposed service connections. Each delineation zone has a one service connection, resulting in 10 total sanitary services. The service connection locations can be summarized as follows:

Tower A

- Two connections, West face of the building (250mm, 300mm)

Tower B (Loading Dock)

- Three connections, East face of the building (300mm, 300mm, 300mm)
- One connection, North face of the building (250mm)

Main Entryway (Emergency Access)

- One connection, North face of the building (200mm)

Central Utility Plant

- Two connections, North face of the CUP, off the South face of the hospital (200mm, 200mm)

Future University of Ottawa Heart Institute

- One connection, South face of the Future University of Ottawa Heart Institute (150m)

Most of the podium area and pavilion drain to the east towards the Loading Dock Tower B connections. This is because of constraints in the interior of the building driven by raft slab elevations. The sanitary service connections in the Loading Dock are the lowest on the site. The sanitary service connections on the east side of the main hospital building are connected by a 300mm and 375mm sanitary sewer that runs to the north before connecting into the Advanced Works mainline sanitary sewer at MHSA11.

The flows captured within the underground parking garage structure at level E1 will be directed towards the sanitary connection provided at the main entryway, while the flows captured above it from the drains in the at-grade parking structure will be directed towards the storm service connections provided at the main entryway.

Full sanitary design sheets are available in Appendix F. There are no proposed sanitary pumping stations or forcemains present in the exterior of the building.

# 5.0 STORMWATER DESIGN

## 5.1 Design Overview

To align with the formatting of the other Site Servicing and Stormwater Management Reports prepared by Parsons for the other relevant projects that comprise the New Civic Development, at the 95% Detailed Design the stormwater management design had been incorporated into this report. This portion therefore covers the storm service connections and their interface with the overall stormwater management design principles of water quantity control, water quality control, and water balance criteria.

### 5.1.1 Background and Site Constraints

Phase 4 of the New Civic Development will be serviced by an oversized 1200 mm and 1500 mm concrete storm sewer that is part of the Advanced Works. This storm sewer will run in a similar orientation to the Advanced Works sanitary and watermain utilities, in a large loop around the main hospital building. The central utility plant and future University of Ottawa Heart Institute will connect into this mainline storm sewer, as will all road and parking drainage in the 17-ha site. The Advanced Works mainline storm sewer connects into an existing 1200 mm concrete storm sewer at the north-western corner of the development, underneath Prince of Wales Drives, where the water runs through federally owned (Public Service and Procurement Canada) storm sewer before its eventual outlet at Dow's Lake.

The Eastern portion of the development site is located within the most upstream point of the Nepean Bay Trunk drainage area. Runoff on the existing site is collected through sewers to Carling Avenue, which discharge into the public Champagne Avenue stormwater sewer. This sewer eventually outlets to the Nepean Bay Trunk, with an end terminal outlet point at the Ottawa River. In addition, there are numerous existing privately-owned sewers on the New Civic Development site that are being relocated as part of the Advanced Works package. For further storm servicing details, please review *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024).*

The *Master Servicing Plan – New Civic Development for The Ottawa Hospital (Parsons, July 2021)* notes that the existing Nepean Bay Trunk sewer is reported to be operating under extreme surcharge during large rainfall events, due to uncontrolled flow in the tributary area as well as significant accumulation of sediment throughout the sewer. However, all of the proposed design encompassed under the scope of this report outlets to the Dow's Lake outfall and not the existing Nepean Bay Trunk sewer, which is under the scope of the Advanced Works and any associated approvals.

The proposed storm service connections are significantly constrained by the previous Approvals achieved by the Advanced Works design. The proposed storm services must outlet water into the mainline Advanced Works storm sewer at the same release rates that were set in the previous approvals, defined by Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital (Parsons, November 2023) and the associated drawings.

### 5.1.2 Advanced Works Delineation

The design and parameters of the 1200 mm/1500 mm storm sewer mainline are contained within the design scope of Advanced Works. Please refer to *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (Parsons, October 2024)* for further detail of the aforementioned design, and the design of any of the relocated storm sewers, public and private, that are required to facilitate Phase 3 of the New Civic Development works.

Also included in Advanced Works are the three (3) stormwater management detention tanks located at the south parking lot, the north parking lot, and the south-western corner of the site, respectively. These items are currently (August, 2025)

indicated as Provisional Advanced Works Items and are not covered in the scope of this report. Please refer to the Parson's reporting for further details of the Advanced Works.

The proposed storm service connections for the main hospital building, the central utility plant, and the future University of Ottawa Heart Institute, the associated proposed stormwater management tanks on the service connections from the main hospital building, as well as a length of storm sewer within the loading dock area of the main hospital building, are contained within the scope of this deport. The design parameters of the Advanced Works storm sewer that are available at the time of print, including size, slope, location, invert, and material, will be utilized to generate storm sewer design sheets and may be revised under subsequent submissions of this report.

The at-grade drainage, including overland drainage swales, ditches, and ditch inlets are within the scope of this report.

### 5.1.3 Study Objectives

This stormwater management analysis examines the potential impacts on the water balance, water quality and water quantity control due to the proposed development and summarizes how each impact will be minimized in accordance with the current governing guidelines and regulations related to stormwater management.

### 5.1.4 Study Limitations

This report is provided at the 95% Design Development stage and thus is subject to updates stemming from the Ottawa Hospital review, any future updated data, and design revisions.

### 5.1.5 Reference to Higher Level Studies and Reports

The current report and study were prepared based on the following reports, drawings and data:

1. Advanced works drawing package dated 2024-09-17, by HDR and Parsons.
2. Site Servicing and Stormwater Management Report- New Campus Development for The Ottawa Hospital - Phase 3: Central Utility Plant Project -Phase 4: Main Hospital Project -Ottawa, Ontario –October 2024 (Issued for FLUDA Approval), Parsons.
3. Hydrogeological Report in Support of a Category 3 Permit to Take Water-The Ottawa Hospital Proposed Civic Campus Redevelopment Project-Ottawa, Ontario – July 2024, Paterson Group
4. Groundwater Contour Plan – Post Construction Conditions – Dwg. No.PG6982-3 – September 2025, Paterson Group
5. Preliminary Groundwater Inflow Estimate – Revision 1- Ottawa Hospital, February 2023, WSP
6. New Ottawa Civic Hospital – Climate Risk Assessment November 25, 2022, Stantec

## 5.2 Stormwater Management – Criteria

The development site is located in the City of Ottawa within the Federal Land regions. The stormwater runoff generated from the site discharges into Dow's Lake which is governed by the National Capital Commission stormwater regulations. As such, this report will follow the most stringent criteria as established by:

- National Capital Commission Stormwater Management Manual,
- City of Ottawa's Sewer Design Guideline,
- Ministry of Environment Conservation and Parks- Stormwater Management and Planning and Design, and
- Leadership in Energy and Environmental Design (LEED) Version v4.1- Rainwater Management- Sustainable Sites, by U.S. Green Building Council.

### 5.2.1 Water Quantity Control

According to the City of Ottawa Sewer Design Guideline, stormwater runoff to Dow's Lake in excess of the 5-year storm up to and including the 100-year storm event, must be detained on site. The 3-hour Chicago storm using the IDF parameters from the City of Ottawa Sewer Design Guidelines was used in the analysis. A 24-hour SCS storm was included as a sensitivity analysis to ensure that the proposed facilities can convey these larger storm events. Additionally, the 100-year design storms increased by 20% was included as a sensitivity analysis.

### 5.2.2 Water Balance-LEED

The LEED Version v4.1- Rainwater Management - Sustainable Sites requires a site to 'retain stormwater on-site with a likelihood of 90$^{th}$ Percentile occurrence', to obtain the maximum 3 points assigned to the sustainable sites. For developments located within the City of Ottawa, retaining the 90$^{th}$ percentile rainfall will require the retention of up to a maximum 22 mm rainfall depth, following LEED rainfall analysis guidelines.

### 5.2.3 Water Balance-

A post-to pre-development water balance analysis was completed to ensure that runoff from the site will not increase under the post-development condition.

### 5.2.4 Water Quality Control

The National Capital Commission Stormwater Management Manual requires the proponent to minimize or improve surface water and groundwater quality, to minimize sediment loading to surface water and groundwater, to maintain or enhance the quality of drinking water sources, and to maintain or enhance existing thermal watercourse regimes.

### 5.2.5 Design Storm

Table 5.2-1 presents the rainfall intensity (mm/hr) calculated from IDF parameters from the City of Ottawa's Sewer Design Guideline.

Rainfall Intensity, i (mm/hr) = A*(Tc+B)^D  Equation (1)

Where, Tc: Time of concentration; and A, B and D are IDF curve coefficients.

Table 5.2-1: Rainfall Intensity (mm/hr) Calculated from the IDF Curve

| | Return Period (Years) | | |
|---|---|---|---|
| | 2 | 5 | 100 |
| IDF Curve Coefficients | | | |
| A | 732.951 | 998.071 | 1735.688 |
| B | 6.199 | 6.053 | 6.014 |
| D | -0.810 | -0.814 | -0.820 |
| Rainfall Duration | Rainfall Intensity (mm/hr) | | |
| 10 min | 76.8 | 104.2 | 178.6 |
| 15 min | 61.8 | 83.6 | 142.9 |
| 30 min | 40.0 | 53.9 | 91.9 |
| 1 hr | 24.6 | 32.9 | 55.9 |
| 2 hr | 14.6 | 19.5 | 32.9 |
| 6 hr | 6.1 | 8.2 | 13.7 |
| 12 hr | 3.5 | 4.7 | 7.8 |
| 24 hr | 2.0 | 2.7 | 4.4 |

In addition to the 2-year to 100-year events, a 100-year event increased by 20% is included in the analysis. This 100-year + 20% is included as a sensitivity analysis to determine how the system may function under future conditions or extreme events. This sensitivity analysis is equivalent to projected precipitation for the 2080s, as per the New Ottawa Civic Hospital – Climate Risk Assessment.

### 5.2.6 Runoff Coefficient

The Rational Method computes peak discharges using established runoff coefficients (C) based on various land-use surfaces. The runoff coefficient for a 100-year storm event is increased by 25% in accordance with the City of Ottawa Sewer Design Guidelines to a maximum of 1.0.

The following C values were used within this study:

Table 5.2-2: Runoff Coefficients

| Land Cover | Return Period (Year) | Runoff Coefficient, C |
|---|---|---|
| Asphalt/concrete/buildings | 5 | 0.9 |
| | 100 | 1.0 |
| Grass/Soft Landscaping | 5 | 0.20 |
| | 100 | 0.25 |
| Forest/Woodlot | 5 | 0.40 |
| | 100 | 0.50 |

## 5.3 Stormwater Management – Existing Conditions

### 5.3.1 Existing Stormwater Management Plan

Runoff from the site is conveyed through AAFC infrastructure from the existing federal lands (Central Experimental Farm) towards Prince of Wales Drive and eventually to Dow's Lake. The AAFC is responsible for the operation of the private servicing within the site. The existing condition of the site is shown in Figure 1.1-1.

### 5.3.2 External Drainage

Runoff from west, east and southern subcatchments are combined with the site runoff and discharge into the Dow's Lake. At the western limits, there are two sub-catchments. Sub-catchment 40 (Appendix A, Model Plan View) which is located south of Carling Avenue includes asphalt roadways and parking areas, buildings, and open grass areas with trees. Runoff originating from this area is conveyed through an on-site underground private storm sewer system that outlets to Dow's Lake. The major system drains to Carling Avenue. The area is approximately 1.19 ha with a runoff coefficient estimated at 0.52. Additionally, Sub-catchment 41 (presented in Appendix A, Model Plan View) which is adjacent to Maple Drive is covered by asphalt roadways and parking areas, buildings, and open grass areas with trees. Runoff generated from this area is collected and conveyed through an on-site underground private storm sewer system, and outlets to Dow's Lake. The major system storm runoff drains to Carling Avenue. The area is approximately 1.52 ha with a runoff coefficient of 0.30.

The southern sub-catchment (D-S44) is covered by asphalt roadways and parking areas, buildings, and open grass areas with trees and the east and west sides of Maple Drive. The area drains through an on-site underground private storm sewer system that outlets to Dow's Lake. The major system drains to Carling Avenue. The area is approximately 12.77 ha with a runoff coefficient of 0.42. Moreover, drainage sub-catchment areas D-S62A and D-S62C (Appendix A, Model Plan View) are adjacent to Prince of Wales Drive and contains an open grass area with trees. These area sheet flows to Prince of Wales Drive. The area is approximately 1.46 ha and 1.13 ha with runoff coefficients estimated at 0.27 and 0.65, respectively.

### 5.3.3 Hydrogeological Characteristics

This information referenced within this subsection is based on the 2023 Preliminary Groundwater Inflow Estimate– Revision 1 Memorandum by WSP, which contains preliminary estimates of groundwater inflow to the excavations for the Ottawa Hospital Expansion. Based on the preliminary findings of this memorandum, the groundwater level at the southern end of the hospital building ranged between elevations of 75 m to 76 m. At the northern limit of the site, the groundwater elevation drops to a range of 72 m to 73 m.

The amount of steady-state dewatering inflow required for the excavation is estimated to range between 400,000 L/day to 900,000 L/day, with an initial inflow is 5-8 million L/day. The hydrogeological section shall be revised upon receiving updated hydrogeological data and its impact on the SWM plan shall be reassessed in the future submissions.

### 5.3.4 Allowable Release Rates

Peak flows were estimated according to the Rational Method, which is expressed as follows (Ministry of Transportation Ontario, 1997):

$$Q=0.0028CIA \qquad \text{Equation (2)}$$

Where:

- Q = Peak runoff rate ($m^3/s$)
- C = Weighted runoff coefficient
- I = Rainfall intensity corresponding to duration equal to the time of concentration (mm/hr)
- A = Drainage area (ha).

According to City of Ottawa Sewer Design Guideline, stormwater runoff to Dow's Lake in excess of the 5-year storm up to and including the 100-year storm event, must be detained on site; All runoff shall be controlled down to the 5-year pre-development flow rate of 2,345 L/s as per HDR-Parson's Site Servicing and Stormwater Management Report (October 2024). The 2-year to 100-year stormwater runoff which is directed to Dow's Lake is to be controlled to the 2-year predevelopment flow rate of 238.8 L/s, as per the HDR-Parson Site Servicing and Stormwater Management Report (October 2024). It is noted that the allowable release rate is subject to change and may be revised by WSP for future submissions.

## 5.4 Stormwater Management – Proposed Conditions

### 5.4.1 Water Quantity Control – Dow's Lake

The proposed development and external drainage areas generate 9,856 L/s of precipitation runoff. To reduce runoff to the maximum allowable release rate of 2,345 L/s, eight (8) SWM storage tanks and chambers were proposed, and storage capacity provided within existing grassed ditch was utilized. Of the proposed storage tanks, four (4) were placed at the periphery of the hospital building:

- Chamber 201, the east tank, retains runoff from Tower B and portions of the loading dock.
- Chamber 202, the northern tank, retains the runoff from the northern part of the podium and northern roofs.
- Chamber 203, the western tank, retains runoff from Tower A.
- Chamber 204, the southern tank, from the southern part of the podium.

These tanks collect and control runoff from the hospital building and discharge flows to the superpipe system. The remaining storage tanks are part of the Advanced Works package and control runoff from at-grade areas both internal and external to the site.

- Chamber 102, retains and controls runoff from the south-east parking lot
- Chamber 103, retains and controls runoff from a portion of the CUP and an external areas
- Chambers 104A and 104B retains and controls remaining parking lots, rights-of-way, external areas, and superpipe.

The superpipe system is controlled by an orifice and weir located in manholes MHST145 and MHST142. Permanent dewatering will occur in MHST158 with an estimated flow rate of 4 L/s. This flow is included as a baseline inflow in the modeling. Please refer to the Geotechnical Report for further details on groundwater flows.

The total required storage volume for the buildings was estimated through collective modelling of the site and optimizing the combination of the proposed storages. Proposed chambers 201 through 204 were designed considering parameters such as the available tank footprint area, potential spatial conflicts with utilities and topographical constraints. As a result, the required storage volume for the building tanks was estimated to be 1,297 $m^3$; Incorporating the 20% extra volume considered for climate change analysis, the total volume required is 1,556 $m^3$. Overall, 1,700 $m^3$ of storage is proposed to provide quantity control. An overview of the storage tanks for the hospital is presented in Table 6.2-1.

Note that required storage volume(s) for quantity control and water balance shell be reviewed and are subject to change pending on the evolving design of the green roof and irrigation system.

Overland flow from the eastern half of the site, including Sub-catchment 60A and Sub-catchment 60B, is directed to the swale located east of the hospital. Flow within the swale is controlled via an inlet control device (ICD) which creates surface ponding in the swale. Ponding in the swale will occur over DICB8 and once the ponding exceeds an elevation of 70.25 m the runoff will spill to the north and enters the Prince of Wales Drive ROW.

The overland flow from the west half of the site is directed to a depression within a landscaped feature above Chamber 104B. Runoff will pond on catchbasin CB98 located in the landscaped depression to collect the 100-year runoff and direct it to the minor system. One runoff over catchbasin ponds to an elevation greater than 74.22 m (0.42 m ponding depth) runoff is directed through a curb cut to CB65 located in catchment 47. Runoff then ponds on CB65 to an elevation of 73.70 m (0.16 m ponding depth) after which runoff is directed north towards Carling Avenue.

Runoff from catchments 54A-B, 55 A-D and 56A is directed to the minor system and is controlled by Chamber 202 and by an orifice and weir located in MHST142. Overland flow from these catchments is directed to Carling Avenue and the Nepean Bay trunk sewer

Before discharging to the outfall at Dow's Lake, runoff within the superpipe system is treated by the proposed water quality units. Post-development figures included in Appendix I outlines the post-development catchments and the drainage areas to each tank.

Furthermore, the high groundwater elevations observed across the site require that an analysis of the effects of hydrostatic uplift (buoyancy) forces on the proposed chambers shall be completed prior to design finalization and chamber selection, to ensure the specified chamber product/system can withstand the force both during construction/installation and day-to-day expected operations of the Hospital site, including anticipated vehicle loadings, cover depth, etc. This analysis shall be completed in coordination with the supplier of the chamber system.

Table 6.2-1: Proposed storage tanks for the hospital building

| Storage Tank Name | Subcatchment Characteristics | | | Quantity Control | | Water Balance | | | Total Storage Volume ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|
| | Sub- catchment Name/Nº | Outlet | Area (ha) | 100-yr + 20% Storage Volume for Quantity Control ($m^3$) | Provided Active Storage ($m^3$) | Runoff (mm) | Runoff Volume ($m^3$) | Provided Sump Volume for Water Balance ($m^3$) | |
| Tower B (Eastern)/ Chamber 201 | S-11 | MH-SA52 | 0.4268 | 506 | 510 | 29.8 | 127 | 216 | 726 |
| | S-10 | MH-SA52 | 0.2975 | | | 30.0 | 89 | | |
| Dome (Northern) Chamber 202 | S-7 | MH-SA56-1 | 0.2899 | 588 | 625 | 25.0 | 72 | 284 | 909 |
| | S-9 & 53 | MH-SA56-2 | 0.4718 | | | 28.8 | 136 | | |
| | S-8, 54B, S11A&B | D-S56_2 | 0.3028 | | | 25.0 | 76 | | |
| Tower A (Western)/ Chamber-203 | S-4 | MH-SA49 | 0.2908 | 271 | 271 | 30.0 | 87 | 191 | 461 |
| | S-3 | MH-SA50 | 0.3456 | | | 30.0 | 104 | | |
| Podium (Southern)/ Chamber 204 | S-6 | MH- SA51-1 | 0.2932 | 271 | 295 | 22.3 | 65 | 149 | 444 |
| | S-5 | MH-SA51-2 | 0.2767 | | | 22.0 | 61 | | |
| | S-12 | MH-SA51-1 | 0.0933 | | | 24.3 | 23 | | |
| Total | | | 3.0884 | 1,636 | 1,700 | | 840 | 844 | 2,544 |

### Quantity Control-Advanced Works Tanks and Superpipe

Three (3) stormwater management detention tanks located at the south parking lot, the north parking lot, and the south-western corner have been proposed as part of the Advanced Works Provisional design. The tank located in the south parking lot, Chamber 102, retains runoff from the parking lot located in the south-east corner of the site. The tank located in the south-west corner of the site, Chamber 103, retains runoff from the external areas and a portion of the CUP. Runoff from Chambers 102 and 103 are controlled via combination of an orifice plate and weir before discharging to the superpipe.

Chambers 104A and 104B, located in the north parking lot, retain runoff from their adjacent parking lots and the overall superpipe system which encircles the hospital. The proposed superpipe controls runoff with a combination of a weir and orifice plate in two separate locations and a weir. The first superpipe control is located in manhole MHST145 and is comprised of a 750 mm orifice plate and a weir with a height of 1000 mm. The second superpipe control is located downstream within manhole MHST142 and is comprised of a 700 mm orifice plate and a weir with a height of 500 mm. This superpipe ultimately discharges to Dow's Lake. Please refer to the Parson reporting package for further details of the Advanced Works.

Table 6.2-2 demonstrates that the proposed storage tanks collect and store the runoff from all events up to and including the 100-year + 20% sensitivity analysis.

Table 6.2-2: Utilized Storage Summary 3-hour Chicago_ Dow's Lake

| | 2-year Utilized Active Volume ($m^3$) | 5-year Utilized Active Volume ($m^3$) | 100-year Utilized Active Volume ($m^3$) | 100-year+ 20% Utilized Active Volume ($m^3$) |
|---|---|---|---|---|
| Chamber 201 | 158 | 217 | 380 | 487 |
| Chamber 202 | 149 | 221 | 434 | 557 |
| Chamber 203 | 78 | 108 | 200 | 271 |
| Chamber 204 | 66 | 100 | 207 | 258 |
| Advanced Works | | | | |
| Chamber 102 | 112 | 179 | 280 | 309 |
| Chamber 103 | 506 | 700 | 1,681 | 2,127 |
| Chamber 104A | 288 | 453 | 1,062 | 1,278 |
| Chamber 104B | 454 | 637 | 1,303 | 1,532 |

Table 6.2-3: Storage Summary 24-hour SCS_ Dow's Lake

| | Total Provide Active Volume ($m^3$) | 100-year Utilized Active Volume ($m^3$) | 100-year Storage Utilization (%) | ICD | Peak Flow at ICD ($m^3/s$) |
|---|---|---|---|---|---|
| Chamber 201 | 510 | 405 | 79 | 0.35 m circular orifice at 67.95 m (ICD 201) | 0.151 |
| Chamber 202 | 625 | 462 | 74 | 0.245 m circular orifice at 70.84 m (ICD 202) | 0.124 |
| Chamber 203 | 271 | 210 | 78 | 0.225 m circular orifice at 71.42 m (ICD 203) | 0.09 |
| Chamber 204 | 295 | 220 | 66 | 0.19 m circular orifice at 73.03 m (ICD 204) | 0.066 |

| Advanced Works | | | | | |
|---|---|---|---|---|---|
| Chamber 102 | 473 | 285 | 60 | 0.1 m circular orifice at 71.93 m (ICD 102) | 0.021 |
| | | | | 0.5 m x 1.5 m rect. orifice at 73.0 m (Weir 102) | 0.176 |
| Chamber 103 | 2,126 | 1,935 | 91 | 0.675 m circular orifice at 74.06 m (ICD 103) | 0.135 |
| | | | | 1.0 m x 1.0 m rect. orifice at 76.45 m (Weir 103) | 0.030 |
| Chamber 104A | 1,302 | 1,131 | 86 | NA | NA |
| Chamber 104B | 1,703 | 1,375 | 81 | NA | NA |
| Superpipe MHST142[1] | 335 | 334 | 100 | 0.7 m circular orifice at 69.32 m (ICD 105) | 1.309 |
| | | | | Weir at 70.7 m (Weir 105) | 0.820 |
| Superpipe MHST145[1] | 645 | 611 | 95 | 0.75 m x 0.75 m rect. orifice at 69.9 m (Weir 104) | 1.218 |
| | | | | Weir at 71.64 m (ICD 104) | 0.978 |
| Swale S-60 | 206 | 38 | 19 | 0.4 m circular orifice at 68.11 m (ICD 111) | 0.341 |

Table 6.2-4: Storage Summary _ Dow's Lake

| ICD Name | ICD Type | Size (m) | Discharge Coefficient | Inlet Elev. (m) | Contributing Drainage Area (ha) | Contributing Imp. Area (ha) |
|---|---|---|---|---|---|---|
| ICD 102 | Orifice Plate | 0.1 | 0.62 | 71.93 | 2.721 | 1.495 |
| Weir 102 | Transverse | 0.3 x 1.5 | 1.65 | 73.00 | 2.721 | 1.495 |
| ICD 103 | Orifice Plate | 0.675 | 0.62 | 74.06 | 13.662 | 4.672 |
| Weir 103 | Transverse | 1.0 x 1.0 | 1.65 | 76.45 | 13.662 | 4.672 |
| ICD 104 | Rectangular | 0.75 x 0.75 | 0.62 | 69.90 | 22.804 | 9.774 |
| Weir 104 | Transverse | 1.0 x 2.0 | 1.65 | 71.64 | 22.804 | 9.774 |
| ICD 105 | Orifice Plate | 0.7 | 0.62 | 69.32 | 24.988 | 11.213 |
| Weir 105 | Transverse | 0.5 x 1.4 | 1.65 | 70.70 | 24.988 | 11.213 |
| ICD 110 | HydroVex | 200 VHV-2 | - | 78.20 | 0.917 | 0.594 |
| ICD 111 | Orifice Plate | 0.4 | 0.62 | 68.11 | 2.957 | 1.299 |
| ICD 112 | Transverse | 1.5 x 1.5 | 1.65 | 70.17 | 19.249 | 9.924 |
| ICD 201 | Orifice Plate | 0.35 | 0.62 | 67.95 | 1.170 | 1.124 |
| ICD 202 | Orifice Plate | 0.245 | 0.62 | 70.84 | 1.787 | 1.292 |
| ICD 203 | Orifice Plate | 0.225 | 0.62 | 71.42 | 0.637 | 0.636 |
| ICD 204 | Orifice Plate | 0.190 | 0.62 | 73.03 | 0.663 | 0.439 |

Table 6.2-5 demonstrates that the modelled peak flows from the proposed system for the 2-year to 100-year events are lower than the allowable release rate of 2,345 L/s.

Table 6.2-5: Post-Development Flows _ Dow's Lake

| | Existing Flows to Dows Lake (L/s)[1] | Proposed Flows to Dows Lake (L/s) | Allowable Flow Rate to Dow's Lake (L/s)[1@] |
|---|---|---|---|
| 2-year | | 845 | 2,345 |
| 5-year | 2,345 | 1,170 | |
| 100-year | 5,154 | 2,185 | |
| 100-year + 20% | | 3,019 | |

Further, a 24-hour SCS storm was also included in the analysis to ensure that the proposed system and storage is able to collect and convey larger runoff volumes. Table 6.2-6 outlines the utilized active storage for each tank during the 3-hour Chicago and the 24-hour SCS storms.

Table 6.2-6: Utilized Storage Summary 3-hour Chicago & 24-hour SCS_ Dow's Lake

| Storage Element | 2-year Chicago ($m^3$) | 5-year Chicago ($m^3$) | 100-year Chicago ($m^3$) | 100-year+ 20% Chicago ($m^3$) | 100-year SCS ($m^3$) | 100-year+ 20% SCS ($m^3$) |
|---|---|---|---|---|---|---|
| Chamber 201 | 158 | 217 | 380 | 487 | 405 | 506 |
| Chamber 202 | 149 | 221 | 434 | 557 | 462 | 588 |
| Chamber 203 | 78 | 108 | 200 | 271 | 210 | 271 |
| Chamber 204 | 66 | 100 | 207 | 258 | 220 | 271 |
| | | | | | | |
| Chamber 102 | 112 | 179 | 280 | 309 | 285 | 330 |
| Chamber 103 | 506 | 700 | 1,681 | 2,127 | 1,935 | 2,127 |
| Chamber 104A | 288 | 453 | 1,062 | 1,278 | 1,131 | 1,131 |
| Chamber 104B | 454 | 637 | 1,303 | 1,532 | 1,375 | 1,572 |

### 5.4.2 Water Quantity Control – Nepean Bay Trunk

According to the Project specific requirements in conjunction with City of Ottawa Sewer Design Guidelines, stormwater runoff to the Nepean Bay Trunk sewer in excess of the 2-year storm up to and including the 100-year storm event, must be detained on site. The 2-year through 100-year stormwater runoff directed to the Nepean Bay Trunk sewer is to be controlled down to the 2-year predevelopment flow rate of 238.8 L/s. Parson's reporting identified a total drainage area of 5.40 ha is directed to the Nepean Bay Trunk sewer, with a contributing impervious area of 2.91 ha. Under proposed conditions, the total drainage area directed to the Nepean Bay Trunk sewer increases to 6.15 ha, with a with a contributing impervious area of 3.03 ha. Due to this increase in drainage area, several updates were made to the drainage area to offset the increased runoff produced by this additional drainage area. These changes are listed below:

- Minor flow from Catchment S-56A will be directed to the proposed storm sewer which discharges to the Dow's Lake outlet.
- The proposed outlets controlling runoff from the ditches in Catchments S-26B and S-26D will be reduced to smaller sizes.
  - The outlet for Catchment S-26B will be a 100VHV-1
  - The outlet for Catchment S-26D will be a 50VHV-1

These changes result in a 100-year release rate of 232.9L/s to the Nepean Bay Trunk sewer. Updates to the proposed parking garage's stormwater management system and the swale which collects and conveys runoff from Catchment 57 are expected and may affect the flows to Nepean Bay Trunk Sewer. As per RFI# DPA-386, pumped flows from the parking garage are confirmed to be 60 L/s and are included in the modeling.

Table 6.2-7: Post-Development Flows _ Nepean Bay Trunk Sewer

| | 2-year | 5-year | 100-year | 100-year +20% |
|---|---|---|---|---|
| Total Flow to Nepean Bay Trunk | 145 | 174 | 233 | 308 |

### 5.4.3 Water Quantity Control – Carling Avenue & Preston Street

The Phase 3 and Phase 4 work associated with the New Civic Development impact two of the four stormwater outlet locations for the overall project site. As per Drawing C4-201 Post-Development Drainage Areas, only the Dow's Lake outlet and Nepean Bay Trunk outlet have modifications by the DPA works that would alter these drainage areas as they were previously delineated in the Parsons design report. The remaining two drainage outlets to Carling Avenue and Preston Street are not impacted by DPA works. The project site is controlling stormwater runoff to the Preston Trunk outlet to the 2-year storm event. Therefore, there are no stormwater modifications or design elements anticipated to impact these areas. Please refer to *Site Servicing and Stormwater Management Report – New Campus Development for The Ottawa Hospital Phase 3: Central Utility Plant Project, Phase 4: Main Hospital Project (October 2024)* for design information pertaining to those outlet points.

### 5.4.4 Water Balance

LEED Version v4.1- Rainwater Management- Sustainable Sites requires a site to 'retain stormwater on-site with a likelihood of 90$^{th}$ Percentile occurrence', to obtain the maximum 3 points assigned to the sustainable sites. For developments located in the City of Ottawa, retention of the 90$^{th}$ percentile rainfall depth following LEED rainfall analysis guidelines requires the capture of a 22 mm rainfall depth. Allowing for no initial abstractions (IA) off impervious surfaces, and a 25 mm IA for at-grade pervious surfaces, the 25 mm runoff volume across the 29.2 ha area is 3,380 m$^3$. This volume is to be reused across the site via irrigation or disposed of within the site limits though infiltration. A site-wide annual water balance analysis was completed using the method developed by Thornthwaite and Mather in 1957 and following the example given in Section 3.2.2 in the 2003 MECP "Stormwater Management Planning and Design Manual". This method evaluates the precipitation,

infiltration, evapotranspiration, and runoff on an annual basis to demonstrate that runoff from the site will not increase in under the post development (proposed) condition. Detailed water balance calculations are included under Appendix J.

### Water Balance - Hospital Building

A 30 mm retention depth for the proposed hospital building roof is proposed as a depth target necessary to manage the site overall post-development runoff volume target. It is assumed that the green roof will abstract the first 10 mm of rainfall, and the impervious roof will abstract no rainfall, resulting in a total retention volume of 840 $m^3$. The 30 mm runoff depth was selected as it approaches the 100$^{th}$ percentile rainfall depth, meaning that almost all rainfall events which occur are 30 mm or less. Therefore, sizing the reuse storage volume for capture beyond the 30 mm rainfall depth is not beneficial as the full reuse storage will rarely be utilized. The reuse storage volume sized for the hospital building was determined by assuming that the full 30 mm of rainfall runoff will leave the impervious roof surfaces (no initial abstraction/'wetting depth') and also considers the green roof abstracting the first 10 mm of rainfall depth that falls onto its surface, therefore 20 mm of rainfall runoff is accounted for from the green roof surfaces. Retention is provided under the outlets of chambers 201-204, to be reused on site for irrigation of green spaces in the vicinity of the building.

Table 6.2-1 shows the average roof runoff depth to each 200 series tank and the resulting volume. Please note the sump volumes are not included in the modeling; this approach ensures that the proposed system can provide the required active storage to manage quantity control should the sumps be full at the onset of a rainfall event. The proposed LIDs are not included in the modeling to address saturated conditions. Subdrains shall be connected downstream of the 200 series tanks where possible to avoid utilizing sump space leaving it empty for rain events.

### Water Balance - Remaining Site

Infiltration is the proposed mechanism to meet the water balance requirement for area surrounding the hospital. Runoff will be infiltrated via LIDs (Low Impact Development) across the site. LIDs use natural means, including vegetation and engineered soil, to treat stormwater by filtering out contaminants commonly found in runoff. The type and arrangement of LIDs to be utilized to infiltrate runoff are constrained by the infiltration rate of the underlying native soils, groundwater elevations, and bedrock elevations.

In-situ infiltration testing for the site is not currently planned as there will be significant removal of the surface and the grades will be reduced by as much as 10 m in some locations. To estimate the infiltration rate for design, an analysis of the underlying soils was completed. As detailed in the July 2024 hydrogeological report "Hydrogeological Report in Support of a Category 3 Permit to Take Water", prepared by Paterson Group, the underlying soil is comprised of sandy silt and silty clay. The hydrogeological report estimates that the hydraulic conductivity for sandy silt ranges between 1x10-4 to 1x10-6 m/s. The infiltration rate of site soil is estimated using Table C1 in Appendix C of the "Low Impact Development Stormwater Management Planning and Design Guide" developed by the Credit Valley Conservation (CVC) Authority and the Toronto and Region Conservation Authority (TRCA) (hereafter CVC and TRCA's LID SWMDG), to be ~46.3 mm/hr. Applying the minimum design safety factor of 2.5, as per Table C2 in Appendix C of the CVC and TRCA's LID SWMDG, the sandy silt has a design infiltration rate of 18.5 mm/hr. Additionally, the hydrogeological report estimates that the hydraulic conductivity for silty clay ranges from 1x10-7 to 1x10-9 m/s and results in an estimated design infiltration rate of 5.4 mm/hr. Detailed calculations are outlined in APPENDIX J of the 65DD report. To avoid mounding impacts or the scenario where runoff is left standing in the LID within the bottom gravel layer of the LID for a prolonged time, the design volume should infiltrate within 48 hours. As a result, LIDs within areas with sandy silts include a gravel layer limited to a maximum depth of 0.89 m. LIDs within silty clays shall be limited to a maximum gravel depth of 0.26 m. The boreholes used to determine the soil type for each finalized LID are outlined below in Table 6.2-8.

As per the Post Condition Groundwater Contour Map Dwg. No. PG6982-3 the groundwater levels on site vary from 68 masl to 74 masl. Due to high groundwater table caused by the proximity of Dow's Lake and the site soil characteristics, the clearance of the groundwater to the surface varies from as little as 0.3 meters below ground surface (mbgs) to 5.3 mbgs.

The groundwater clearance is lowest along the east side of the proposed hospital, meaning that infiltration-based LIDs are not wholly suitable within this area. The groundwater clearances for each drainage area are outlined in Appendix J. For areas which have low clearance between the groundwater table and the proposed bottom of infiltration for an LID (i.e. groundwater levels observed at or less than 1.5 mbgs), shallow LIDs such as enhanced swales/flat-bottomed swales are recommended. Areas which have high groundwater clearance (i.e., groundwater levels greater than 1.5 mbgs) deep-recharge LIDs which can infiltrate greater volumes of runoff such as bioretention are feasible and are recommended as a mechanism for retention.

Opportunities for LIDs within the site have proven limited due to high groundwater levels caused by the proximity of Dow's Lake. In areas with higher groundwater table, shallower LIDs units such as enhanced swales with clear stone to promote retention and infiltration are proposed. In areas with greater groundwater separation, deeper LIDs units such as bioretention cells are proposed. Due to the high groundwater table caused by the proximity to Dow's Lake and the need to maximize infiltration on site, the bottom of some proposed LIDs present less than 1 m clearance from the groundwater table. Despite the lesser groundwater clearance of the shallower LID units, as there are no underdrains proposed that will connect to the storm system, there is no risk to dewater the ground water table and these units are considered feasible to reduce the post-development runoff volume to Dow's Lake as they will function so long as there is free-drainage occurring in the native soil media below the infiltration footprint area.

Based on these parameters, infiltration zones have been identified on the west and southern portions of the site and can be seen in Figure 6.2-1. The exact LID locations are included in Site Grading drawings (C5-200 Series) and are currently under development. As the alignment of the Advanced Works and Proposed utilities is finalized, as well as developing information of the proposed post-construction groundwater contours and infiltration rates, the location and configurations of the proposed infiltration features may be modified. These locations are under development with the Landscape Architect to ensure there are no design conflicts with plantings or site lighting fixtures. Figure 6.2-2 shows the currently proposed Bioretention Cell, sourced from Detail T-850.061-3. This detail will be modified through the design development phase to suit the site and the City of Ottawa environment. Note that the significant benefit of this bioretention cell is that it allows for infiltration to occur via the filter media without impacting tree plantings, as plantings may occur within footprint of the cell. Adequate supply of runoff to the tree root system is critical to maintain the health of the trees within the canopy planting plan that is required on site. Details of the finalized LIDs are presented in Table 6.2-8 below.

Table 6.2-8: Summary of Proposed LID features

| LID Feature | Contributing Subcatchment | Contributing Drainage Area (CDA) ($m^2$) | Nearest Borehole Nº | LID Area ($m^2$) | Retention Volume ($m^3$) | Groundwater Separation (m) |
|---|---|---|---|---|---|---|
| 42I-Bioswale | 42I | 1,464 | BH22-303 | 21.5 | 3 | 0.25 |
| 47-Bioretention | 47 | 376 | BH4A | 46.8 | 32 | 1.30 |
| 47A-Bioretention | 47A | 5,759 | BH4A | 265.0 | 280 | 1.04 |
| 47B-Bioretention | 47 B,C,G | 3,700 | BH6 | 183.6 | 96 | 0.25 |
| 60B-Bioswale | 60&60A-B | 10,754 | BH 22-112 | 186.1 | 22 | 0.24 |
| 65C-Bioswale | 65A-C,E-G &62B | 5,031 | BH21-108 | 243.6 | 34 | 1.17 |
| 65D-Bioswale | 65D | 1,138 | BH21-108 | 103.5 | 12 | 1.79 |
| 67-Bioretention | 67 | 6,221 | 22-306 | 236.7 | 284 | 0.25 |

Figure 6.2-1: Proposed Infiltration Zones

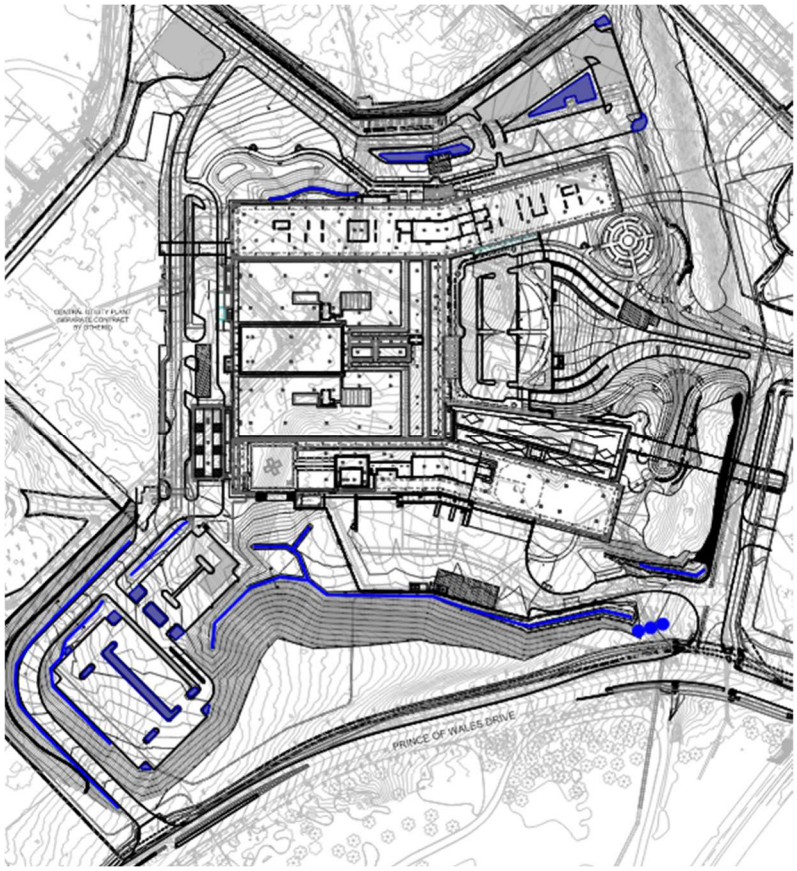
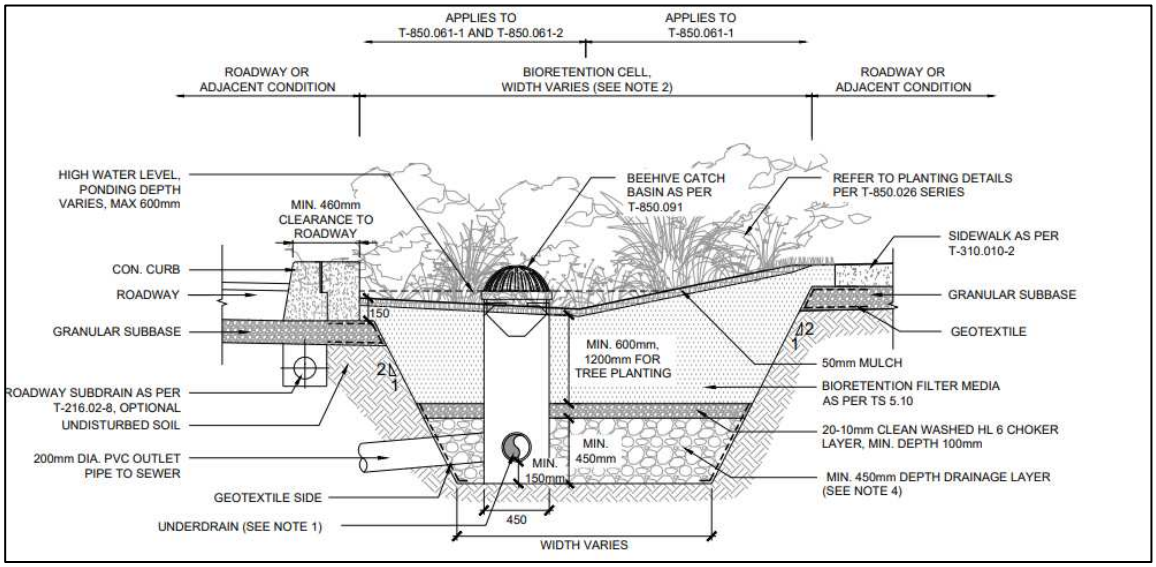



Figure 6.2-2: Proposed Bioretention Cell



### 5.4.5 Water Quality

According to the National Capital Commission Stormwater Management Manual requires the proponent to minimize or improve surface water and groundwater quality, to minimize sediment loading to surface water and groundwater, to maintain or enhance the quality of drinking water sources, and to maintain or enhance existing thermal watercourse regimes.

To improve runoff quality, runoff generated on site is proposed to be treated via a treatment train approach. LIDs will collect and filter runoff before being collected by the proposed storm sewers and through a water quality treatment unit. The proposed LIDs have been sized to accept 25 mm of runoff from impervious surfaces. The first 25 mm of runoff during a rainfall event is referred to as the first flush. The first flush is the initial runoff which contains higher concentration of pollutants. By capturing and filtering the first flush the TSS directed to the outlet from these subcatchments is minimal.

The drainage swales used primarily for conveyance will be enhanced swales, offering TSS removal through the linear run of water. Vegetation in the swale slows the water to allow sedimentation, filtration through the root zone and soil matrix, evapotranspiration, and infiltration into the underlying native soil. Simple grass channels or ditches are conventionally used for stormwater conveyance, particularly for roadway drainage. Enhanced swales incorporate design features, such as modified geometry, gentle slopes, check dams, flat bottoms, vegetation, etc., that improve the contaminant removal processes by reducing both runoff flow rate velocities and runoff volumes as compared to simple grass channel and roadside ditch designs. The locations of the enhanced swales are shown in the following locations and noted in Figure 6.2- 3:

- Behind the loading dock retaining wall, outletting north.
- In front of the Advanced Works retaining wall along the southern Road East
- On the north side of Road E, amongst the proposed southern parking lots in the future UOHI area
- On the north-west corner of the loading dock area

Please refer to Detail 1 on drawing C1-901 highlighting the typical cross-section of an enhanced swale. This same detail is shown in Figure 6.2-4. As the grading design is finalized moving into the 95% developed design phase, detailed cross-sections of the enhanced grassed swales at each location will be provided.

Figure 6.2-3: Swale Locations on Site

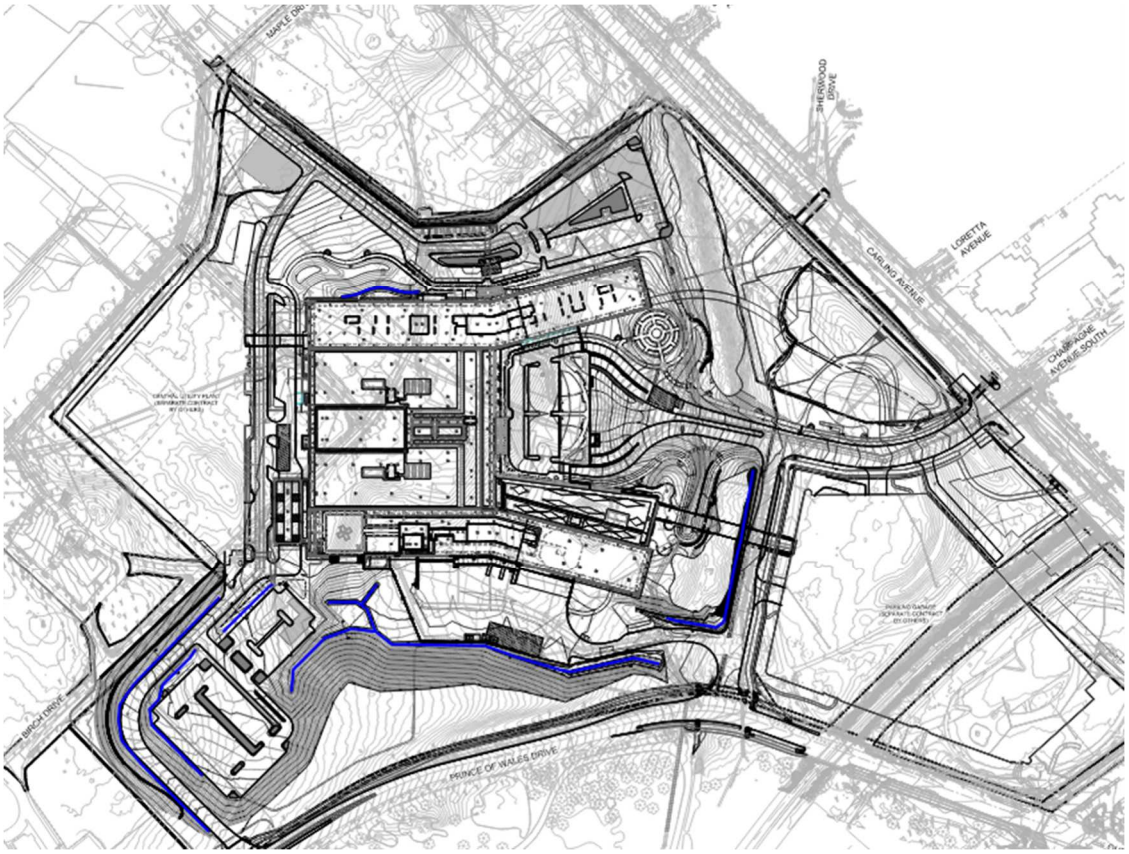
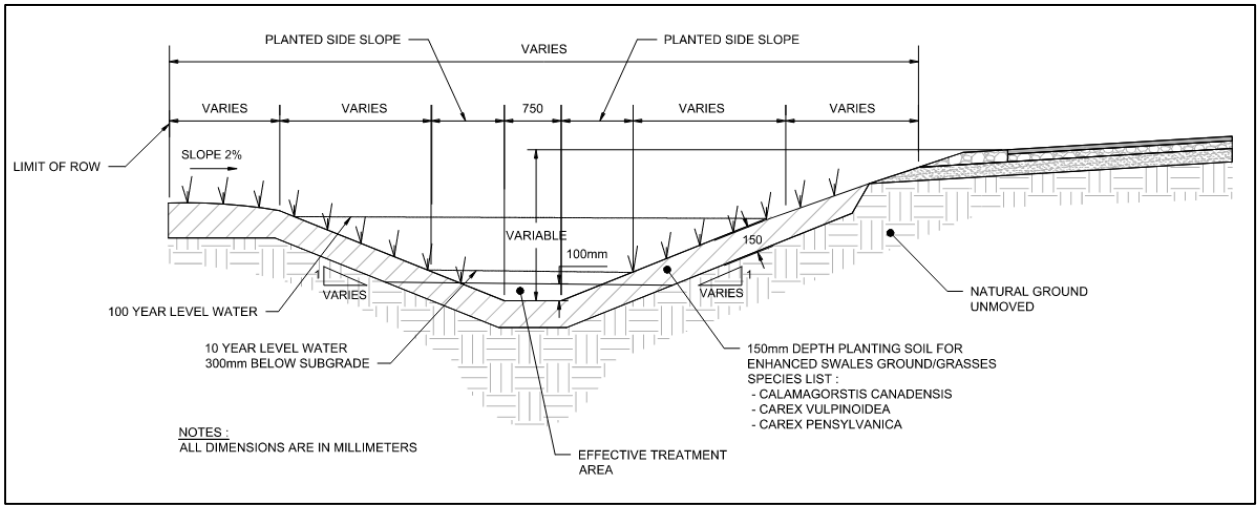



Figure 6.2-4: Enhanced Conveyance Swale Detail




Once runoff is collected by the proposed sewers, an Oil and Grit Separator (OGS) is proposed to treat runoff before entering Dow's Lake. Due to the large drainage area which is directed through the proposed sewer multiple OGS units in parallel are recommended to treat runoff. Three (3) Imbrium EFO 12 units in parallel are recommended to treat runoff.

For information regarding post-construction stormwater monitoring, in particular to the Dow's Lake outlet point, a stormwater monitoring program is under development, informed by feedback provided by Authorities Having Jurisdiction.

Please refer to the draft monitoring program *New Campus Development – Baseline, During, and Post-Construction Stormwater Monitoring Program, (Parsons, October 2024).*

### 5.4.6 Water Balance – Annual Volumetric Discharge

The relevant Authorities Having Jurisdiction (AHJ) for this project, including the National Capital Commission, Park's Canada, and Agri-Canada have noted that there is concern about the sensitivity of the receiving water body, Dow's Lake. The AHJ expectation is that there is no increase in annual flows to Dow's Lake because of the Civic Hospital development. To demonstrate the volumetric impacts to Dow's Lake, the same water balance approach from Section 6.2.4 was analyzed over an average year of precipitation. This annual analysis only includes stormwater flows because of the project development site and does not include groundwater, which would be interacting with the lake water underground in existing conditions regardless.

The Advanced Works storm sewer outlets into Dow's Lake through an existing headwall located on lands owned by Parks Canada. Refer to Figure 6.2-5 for the location of the outlet in summer months and Figure 6.2-6 for the location of the outlet in winter months, in comparison to the Rideau Canal Skateway skating surface. Note that the outlet is approximately 250 m from the skating surface.

Figure 6.2-5: Location of Existing Dow's Lake Outlet

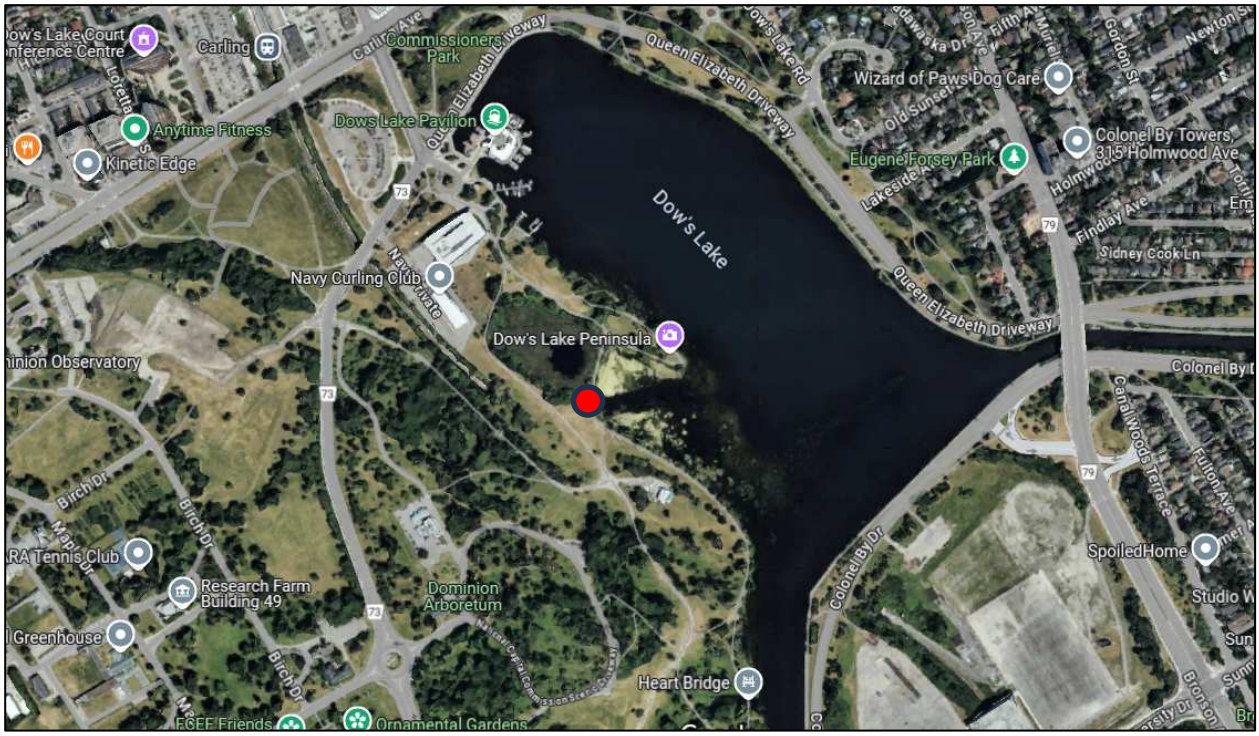


Figure 6.2-5: Location of Existing Dow's Lake Outlet

The existing ground conditions on site, detailed in Drawing C4-200 Pre-Development Drainage Area Plan, ultimately release 32,548 $m^3$ of uncontrolled runoff into Dow's Lake on an annual basis. The proposed development condition of the hospital, detailed in Drawing C4-201 Post-Development Drainage Area Plan, releases 74,474 $m^3$ of uncontrolled runoff into Dow's Lake. The volume difference from pre-development to post-development stems from the significant increase in impervious land use on site.

The net difference is the target for reuse, approximately 41,926 $m^3$. As discussed in Section 6.2.4, this amount of reuse is utilized through infiltration and irrigation. The infiltration on the site is constrained by the elevation of the groundwater table in post-development conditions, as 1.0m clearance is recommended between the bottom of any infiltration gallery and the groundwater table, and the infiltration rate of the soils on site. Irrigation will be supplied by the four stormwater retention tanks, one located on each side of the hospital, to serve the various soft landscape and landscape zones required on the project.

An annual water balance analysis for the site has been completed using the method developed by Thornthwaite and Mather in 1957. The annual analysis which demonstrates that the site is capable of meeting pre-development runoff volumes, the post development vs predevelopment water balance is presented below in Table 6.2-9. Overall, on an annual basis, the runoff volume will increase by 34 $m^3$ or 0.1%.

Table 6.2-9: Post vs Pre Annual Water Balance

| Hydrologic Cycle Components | Pre-Development Conditions | | Post-Dev. Conditions with Mitigation Measures | | Difference | |
|---|---|---|---|---|---|---|
| | % | $m^3$ | % | $m^3$ | % | $m^3$ |
| Infiltration | 17.0% | 18,432 | 32.7% | 35,482 | 17,050 | 92.5% |
| Evapotranspiration | 53.0% | 57,395 | 37.6% | 40,789 | -16,606 | -28.9% |
| Runoff | 30.0% | 32,548 | 29.6% | 32,104 | -444 | -1.4% |
| Precipitation | 0% | 108,375 | 100% | 108,375 | 0 | 0% |

Refer to Appendix J for Water Balance calculations.

Furthermore, a preliminary Salt Management plan is under development. The Salt Management Plan will provide context on the design choices made by the Dev Co team to help reduce the salt burden on the project site and will also provide recommendations on salt maintenance to further reduce salt impacts. Please see Appendix K for the draft report.

### 5.4.7 Erosion and Sediment

Preliminary outlet protection calculations for the outlet to Dow's Lake are available in Appendix J of Parson's SWM Report, dated October 2024. The calculations outline a riprap apron which will spread the flow from the outlet before entering Dow's Lake. Park's Canada has indicated during the AHJ Stormwater Presentations that they will review the requirement for rip-rap following completion of detailed design of Phase 4.

### 5.4.8 Hydrologic and Hydraulic Modelling Software

The modelling software deemed most suitable for this type of analysis is the dynamic hydrology-hydraulic water quality simulation model PCSWMM by Computational Hydraulics International (CHI). This software package acts as a graphical front-end interface for the US Environmental Protection Agency (EPA) Storm Water Management Model (SWMM) engine. It is capable of dual-drainage (major/minor system) modelling and design, including dynamic interaction of dual systems. The software version used for the analysis was PCSWMM 2020, version 7.7.3895.

#### Hydraulic Parameters

The parameters used in the PCSWMM model are outlined in the following tables.

Table 6.2-2: Model Parameters – Rainfall

| Parameter | Value |
|---|---|
| IDF | City of Ottawa |
| Design Storm Distributions | City of Ottawa 24-hour & 3-hour Chicago |
| Return Periods | 2-year, 5-year & 100-year |

Table 6.2-3: Model Parameters – Sub-catchment

| Parameter | Value | Units |
|---|---|---|
| Flow Length | Manually Measured | m |
| Impervious | Percentage imperviousness values have been estimated from runoff coefficients in published reports | % |
| $N_{IMPERV}$ | 0.016 | - |
| $N_{PERV}$ | 0.15 | - |
| $D_{STOR}$ Imperv | 1 | mm |
| $D_{STOR}$ Perv | 5 | mm |

Table 6.2-4: Model Parameters - Infiltration

| Parameter | Value | Units |
|---|---|---|
| Infiltration Model | Horton | - |
| Max Infiltration Rate | 76.2 | mm/hr |
| Min Infiltration Rate | 13.2 | mm/hr |
| Decay | 4.14 | - |
| Routing Method | Dynamic | - |

### Minor System

The minor system was defined based on the Parson's model "Partial Green Roof_ November-2023.pcz". The model included the "Advance works" minor system as well as the proposed minor system discharging into three outlets including Nepean Bay trunk, Preston Street Sewer, and Dow's Lake. The minor system has been updated as per Parson's Advanced Works drawing package dated September 2024 and SWM report dated October 2024.

### Major System

The major system was defined based on the cross sections and the proposed re-grading elevations shown within the Parson's model. In this model, the junction nodes used to define the slopes of the road-conduits and have been set to provide a constant fall from high points to catchbasin locations at low points. The minor system has been updated as per Parson's Advanced works drawing package dated September 2024 and SWM report dated October 2024.

### Drainage to Major/Minor System

Catchments that were determined to have controls that restrict major flow were drained into the minor system, e.g. buildings tank outlets. Roadways were drained to the major system.

### Modelling Connection

At each major system junction, an outlet was defined to represent the catchbasins, or the flow split between the major and minor system. Ideally each outlet should represent a single or double catchbasin in the model. However, for design simplification, a modular approach has been used, meaning that each outlet could represent a range catch basins, e.g. on outlet denoted by 3 represents 3 catchbasins in the model. This approach allowed for representing several catchbasins in the area through defining one outlet in the model. Rating curves were developed from the "Catch Basin Rating Curves – Guidance Document" prepared by the National research Council of Canada, dated March 3, 2023.

Modelling Assumptions

The subcatchments outlets, delineation, and runoff coefficients were sourced from the Advanced Works package and the Post-Development Drainage Area Plan found in drawing C4-201. Some subcatchments in the PCSWMM model will not match the catchments found in drawing C4-201, this is because multiple in the PCSWMM model multiple catchments are grouped together if their runoff is directed to the same outlet. This drawing has been included in Appendix J. It has been assumed that all rooftop surfaces are completely impervious as the green roof configuration is underway.

All outfalls to Dow's Lake were defined as a free outfall (i.e., under free-flow conditions), the assumption was that in designing the minor system, the receiving lake's water surface level has been lower than the invert of the pipes discharging into the lake. Therefore, the minor system will discharge into the lake without being submerged by a high lake water level. This condition is assumed to be a reasonable condition as the normal operating condition of the CSOs are generally not submerged. However, this assumption should be confirmed via records of observed lake levels.

Boundary Conditions: Outfalls were modelled as free flow to ensure the allowable peak flow is met regardless of downstream conditions. For Dow's Lake, this is likely an accurate assumption during normal conditions as the outfall is to a controlled waterway and is not submerged. If the maximum operating level of the canal during navigation season at Dow's Lake is provided, a check can be run in PCSWMM to ensure the system functions as intended. Similarly for the Nepean trunk sewer, the model can be checked with boundary conditions.

For all future design submissions, this modeling arrangement may be refined via new finalized/revised site plans, green roof arrangements, and updated data. The modeling approach is considered acceptable as it will slightly overestimate the amount of flow reaching each low point and is, therefore, more conservative.

## 5.5 Proposed Storm Servicing Design

### 5.5.1 Storm Service Connections

The proposed storm delineation zones, as per constraints and allowable storm drainage within the main hospital building, define the locations of the proposed service connections. Each delineation zone has a single service connection. The drainage boundaries shown in Figure 6.3-1 are consistent with the overall site post-development drainage plan, depicted in the C4-400 drawing. The service connection locations can be summarized as follows:

Tower A

- Two west connections into a stormwater management detention tank

Tower B (Loading Dock)

- Two east connections into a stormwater management detention tank

Main Entryway (Emergency Access)

- Two connections into a stormwater management detention tank

Podium Roof

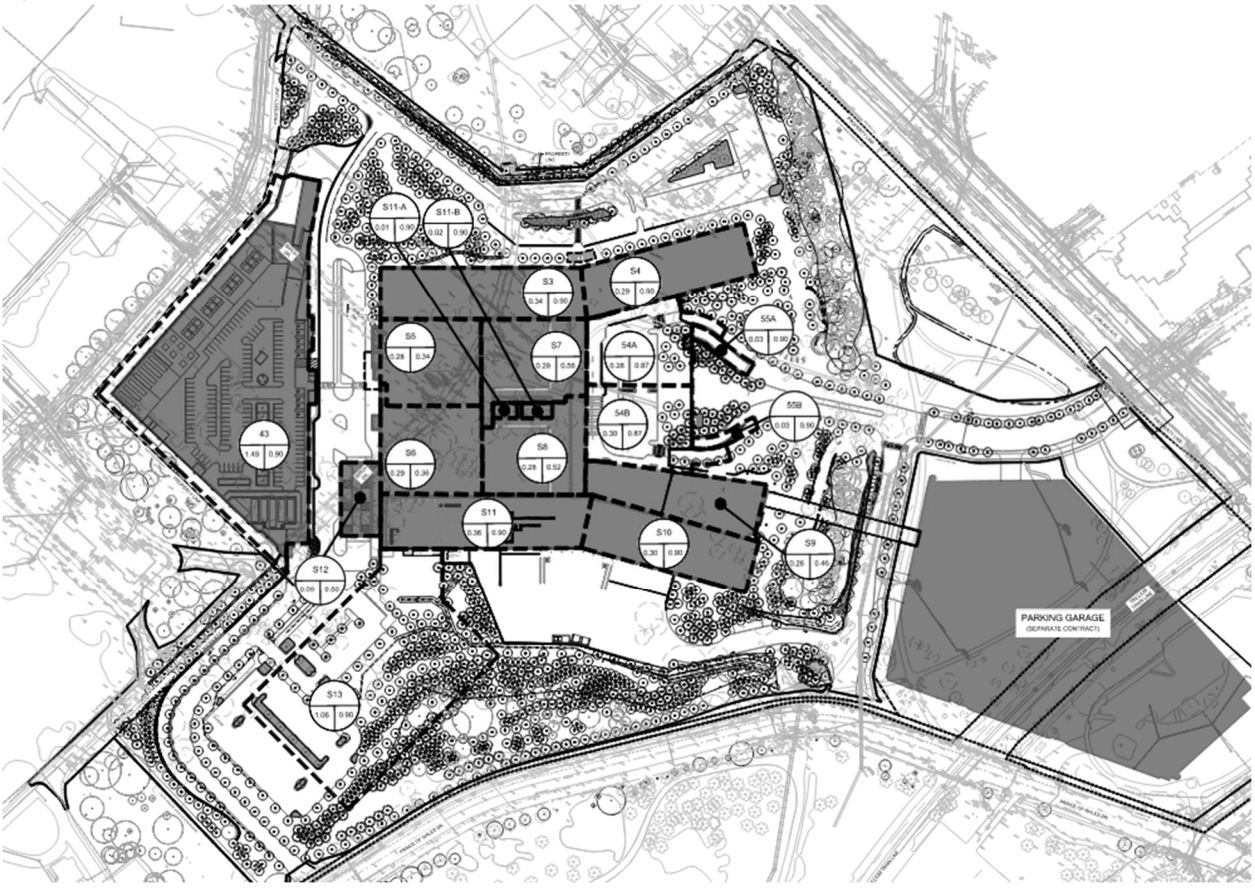
- Two south connections into a stormwater management detention tank

Ambulance Garage

- One west connection into the Podium Roof stormwater management detention tank

A post-development drainage area plan is available in the accompanying Engineering Drawings; however, the post-development drainage area plan aligns with the storm sewer to be able to assign drainage areas to each run of storm sewer to determine capacity. Some of the roof areas may drain to the same leg of NCD mainline storm sewer, so the catchment area would cover multiple service connections. To accurately determine the flow to each service connection, a more refined stormwater drainage catchment plan can be seen in Figure 6.3-1.

Figure 6.3-1: Storm Drainage Areas – Main Hospital Building




There are no proposed water detention devices on the roof of the main hospital building, which has portions of green roof. Runoff that is collected by roof drains on the proposed podium, pavilion, and tower roofs outlets through the internal building storm downspout system to various storm service connections on each side of the hospital. These storm service connections outlet into four stormwater detention tanks, one on each side of the building located underneath drive or parking surfaces and away from proposed plantings or at-grade structures. The tanks serve to provide water quantity control and water balance (retention) volume. The four tanks outlet into the mainline Advanced Works storm sewer, restricting the outlet rate to the allowable release rates of the overall system, as defined by the Advanced Works approvals.

The target design flows, as defined by the City of Ottawa Sewer Design Guidelines, are calculated using the Rational Method. This calculation is separate and unrelated to the internal building Mechanical Consultant flow calculations, which are to be completed as defined by the Ontario Building Code. As noted by the City of Ottawa Sewer Design Guidelines, Section 8.3.12 - Climate Change, the drainage system shall be stress tested using design storms calculated based on a 20% increase of the City's IDF curve rainfall values. This is in coordination with project requirements to design and construct storm sewers to capture the 100-year storm event if the overland flow route could be obstructed by future expansions within the site. As such, storm sewers proposed within the scope of Phase 3 and Phase 4 have been sized to accommodate the 100-year + 20% storm event.

To ensure proper pipe sizing, both flows have been listed in Table 6.3-1, the City of Ottawa Rational Method flow and the Ontario Building Code Mechanical consultant flow. The Rational Method flow calculation has been used for overall sewer flow capacity and allowable release rate calculations, as defined in the Stormwater Management Report, but the Ontario Building Code flow calculations is provided, with associated capacity, for context and continuity. Storm sewer design sheets can be viewed in Appendix G.

Table 6.3-1: Storm Service Flows

| Storm Service Connection ID | 5-Year Rate (L/s) | 100-Year Rate + 20% (L/s) |
|---|---|---|
| S3 (TOWER A SOUTH) | 88.63 | 227.84 |
| S4 (TOWER A NORTH) | 75.60 | 161.95 |
| S5 (HOSPITAL SOUTHWEST) | 28.39 | 60.81 |
| S6 (HOSPITAL SOUTHEAST) | 31.57 | 67.63 |
| S7 (MIDDLE HOSPITAL) | 171.48 | 367.33 |
| S8 (MIDDLE HOSPITAL) | 42.58 | 91.21 |
| S9 (TOWER B WEST) | 35.34 | 75.70 |
| S10 (TOWER B EAST) | 78.21 | 167.53 |
| S11 (TOWER B SOUTH) | 101.67 | 217.79 |
| S12 (AMBULANCE GARAGE) | 13.32 | 28.54 |

As per the Central Utility Plant current design, two stormwater service connections are present to service the facility. The flows from these two connections are listed per the drainage region breakdown and are denoted in Table 6.3-2.

Table 6.3-2: CUP and UOHI Storm Services Flows

| Storm Service Connection ID | 5-Year Rate (L/s) | 100-Year Rate + 20% (L/s) |
|---|---|---|
| S1 (CUP NORTH) | 182.48 | 390.91 |
| S2 (CUP SOUTH) | 151.20 | 323.90 |
| S13 (UOHI) | 276.33 | 591.95 |

### 5.5.2 Loading Dock Trench Drains

On the eastern side of the main hospital building, along the limits of Tower B, is the hospital loading dock area. This area contains multiple loading bays for various design vehicles to access the main hospital building. To accommodate the bays with the elevation of the interior floors, a number of the loading bay docks are sloped down toward the hospital, meaning that any overland flow in this region would flow backwards against the building. To remedy this, trench drains have been proposed at the bottom of each of the loading bays as well as at the end of the hearse parking area.

As the elevation of these loading bays is too low to accommodate gravity drainage back to the storm sewers located further east, the trench drains are to be drained locally via gravity to a small pumping station, where the trench drain flows will be lifted before discharging again by gravity to the storm sewer to the east. Refer to Drawing C3-400 in the Site Servicing package for details of the design and layout.

Figure 6.3-2: Trench Drain Design – Tower B South

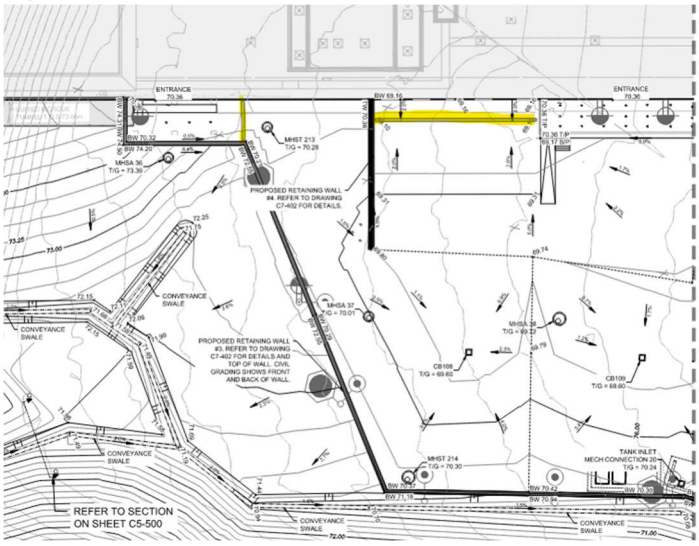
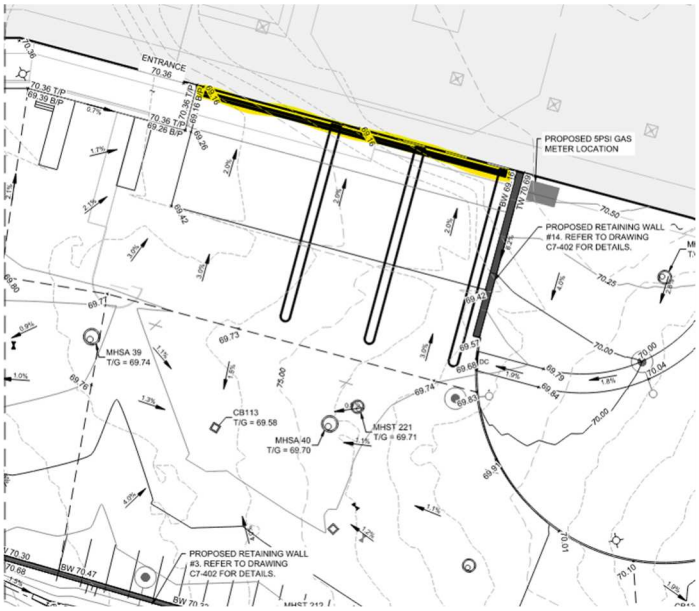



Figure 6.3-3: Trench Drain Design – Tower B East




## 5.6 Catch Basins and Drains

### 5.6.1 Catch Basin Spacing

WSP has updated the catch basin spacing and inflow calculations to suit the design at 95% Design Development. Please see Appendix N for detailed design calculations.

### 5.6.2 Area Drains

There are six area drains provided in the at the Main Entryway to drain the at-grade parking structure. The flows from these drains will be directed by mechanical to the two service connections provided at the Main Entryway. Please see the mechanical report and drawing set for more information.

There are also three (3) area drains in the pavilion dining area. The area drains capture flows and direct them towards the advanced works storm sewer to Dow's Lake. See the dynamic inlet capacity charts provided by the supplier in Appendix O for reference.

## 5.7 Vertical Lift Stations

There is a single pump station required in the loading dock. The remainder of the external flows shall drain by gravity.

The pump station will be a packaged sewer lift - wet well type. See specification 33 32 13.13 for details on the lift station as well as drawing C1-202 for details.

## 5.8 Erosion and Sediment Control

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction. Silt fences will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fences will remain in place until the working areas have been stabilized or re-vegetated. Catchbasins will have filter fabric installed under the grate during construction to protect from silt entering the storm sewer system. Mud mats are to be installed at the construction access point(s) to prevent mud tracking onto adjacent roads.

Erosion and sediment controls must be in place during construction. The contractor shall implement best management practices, to provide for protection of the area drainage system and the receiving watercourse, during construction activities. The contractor acknowledges that failure to implement appropriate erosion and sediment control measures may be subject to penalties imposed by any applicable regulatory agency. The following recommendations to the contractor will be included in the erosion and sediment control plan:

- Limit extent of exposed soils at any given time;
- Re-vegetate exposed areas as soon as possible;
- Minimize area to be cleared and grubbed;
- Install silt fence to prevent sediment from entering existing conveyance systems;
- No refueling or cleaning of equipment near the receiving ditch;
- Installation of filter cloth between frame and cover of catchbasins;
- Provide sediment traps and/or basins during dewatering;
- Establish material stockpiles away from watercourses; and
- Plan construction at proper times to avoid flooding.

The following practices should be followed after every rainfall to guarantee proper performance:

- Verify that water is not flowing under silt fences;
- Built-up material should be removed when it reaches a depth equal to half the height of the fence;
- A visual inspection shall be completed daily on sediment control barriers and any damage repaired immediately, and in some cases barriers may be removed temporarily to accommodate the construction operations; affected barriers will be reinstated at night when construction is completed;

If the environmental inspectors believe that additional prevention methods are required to control erosion and sedimentation, construction staff will install additional silt fences or other methods as required; and Construction and maintenance requirements for erosion and sediment controls to comply with Ontario Provincial Standard Specification OPSS 577, and City of Ottawa specifications

## 5.9 Monitoring and Mitigating Thermal Impacts on Dow's Lake

DevCO has provided six presentations to the NCC and Parks Canada to help aid the discussion and review of Stormwater and Groundwater:

1. Stormwater and Groundwater Presentation 01: 2024-06-17
2. Stormwater and Groundwater Presentation 02: 2024-08-22
3. Stormwater and Groundwater Presentation 03: 2024-11-13
4. Stormwater and Groundwater Presentation 04: 2025-06-09
5. Stormwater and Groundwater Presentation 05: 2025-07-08
6. Stormwater and Groundwater Presentation 06: 2025-07-23

The intent of these meetings was to discuss the stormwater management strategy and outstanding comments from the AHJs. The critical comment to be resolved was in relation to the impacts of groundwater to both flows, volumes and temperature on Dow's Lake. This resulted in the delivery of a Stormwater Management Memorandum dated July 29, 2025, which was provided to the NCC in support of the NCC board submission materials. The memorandum served as an intermediary submission between 65DD and 95DD which is now retired with the issuance of 95DD. The findings and recommendations found within the memorandum have been included in this report.

The memorandum and presentations relied upon the findings of the 65DD geotechnical report prepared by Paterson for post-construction groundwater contours and flows. The findings and solutions of this section rely upon the estimated groundwater flow and subdrain designs as provided by others. For the most current information relating to groundwater for this site, please refer to the 95DD Geotechnical and Hydrogeological report dated September 19, 2025.

### 5.9.1 Estimated Groundwater Flows

The current estimates are provided for 95DD and as presented at the July 23rd NCC Meeting are as follows:

- Current Main Building Groundwater Estimate: Based on the existing information, it is expected that the long-term volumes that the exterior perimeter drainage system would handle would vary between 200 000 L/day (2.3 L/s) to 350 000 L/day (4.1 L/s) should this option be selected. The volume would consist of surface water generated from snowmelt, heavy rainfall and spring thaw of subsoils
- Current Full Campus (including all sub-projects): Long-term groundwater control - Systems should be designed to handle up to 400,000 L/day (4.6 L/s) or 750,000 L/day (8.7 L/s)

Therefore, for the mitigation strategies, a conservative estimate of 850,000 L/Day (9.83 L/s) for design.

### 5.9.2 Thermal Impacts of Groundwater and Stormwater

Groundwater measurements and studies are ongoing with the project. Parson's is currently completing a stormwater monitoring program which has been provided to the NCC previously.

Please note that currently, groundwater flows to Dow's Lake via the project parcel and no at-grade storage of groundwater is planned. Therefore, the temperature of the discharge should match the current temperatures within reason. It is recommended to continue monitoring throughout the construction and post-construction phase(s) to confirm the proposed mitigation strategies are working as intended or need adjustment.

Stormwater storage on site will be managed underground. This limits thermal impacts and maintains cooler stormwater temperatures in the summer, as opposed to traditional stormwater management strategies such as wet ponds or surface detention over impervious surfaces (i.e. parking lot detention, temporary roof detention). Parson's is currently completing

a stormwater monitoring program which involves tracking the temperature of Dow's Lake at the outlet from the site. For more information on temperature tracking, please refer to the Parson's stormwater monitoring report.

### 5.9.3 Mitigation and Monitoring Options Analysis

At this stage of the project, it is understood that passive drainage will be utilized throughout the site with a combination of subdrains collecting groundwater as well as the flows from various sump pits across the site. The site is not intended to be actively dewatered in permanent conditions as it is during construction. The current estimate for the full campus steady state groundwater discharge in the permanent condition is between 400,000 L/day and 750,000 L/day (4.5 – 8.7 L/s), and 200,000L/day and 450,000 L/day for just the main building (65DD Paterson Geotechnical Report).

It may not be possible to confirm the exact volumes of groundwater entering directly from the parcel monthly to a degree of confidence that will satisfy that no thermal impacts will occur. Therefore, it is a suggested mitigation measure to install a diversion and monitoring system to redirect groundwater flows in the winter months.

There are two methods of diversion that were proposed to the AHJ: Option 01 – Dedicated Groundwater and Option 02 – Storm Sewer diversion. Please note that both options were presented and described in the July 23rd meeting with the NCC. While the two options have their own pros and cons, there are numerous similarities:

1. A diversion mitigation allows for the removal of a portion of the captured groundwater flows in the winter months which mitigates some of the risk of groundwater from the site increasing the temperature of Dow's Lake
2. Both options will utilize an orifice plate set to 10 L/s which limits the amount of flow going to the City, but is expected to allow enough flow within the estimates as currently available
3. Both options have the flexibility to increase or decrease from 10 L/s down the line with approval of all parties by modifying the orifice plate if continuous monitoring identifies an issue.
4. Both options are proposed to have a quality treatment unit (currently proposing a JF4 jellyfish unit) for treatment prior to discharge to the City sewer
5. Both options would utilize sluice gates to allow for flow diversion only within certain months
6. Both options should include continuous flow monitoring at both the final storm manhole prior to exiting site to Dow's Lake as well as at the connection to the Road A Storm Sewer to measure flows to the City. Refer to Parson's stormwater monitoring program for additional information on the current monitoring taking place
7. Both options can be installed utilizing construction techniques (such as a doghouse manhole) which allow the diversion to be installed even after the advanced work storm sewer is in place
8. Both options require approval from the City of Ottawa which has not yet been obtained.

### Option 01 – Dedicated Groundwater Diversion

The intention is to provide a connection for the main hospital subdrain to drain into a separating manhole upstream of the sewer connection. This allows for two connections to be provided: one to the advanced works storm sewer (to Dow's) and one to a new pipe carrying flows down Road A (to the Nepean Bay Trunk Sewer). The separating manhole will contain two sluice gate which allow flows to travel to either the City system or Dow's Lake. Given the periods of ice formation for the NCC Skateway the sluice gate to the City is proposed to be open between December 1st and March 15th. This ensures that groundwater collected by the main building is collected and distributed to the City Sewer. The benefits and disbenefits of this solution are as follows:

Benefits

1. Only groundwater will be diverted to the City storm sewer (dedicated system)

Disbenefits

1. There are numerous other subdrains on site (loading dock, roadway subdrains, landscaping subdrains, CUP and Retaining Walls) that would not be captured by this method. Based on the current Hydrogeological estimates as provided by Paterson it appears that only 25-50% of the groundwater is anticipated to be captured by this system; 50-75% of the groundwater on site would likely bypass the diversion.
2. Requires more piping and an additional sluice gate

### Option 02 – Storm Sewer Diversion

Option 02 follows many of the same principles as Option 01. The primary difference is to intercept and divert groundwater flows from the advanced works storm sewer system as opposed to collecting them from the perimeter subdrain. The benefits and disbenefits of this solution are as follows

Benefits

1. More likely to hit 10 L/s of diverted flow as a greater percentage of the site subdrains will be captured. It will not be possible to divert all subdrains, but far more connections are intercepted by Option 02 than Option 01.
2. Less piping than Option 01 and only one sluice gate

Disbenefits

1. Unable to guarantee that the water will be entirely groundwater (i.e., there may be snow melt in the winter months during periods of warmer weather) but the quantity will be limited to 10 L/s, and quality treatment will be provided.

After review of the options, it was determined that Option 02 is the preferred option. Since the submission on July 29th, 2025, Option 02 has been modelled and can be found on design drawing C1-202 of the 95DD drawings.

### Operational Considerations

NCC and DevCO had a productive conversation on July 23rd outlining how the mitigation system would operate. The sluice gate has a manual wheel which allows for opening and closing. This is proposed to be carried out twice yearly, but may be modified should the continuous monitoring yield results requiring a change (in approval with TOH, City and NCC):

1. Open Sluice Gate to send up to 10 L/s to City – Nov 30
2. Close Sluice Gate returning flows to Dow's Lake – Mar 15

The NCC raised a valid concern in the July 23rd meeting inquiring if operation of the sluice gate would close the existing lane from the main entry. The intent is for the access lid to be within the roadway to ensure that it is accessible during the winter months. Placement of the entry lid to the diversion manhole will be set through design to ideally allow a partial closure of the lane with a detour, to allow traffic to continue to flow. It is anticipated that the closure would last less than two hours and could be completed in off-peak hours.

Continuous monitoring data should be tracked by the hospital's facility management team and distributed for review to both the City and the NCC at agreed upon intervals.

### 5.9.4 Next Steps

The mitigation strategy will need to be reviewed and accepted by the City. It is understood that the next opportunity for review and discussion will occur following the Site Plan Control Resubmission milestone for the project. Given that the mitigation measure can remain closed until approved, it is recommended that it be constructed and that the data collected from the continuous monitoring of the system be utilized to evaluate the effectiveness of the solution and help determine any modifications that need to be made (I.E. alteration of orifice plate sizing for flow release, changing of timing of sluice gate operation etc).

# 6.0 APPROVALS

## 6.1 Permits and Approvals

The following approvals and permits are anticipated to be required for the proposed development. Note that due to the split scope between Phase 4 and Phase 3: Advanced Works, some or all of the below permits may be required under the Advanced Works scope.

1. City of Ottawa Site Plan Agreement
2. City of Ottawa Commence Work Order
3. City of Ottawa Water Permit
4. City of Ottawa Water Data Card
5. City of Ottawa Flow Control Roof Drainage Declaration
6. Ministry of the Environment, Conservation and Parks Environmental Compliance Approval
7. Ministry of the Environment, Conservation and Parks Permit to Take Water
8. National Capital Commission Federal Land Use and Design Approval

Note that the governing Conservation Authority, the Rideau Valley Conservation Authority, does not have an outright permit or approval required, but they do enforce an 80% Total Suspended Solids Removal. Similar to the National Capital Commission, the Rideau Valley Conservation Authority requires best management practices for water treatment and promotes the usage of Low-Impact Development.

## 7.0 CONCLUSION

In summary, stormwater, sanitary, and watermain site servicing connections are proposed to accommodate the Phase 3 design of the New Civic Development for The Ottawa Hospital. The service connections accommodate the future buildout of the Main Hospital Building, the Central Utility Plant, and the future University of Ottawa Heart Institute. The servicing connections have been designed in compliance with federal, local, and project governing criteria.

The site grading and stormwater management design has been completed for the 95% Developed Design level. The accompanying engineering drawings and stormwater management report depict the overall design of the scope and discuss the relevant stormwater management parameters.

Future iterations of this report, for subsequent and upcoming design submission milestones, will include a comment matrix in an Appendix for all open and provided comments by various review agencies and stakeholders. Project and WSP responses will accompany all previous comments.

WSP Canada Inc trusts that the above information and design is complete and satisfactory. If you have any questions, comments, or concerns, please do not hesitate to contact the undersigned.

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Colin Graham, P. Eng, PMP
Senior Project Engineer
Municipal Engineering & Land Development
WSP Canada Inc.
Ottawa, Ontario

# APPENDIX A: CIVIL DOMESTIC WATER DEMANDS

# WATER DISTRIBUTION - DISTRIBUTION DEMANDS

**PROJECT:** NEW CIVIC DEVELOPMENT FOR THE OTTAWA HOSPITAL
**PROJECT NUMBER:** CA0021243.8764
**DATE:** 2025-12-19
**SUBMISISON:** SPC RESUBMISSION
**BY:** LIAM CURLEY
**CHECKED:** COLIN GRAHAM

**Site Information**

| | | |
|---|---|---|
| Address: | New Civic Development - The Ottawa Hospital | |
| Area | 82429 | $m^2$ |
| Area | 8.24 | ha |

**Distribution Demands**

Consumption Rates via Table 4.2

| | | |
|---|---|---|
| Residential = | 350 | L/c/d |
| Industrial - Light = | 35000 | L/gross ha/d |
| Industrial - Heavy = | 55000 | L/gross ha/d |
| Com.Indu - Shopping Centre = | 2500 | L/(1000m2/d) |
| Com.Indu - Hospital = | 900 | L/(bed/d) |
| Com.Indu - School = | 70 | L/(student/d) |
| Com.Indu - Trailer Park = | 340 | L/space/d) |
| Com.Indu - Trailer Park (w HU) = | 800 | L/space/d) |
| Com.Indu - Campground = | 225 | L/(campsite/d) |
| Com.Indu - Mobile Home = | 1000 | L/(Space/d) |
| Com.Indu - Motels = | 150 | L/(bed-spce/d) |
| Com.Indu - Hotels = | 225 | L/(bed-spce/d) |
| Commercial - Tourist = | 28000 | L/gross ha/d |
| Commercial - Other = | 28000 | L/gross ha/d |

| Unit Populations | Persons/Unit |
|---|---|
| Single Famil = | 3.4 |
| Semi-Detach = | 2.7 |
| Duplex = | 2.3 |
| Townhouse = | 2.7 |
| Bachelor = | 1.4 |
| 1 Bedroom = | 1.4 |
| 2 Bedroom = | 2.1 |
| 3 Bedroom = | 3.1 |
| Average Apt = | 1.8 |

**Maximum Daily Demand:**

| | | | | |
|---|---|---|---|---|
| Residential = | 2.5 | x | average day | L/c/d |
| Industrial = | 1.5 | x | average day | L/gross ha/d |
| Commercial = | 1.5 | x | average day | L/gross ha/d |
| Institutional = | 1.5 | x | average day | L/gross ha/d |

**Maximum Hour Demand:**

| | | | | |
|---|---|---|---|---|
| Residential = | 2.2 | x | maximum day | L/c/d |
| Industrial = | 1.8 | x | maximum day | L/gross ha/d |
| Commercial = | 1.8 | x | maximum day | L/gross ha/d |
| Institutional = | 1.8 | x | maximum day | L/gross ha/d |

| **Distribution Demands** | **Calculations Design Build-Out** | | **Calculations Ultimate Build-Out** | | **Justifications** |
|---|---|---|---|---|---|
| Residential? = | No | | No | | Not a residential site. |
| If Yes, Unit Population = | 0 | Persons | 0 | Persons | |
| If No, Demand Type = | Com.Indu - Hospital | | Com.Indu - Hospital | | Per Ottawa Design Guidelines - Water Distribution Table 4.2 - Other - Commercial |
| Average Day Demand = | 900 | L/bed/day | 900 | L/bed/day | Per Ottawa Design Guidelines - Water Distribution Table 4.2 - the Average Day Demand of a Commercial - Industrial Hospital is 900L/bed/day |
| **Beds =** | **689.00** | **Beds** | **1,147.00** | **Beds** | Approximately 689 Inpatient Beds in NCD as per PSOS. Final Bed count for the total build out is 1147. |
| **A. Average Daily Flow** | | | | | |
| **Average Daily Flow =** | 900 x 689 | | 900 x 1147 | | |
| = | 620,100 | L/day | 1,032,300 | L/day | |
| **=** | **7.18** | **L/s** | **11.95** | **L/s** | |
| **B. Maximum Daily Demand** | | | | | |
| Daily Demand Type = | Industrial | | Industrial | | Commercial and Industrial have the same maximum daily factor coefficient. |
| Max. Daily Factor = | 1.5 | | 1.5 | | |
| **Maximum Daily Demand =** | 1.5 x | average day | 1.5 x | average day | |
| = | 1.5 x | 620,100 | 1.5 x | 1,032,300 | |
| = | 930,150 | L/day | 1,548,450 | L/day | |
| **=** | **10.77** | **L/s** | **17.92** | **L/s** | |
| **C. Maximum Hour Demand** | | | | | |
| Hour Demand Type = | Industrial | | Industrial | | Commercial and Industrial have the same maximum daily factor coefficient. |
| Max. Hour Factor = | 1.8 | | 1.8 | | |
| **Maximum Hour Demand =** | 1.8 x | maximum day | 1.8 x | maximum day | |
| = | 1.8 x | 930,150 | 1.8 x | 1,548,450 | |
| = | 1,674,270 | L/day | 2,787,210 | L/day | |
| = | **19.38** | **L/s** | **32.26** | **L/s** | |

| **TOTAL MAIN HOSPITAL BUILDING** | **Design Build-Out Demands** | | **Ultimate Build-Out Demands** | |
|---|---|---|---|---|
| **Average Daily =** | 7.18 | L/s | 11.95 | L/s |
| **Max Daily =** | 10.77 | L/s | 17.92 | L/s |
| **Max Hourly =** | 19.38 | L/s | 32.26 | L/s |

# WATER DISTRIBUTION - DISTRIBUTION DEMANDS

**PROJECT:** NEW CIVIC DEVELOPMENT FOR THE OTTAWA HOSPITAL
**PROJECT NUMBER:** CA0021243.8764
**DATE:** 2025-12-19
**SUBMISISON:** SPC RESUBMISSION
**BY:** LIAM CURLEY
**CHECKED:** COLIN GRAHAM

**Site Information**

| | | |
|---|---|---|
| Address: | New Civic Development - The Ottawa Hospital | |
| Area | 82400 | $m^2$ |
| Area | 8.24 | ha |

**Distribution Demands**

| Consumption Rates via Table 4.2 | | | Unit Populations | | Persons/Unit |
|---|---|---|---|---|---|
| Residential = | 350 | L/c/d | Single Family | = | 3.4 |
| Industrial - Light = | 35000 | L/gross ha/d | Semi-Detached | = | 2.7 |
| Industrial - Heavy = | 55000 | L/gross ha/d | Duplex | = | 2.3 |
| Com.Indu - Shopping Centre = | 2500 | L/(1000m2/d) | Townhouse (Row) | = | 2.7 |
| Com.Indu - Hospital = | 900 | L/(bed/d) | Bachelor | = | 1.4 |
| Com.Indu - School = | 70 | L/(student/d) | 1 Bedroom | = | 1.4 |
| Com.Indu - Trailer Park = | 340 | L/space/d) | 2 Bedroom | = | 2.1 |
| Com.Indu - Trailer Park (w HU) = | 800 | L/space/d) | 3 Bedroom | = | 3.1 |
| Com.Indu - Campground = | 225 | L/(campsite/d) | Average Apt | = | 1.8 |
| Com.Indu - Mobile Home = | 1000 | L/(Space/d) | | | |
| Com.Indu - Motels = | 150 | L/(bed-spce/d) | | | |
| Com.Indu - Hotels = | 225 | L/(bed-spce/d) | | | |
| Commercial - Tourist = | 28000 | L/gross ha/d | | | |
| Commercial - Other = | 28000 | L/gross ha/d | | | |

**Maximum Daily Demand:**

| | | | | |
|---|---|---|---|---|
| Residential = | 2.5 | x | average day | L/c/d |
| Industrial = | 1.5 | x | average day | L/gross ha/d |
| Commercial = | 1.5 | x | average day | L/gross ha/d |
| Institutional = | 1.5 | x | average day | L/gross ha/d |

**Maximum Hour Demand:**

| | | | | |
|---|---|---|---|---|
| Residential = | 2.2 | x | maximum day | L/c/d |
| Industrial = | 1.8 | x | maximum day | L/gross ha/d |
| Commercial = | 1.8 | x | maximum day | L/gross ha/d |
| Institutional = | 1.8 | x | maximum day | L/gross ha/d |

| **Distribution Demands** | **Calculations** | | | **Justifications** |
|---|---|---|---|---|
| Residential? = | No | | | Not a residential site. |
| If Yes, Unit Population = | 0 | | Persons | |
| If No, Demand Type = | Industrial - Heavy | | | Per Ottawa Design Guidelines - Water Distribution Table 4.2 - Other - Commercial |
| | | | | Industiral Heavy flows used to simulate the water demands for the Future University of Ottawa Heart Institute. |
| Average Day Demand = | 55,000 | | L/ha/day | |
| | | | | The approximate gross floor area for the build-out of the Future University of Ottawa Heart Institute is 9.29 ha. |
| **Site Area =** | **9.29** | | **ha** | |
| **A. Average Daily Flow** | | | | |
| **Average Daily Flow =** | 55,000 | x | 9.29 | |
| = | 510,950 | | L/day | |
| **=** | **5.91** | | **L/s** | |
| **B. Maximum Daily Demand** | | | | |
| Daily Demand Type = | Industrial | | | Commercial and Industrial have the same maximum daily factor coefficient. |
| Max. Daily Factor = | 1.5 | | | |
| **Maximum Daily Demand =** | 1.5 | x | average day | |
| = | 1.5 | x | 510,950 | |
| = | 766,425 | | L/day | |
| **=** | **8.87** | | **L/s** | |
| **C. Maximum Hour Demand** | | | | |
| Hour Demand Type = | Industrial | | | Commercial and Industrial have the same maximum daily factor coefficient. |
| Max. Hour Factor = | 1.8 | | | |
| **Maximum Hour Demand =** | 1.8 | x | maximum day | |
| = | 1.8 | x | 766,425 | |
| = | 1,379,565 | | L/day | |
| = | **15.97** | | **L/s** | |

| **TOTAL** | **FUTURE UNIVERSITY OF OTTAWA HEART INSTITUTE** | |
|---|---|---|
| **Average Daily =** | 5.91 | L/s |
| **Max Daily =** | 8.87 | L/s |
| **Max Hourly =** | 15.97 | L/s |

# APPENDIX B: FIRE FLOW

# WATER DISTRIBUTION - THEORETICAL FIRE FLOW DEMANDS

**PROJECT:** NEW CIVIC DEVELOPMENT FOR THE OTTAWA HOSPITAL
**PROJECT NUMBER:** CA0021243.8764
**DATE:** 2025-12-19
**SUBMISISON:** SPC RESUBMISSION
**BY:** LIAM CURLEY
**CHECKED:** COLIN GRAHAM

**F = 220 C √ A**

MAIN HOSPITAL BUILDING

| **Type of Construction Coefficient:** | | Comments |
|---|---|---|
| Type V Wood Frame | 1.5 | When structural elements, walls, arches, floors, and roofs are constructed or entirely or partially of wood or other material. |
| Type IV-A Mass Timber | 0.8 | Encapsulated - When structural elements, walls, arches, and floors have a minimum 2-hour fire reisstance rating and the roof has a minimum 1 hour fire resistance rating. |
| Type IV-B Mass Timber | 0.9 | Rated - When all building assemblies include mass timber construction elements and all structural elements, exterior walls, interior bearing walls, and roof have a minimum 1-hour fire resistance rating. |
| Type IV-C Mass Timber | 1.0 | Ordinary - When exterior walls are of Mass Timber construction with a minimum 1-hour fire resistance rating. Other structural elements, interior bearing walls, and the roof may not have a fire resistance rating. |
| Type IV-D Mass Timber | 1.5 | Un-rated - When exterior walls do not have a minimum 1-hour fire resistance rating, regardless of the fire resistance rating of other structural elements, interior bearing walls, and the roof. |
| Type III Ordinary | 1.0 | When exterior walls are of masonry construction with minimum 1-hour fire resistance rating, but where other elements such as interior walls/arches, floors/roofs do not have mimimum 1 hour fire resistance rating. |
| Type II Noncombustible Construction | 0.8 | When all structural elements, walls, arches, floors, and roofs are constructed with a minimum 1-hour fire resistance rating and are constructed with noncombustible materials. |
| Type 1 Fire Resistive Construction | 0.6 | When all structural elements, walls, arches, floors, and roofs are constructed with a minimum 2-hour fire resistance rating, and all materials used in str. Elmnts, walls/arches/floors/roofs are noncombustible materials. |

| **Total Effective Area** | |
|---|---|
| Construction Coefficient 1.0 to 1.5 | 100% of all Floor Area |
| Construction Coefficient Below 1.0 | |
| Unprotected | If any vertical openings are unprotected, consider two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of 8 |
| Protected | If all vertical openings and exterior vertical communications are properly protected in accordance with the NBC, consider only single largest floor area plus 25% of each of the two immediately adjoining floors |

| **Combustibility:** | | |
|---|---|---|
| Non-Combustible | -25% | Refer to *Water Supply for Public Fire Protection (2020)* Table 3, which provides example major occupancies from the NBC. Values can be modified by up to 10% positively or negatively depending on the extent of unusual fire |
| Limited Combustible | -15% | loading. Buildings with multiple should use the most restrictive occupancy. |
| Combustible | 0% | |
| Free Burning | 15% | |
| Rapid Burning | 25% | |

| **Sprinkler Protection:** | | |
|---|---|---|
| Automatic Sprinkler Protection (NFPA 13) | -30% | Note that if only partial building coverage, the credit is percentage of total floor area serviced by the sprinkler system |
| Water supply is standard for both system+dire | | |
| department hoses | -10% | |
| Fully Supervised System | -10% | |
| Community Level | -25% | |
| None | 0% | |

| **Exposure Adjustments** | | |
|---|---|---|
| 0m to 3m | 25% | Exposed Risk = Adjacent Feature |
| 3.1m to 10m | 20% | |
| 10.1m to 20m | 15% | |
| 20.1m to 30m | 10% | |
| Greater than 30m | 0% | |

## A. Type of Construction Coefficient

| | | |
|---|---|---|
| Building Category | Type 1 Fire Resistive Construction | |
| Coefficient | | 0.6 |

**Justifications**

The structure consists of a steel roof deck, a steel floor deck supporting concrete, structural steel framing, and concrete foundations. These elements make up a non-combustible structure. structural elements including walls, arches, floors, and roofs are constructed with a minimum 2-hour fire resistance rating and are constructed with noncombustible materials.

As such, a Type I Fire Resistive Construction coefficient will be used.

## B. Total Effective Area

| | | |
|---|---|---|
| If Construction Coefficient 1.0 to 1.5 | NO | |
| Floor Areas | N/A | |
| If Construction Coefficient below 1.0 | YES | |
| Vertical Openings | Protected | L/min |
| Floor Area Methodology | SINGLE LARGEST +25% OF TWO ADJOINING | |
| Total Effective Area | | 73,349 m^2 |

**Justifications**

As per the Fire Underwriter's Survey (2020), for a building with a construction coefficient below 1.0: If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest floor area plus 25% of each of the two immediately adjoining floors.

The total effective floor area for the Main Hospital Building was calculated to be 61,518m2 (this includes the largest floor and additional two (2) adjoining floors at 25%).
The largest floor is Level 01 at 42,266m2 (30,266m2 for the Main Hospital Building + 12,000m2 assumed for the future Heart Institute).
The adjoining floor below is Emergency at 41,737m2 (29,737m2 for the Main Hospital Building + 12,000m2 assumed for the future Heart Institute).
The adjoining floor above is Level 02 at 36,860m2 (24,860m2 for the Main Hospital Building + 12,000m2 assumed for the future Heart Institute).

## C. Base Required Fire Flow

| | | |
|---|---|---|
| RFF | 35,750 | L/min |
| Round to Nearest 1,000LPM | 36,000 | L/min |

**Justifications**

F = 220 C √ A

## D. Occupancy Contents Adjustment Factor

| | | |
|---|---|---|
| Modification 1: Occupancy Combustibility | Limited Combustible | |
| | -15% | |
| Occupancy Credit | -5,362 | L/min |
| F(mod1) = F(round) + Occupancy Credit | 30,387 | L/min |

**Justifications**

As per *Technical Bulletin ISTB-2018-02, Page 37 of 47, NRC Guidelines,* the New Campus Development Main Hospital Building classifies as Type C-2, Limited Combustible (railroad terminal). The Occupancy and Contents classification is considered "Limited to Combustible" with an Adjustment Factor of -15% to 0%.

## E. Automatic Sprinkler Protection

| | | |
|---|---|---|
| Automatic Sprinkler Protection (NFPA 13) | YES | |
| Credit | -30% | |
| Water supply is standard for both system+fire department | | |
| hoses | YES | |
| Credit | -10% | |
| Fully Supervised System | YES | |
| Credit | -10% | |
| Additional Reductions | NO | |
| Credit | 0% | |
| Total Credit Percentage | -50% | |
| Sprinkler Credit | -15,194 | L/min |

**Justifications**

A total reduction factor of 50% (automatic sprinklers NFPA standards, standard water supply, and full supervision) was selected for the proposed Main Hospital Building.

## F. Exposure Adjustment Charge

| | | |
|---|---|---|
| ***NORTH SIDE*** | | |
| Exposure Distance | 100.00 | m |
| Exposure Distance Category | Greater than 30m | |
| Length of Exposed | - | m |
| Story of Exposed | - | Story |
| Length/Height Value | 0 | m |
| Exposed Building Construction Type | Type III or IV (Unprotected Openings) | |
| Table 6 Exposure Change | 0% | |
| Exposure Sprinkler Type | Not Applicable | |
| Sprinkler Credit | 100% | |
| Final Exposure Change | 0% | |
| ***SOUTH SIDE*** | | |
| Exposure Distance | 20.00 | m |
| Exposure Distance Category | 10.1m to 20m | |
| Limit of Exposure (hidden) | 20.00 | |
| Length of Exposed | 188.00 | m |
| Story of Exposed | 2.00 | Story |
| Length/Height Value | 376 | |
| Exposed Building Construction Type | Type I or II (Protected Openings) | |
| Table 6 Exposure Change | 8% | |
| Exposure Sprinkler Type | Exposed & Subject: Fully Protected, Automatic Sprinkler | |
| Sprinkler Credit | 0% | |
| Final Exposure Change | 0% | |
| ***EAST SIDE*** | | |
| Exposure Distance | 100.00 | m |
| Exposure Distance Category | Greater than 30m | |
| Length of Exposed | - | m |
| Story of Exposed | - | Story |
| Length/Height Value | 0 | m |
| Exposed Building Construction Type | Type I or II (Unprotected Openings) | |
| Table 6 Exposure Change | 0% | |
| Exposure Sprinkler Type | Not Applicable | |
| Sprinkler Credit | 100% | |
| Final Exposure Change | 0% | |
| ***WEST SIDE*** | | |
| Exposure Distance | 1.00 | m |
| Exposure Distance Category | 0m to 3m | |
| Length of Exposed | 95.00 | m |
| Story of Exposed | - | Story |
| Length/Height Value | 0 | m |
| Exposed Building Construction Type | Type III or IV (Protected Openings) | |
| Table 6 Exposure Change | 15% | |
| Exposure Sprinkler Type | Exposed & Subject: Fully Protected, Automatic Sprinkler | |
| Sprinkler Credit | 0% | |
| Final Exposure Change | 0% | |
| Final Exposure Change Sum of All Sides | 0% | |
| Total Exposure Change | - | L/min |

**Justifications**

*NORTH SIDE*

There are no buildings within 30m on the North side of the Main Hospital Building.

*SOUTH SIDE*

The Central Utility Plant (CUP) is within 30m of the South Side of the Main Hospital Building

*EAST SIDE*

There are no buildings within 30m on the East side of the Main Hospital Building.

*WEST SIDE*

The Pavillion is located adjacent to the Main Hospital Building

## G. Final Flow Calculation

| | | |
|---|---|---|
| F(mod2) = F(mod1) - Sprinkler + Exposure Change | 15,194 | L/min |
| **F(final) = F(mod2) rounded to nearest 1,000L/min** | **15,000** | **L/min** |
| **F** | **250** | **L/s** |
| **F(final)** | **3,963** | **US gpm** |

# WATER DISTRIBUTION - THEORETICAL FIRE FLOW DEMANDS

**PROJECT:** NEW CIVIC DEVELOPMENT FOR THE OTTAWA HOSPITAL
**PROJECT NUMBER:** CA0021243.8764
**DATE:** 2025-12-19
**SUBMISISON:** SPC RESUBMISSION
**BY:** LIAM CURLEY
**CHECKED:** COLIN GRAHAM

**F = 220 C √ A**

CENTRAL UTILITY PLANT

| **Type of Construction Coefficient:** | | Comments |
|---|---|---|
| Type V Wood Frame | 1.5 | When structural elements, walls, arches, floors, and roofs are constructed or entirely or partially of wood or other material. |
| Type IV-A Mass Timber | 0.8 | Encapsulated - When structural elements, walls, arches, and floors have a minimum 2-hour fire reisstance rating and the roof has a minimum 1 hour fire resistance rating. |
| Type IV-B Mass Timber | 0.9 | Rated - When all building assemblies include mass timber construction elements and all structural elements, exterior walls, interior bearing walls, and roof have a minimum 1-hour fire resistance rating. |
| Type IV-C Mass Timber | 1.0 | Ordinary - When exterior walls are of Mass Timber construction with a minimum 1-hour fire resistance rating. Other structural elements, interior bearing walls, and the roof may not have a fire resistance rating. |
| Type IV-D Mass Timber | 1.5 | Un-rated - When exterior walls do not have a minimum 1-hour fire resistance rating, regardless of the fire resistance rating of other structural elements, interior bearing walls, and the roof. |
| Type III Ordinary | 1.0 | When exterior walls are of masonry construction with minimum 1-hour fire resistance rating, but where other elements such as interior walls/arches, floors/roofs do not have mimimum 1 hour fire resistance rating. |
| Type II Noncombustible Construction | 0.8 | When all structural elements, walls, arches, floors, and roofs are constructed with a minimum 1-hour fire resistance rating and are constructed with noncombustible materials. |
| Type 1 Fire Resistive Construction | 0.6 | When all structural elements, walls, arches, floors, and roofs are constructed with a minimum 2-hour fire resistance rating, and all materials used in str. Elmnts, walls/arches/floors/roofs are noncombustible materials. |

| **Total Effective Area** | |
|---|---|
| Construction Coefficient 1.0 to 1.5 | 100% of all Floor Area |
| Construction Coefficient Below 1.0 | |
| Unprotected | If any vertical openings are unprotected, consider two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of 8 |
| Protected | If all vertical openings and exterior vertical communications are properly protected in accordance with the NBC, consider only single largest floor area plus 25% of each of the two immediately adjoining floors |

| **Combustibility:** | | |
|---|---|---|
| Non-Combustible | -25% | Refer to *Water Supply for Public Fire Protection (2020)* Table 3, which provides example major occupancies from the NBC. Values can be modified by up to 10% positively or negatively depending on the extent of unusual fire |
| Limited Combustible | -15% | loading. Buildings with multiple should use the most restrictive occupancy. |
| Combustible | 0% | |
| Free Burning | 15% | |
| Rapid Burning | 25% | |

| **Sprinkler Protection:** | | |
|---|---|---|
| Automatic Sprinkler Protection (NFPA 13) | -30% | Note that if only partial building coverage, the credit is percentage of total floor area serviced by the sprinkler system |
| Water supply is standard for both system+dire | | |
| department hoses | -10% | |
| Fully Supervised System | -10% | |
| Community Level | -25% | |
| None | 0% | |

| **Exposure Adjustments** | | |
|---|---|---|
| 0m to 3m | 25% | Exposed Risk = Adjacent Feature |
| 3.1m to 10m | 20% | |
| 10.1m to 20m | 15% | |
| 20.1m to 30m | 10% | |
| Greater than 30m | 0% | |

## A. Type of Construction Coefficient

| | | |
|---|---|---|
| Building Category | Type 1 Fire Resistive Construction | |
| Coefficient | 0.6 | |

**Justifications**

The structure consists of a steel roof deck, a steel floor deck supporting concrete, structural steel framing, and concrete foundations. These elements make up a non-combustible structure. structural elements including walls, arches, floors, and roofs are constructed with a minimum 2-hour fire resistance rating and are constructed with noncombustible materials.

As such, a Type I Fire Resistive Construction coefficient will be used.

## B. Total Effective Area

| | | |
|---|---|---|
| If Construction Coefficient 1.0 to 1.5 | NO | |
| Floor Areas | N/A | |
| If Construction Coefficient below 1.0 | YES | |
| Vertical Openings | Protected | L/min |
| Floor Area Methodology | SINGLE LARGEST +25% OF TWO ADJOINING | |
| Total Effective Area | 24,000 | m^2 |

**Justifications**

As per the Fire Underwriter's Survey (2020), for a building with a construction coefficient below 1.0: If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest floor area plus 25% of each of the two immediately adjoining floors.

The total effective floor area for the central utility plant was assumed to be 24,000m2 (this is approximately two (2) times the floor area).
The total effective floor area for the central utility plant will need to be calculated and adjusted accordingly based on the interior architectural floor plans.

## C. Base Required Fire Flow

| | | |
|---|---|---|
| RFF | 20,449 | L/min |
| Round to Nearest 1,000LPM | 20,000 | L/min |

**Justifications**

F = 220 C √ A

## D. Occupancy Contents Adjustment Factor

| | | |
|---|---|---|
| Modification 1: Occupancy Combustibility | Combustible | |
| | 0% | |
| Occupancy Credit | 0 | L/min |
| F(mod1) = F(round) + Occupancy Credit | 20,449 | L/min |

**Justifications**

As per *Technical Bulletin ISTB-2018-02, Page 37 of 47, NRC Guidelines,* the New Campus Development Central Utility Plant station classifies as Type C-2, Combustible. The Occupancy and Contents classification is considered "Combustible" with an Adjustment Factor of 0%.

## E. Automatic Sprinkler Protection

| | | |
|---|---|---|
| Automatic Sprinkler Protection (NFPA 13) | YES | |
| Credit | -30% | |
| Water supply is standard for both system+fire department hoses | YES | |
| Credit | -10% | |
| Fully Supervised System | YES | |
| Credit | -10% | |
| Additional Reductions | NO | |
| Credit | 0% | |
| Total Credit Percentage | -50% | |
| Sprinkler Credit | -10,225 | L/min |

**Justifications**

A total reduction factor of 50% (automatic sprinklers NFPA standards, standard water supply, and full supervision) was selected for the proposed Central Utility Plant.

## F. Exposure Adjustment Charge

| | | |
|---|---|---|
| ***NORTH SIDE*** | | |
| Exposure Distance | 20.00 | m |
| Exposure Distance Category | 10.1m to 20m | |
| Length of Exposed | - | m |
| Height of Exposed | - | m |
| Length/Height Value | 0 | m |
| Exposed Building Construction Type | Type I or II (Unprotected Openings) | |
| Table 6 Exposure Change | 0% | |
| Exposure Sprinkler Type | Exposed: Fully Protected, Automatic Sprinkler | |
| Sprinkler Credit | 50% | |
| Final Exposure Change | 0% | |
| ***SOUTH SIDE*** | | |
| Exposure Distance | 100.00 | m |
| Exposure Distance Category | Greater than 30m | |
| Length of Exposed | - | m |
| Height of Exposed | - | m |
| Length/Height Value | 0 | m |
| Exposed Building Construction Type | Type I or II (Unprotected Openings) | |
| Table 6 Exposure Change | 0% | |
| Exposure Sprinkler Type | Not Applicable | |
| Sprinkler Credit | 100% | |
| Final Exposure Change | 0% | |
| ***EAST SIDE*** | | |
| Exposure Distance | 100.00 | m |
| Exposure Distance Category | Greater than 30m | |
| Length of Exposed | - | m |
| Height of Exposed | - | m |
| Length/Height Value | 0 | m |
| Exposed Building Construction Type | Type I or II (Unprotected Openings) | |
| Table 6 Exposure Change | 0% | |
| Exposure Sprinkler Type | Not Applicable | |
| Sprinkler Credit | 100% | |
| Final Exposure Change | 0% | |
| ***WEST SIDE*** | | |
| Exposure Distance | 100.00 | m |
| Exposure Distance Category | Greater than 30m | |
| Length of Exposed | - | m |
| Height of Exposed | - | m |
| Length/Height Value | 0 | m |
| Exposed Building Construction Type | Type I or II (Unprotected Openings) | |
| Table 6 Exposure Change | 0% | |
| Exposure Sprinkler Type | Exposed & Subject: Fully Protected, Automatic Sprinkler | |
| Sprinkler Credit | 0% | |
| Final Exposure Change | 0% | |
| Final Exposure Change Sum of All Sides | 0% | |
| Total Exposure Change | - | L/min |

**Justifications**

*NORTH SIDE*

The closest point of the Main Hospital Building is 20m away from the CUP.

*SOUTH SIDE*

There are no buildings within 30m on the South side of the Central Utility Plant.

*EAST SIDE*

There are no buildings within 30m on the East side of the Central Utility Plant.

*WEST SIDE*

There are no buildings within 30m on the West side of the Central Utility Plant.

## G. Final Flow Calculation

| | | |
|---|---|---|
| F(mod2) = F(mod1) - Sprinkler + Exposure Change | 10,225 | L/min |
| **F(final) = F(mod2) rounded to nearest 1,000L/min** | **10,000** | **L/min** |
| **F** | **167** | **L/s** |
| **F(final)** | **2,642** | **US gpm** |

# APPENDIX C: EPANET OUTPUT

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

Input File: NCD-Case 1 CENTRAL UTILITY PLANT.net

Scenario: with hospital loop
Date: 2024-07-19 11:25:02 AM

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 43-PropWM300mmHospitalJ-2 | J-3 | | 44.3429614279853 | 300 |
| 32-PropWM300mmRdLJ-12 | J-13 | | 8.10 | 300 |
| 21-ExWM400mmCarlingAveR-2 | J-E1 | | 148.67 | 1000 |
| 20-ExWM400mmCarlingAveJ-E1 | J-E2 | | 72.06 | 400 |
| 16-ExWM400mmCarlingAveJ-E4 | J-E3 | | 53.8905996515422 | 400 |
| 8-ExWM400mmCarlingAveJ-E8 | J-E7 | | 30.3005394242057 | 400 |
| 45-PropWM300mmHospitalJ-E1 | J-1 | | 20.64 | 300 |
| 19-PropWM150mmResearchBJ-E2 | J-22 | | 30.3462421119232 | 150 |
| 15-PropWM150mmCarlingV-T#3J-E4 | J-21 | | 30.9676844497797 | 150 |
| 9-PropWM150mmCarlingV-T#2J-E7 | J-20 | | 31.0736886830009 | 150 |
| 7-PropWM150mmCarlingV-T#1J-E8 | J-19 | | 31.2526179381906 | 150 |
| 23-PropWM300mmRdAJ-18 | H-1 | | 8.34306529014965 | 300 |
| 24-PropWM300mmRdAH-1 | J-17 | | 26.2370276682741 | 300 |
| 37-PropWM300mmRdDJ-6 | H-4 | | 14.21 | 300 |
| 36-PropWM300mmRdDH-4 | J-7 | | 59.70 | 300 |
| 28-PropWM300mmRdBH-2 | J-25 | | 47.92 | 300 |
| 30-PropWM300mmRdBJ-25 | H-5 | | 42.00 | 300 |
| 29-PropWM150mmPGServiceJ-25 | J-26(PGService) | | 16.98 | 150 |
| 14-ExWM400mmCarlingAve366028H031 | J-E4 | | 29.2340814798819 | 400 |
| 17-ExWM400mmCarlingAve366028H029 | J-E3 | | 35.0957871684793 | 400 |
| 18-ExWM400mmCarlingAveJ-E2 | 366028H029 | | 54.4871678813318 | 400 |
| 10-ExWM400mmCarlingAveJ-E7 | J-E6 | | 86.5525765463542 | 400 |
| 13-ExWM400mmCarlingAveJ-E6 | 366028H031 | | 7.73250133830889 | 400 |
| 11-ExWM150mmCarlingAveJ-E6 | J-E5 | | 7.45726728454382 | 150 |
| 12-ExWM150mmCarlingAveJ-E5 | 366028H030 | | 90.9465713866359 | 150 |
| 6-ExWM400mmCarlingAveJ-E9 | J-E8 | | 0.382945097269914 | 400 |
| 4-ExWM150mmPrestonStJ-E9 | 366028H219 | | 40.1973470697933 | 150 |
| 31-PropWM300mmRdBJ-14 | H-5 | | 22.94 | 300 |
| 25-PropWM300mmRdAJ-17 | J-16 | | 62.29 | 300 |
| 40-PropWM300mmHospitalJ-4 | H-15 | | 91.57 | 300 |
| 39-PropWM300mmHospitalH-15 | J-5 | | 24.29 | 300 |

```
42-PropWM300mmHospitalJ-3            H-7                 43.89       300
41-PropWM300mmHospitalH-7            J-4                 10.80       300
38-PropWM300mmHospitalJ-5            J-6            35.8431820756787       300
1-ExWM400mmCarlingAveR-1            J-E10               19.39      1000
3-ExWM400mmCarlingAveJ-E10          J-E9           0.399488044413268       400
```

```
Page 2                                    Scenario: with hospital loop
Link - Node Table: (continued)
----------------------------------------------------------------------
Link           Start          End                 Length  Diameter
ID             Node           Node                     m        mm
----------------------------------------------------------------------
5A-ExWM150mmPrestonStJ-E11          366028H185     45.2635914858321       150
46-PropWM200mmCUPServiceJ-24           J-27(CUPService)     11.58       200
27-PropWM300mmRdBJ-16           H-2                 21.58       300
26-PropWM300mmRdAJ-16           J-15                21.35       300
47-PropWM300mmHospitalJ-3            J-29           12.8116327584704       300
49-PropWM300mmRdAJ-28           J-15                34.67       300
50-PropWM300mmRdEJ-7            H-6                 13.31       300
51-PropWM300mmRdEH-6            J-8                 22.67       300
56-PropWM300mmRdEH-11           J-31                 5.74       300
57-PropWM200mmCUPServiceJ-10           J-30(CUPService)     11.59       200
59-PropWM300mmRdEH-10           J-32                19.01       300
60-PropWM300mmRdEJ-32           J-33           35.9527228433413       300
61-PropWM300mmRdEJ-33           H-9            38.6955804752682       300
62-PropWM300mmRdEH-9            J-34           26.326879710781       300
63-PropWM300mmRdEJ-34           J-35           22.6847258729083       300
64-PropWM300mmHospitalJ-35           J-44           66.2303194539337       300
65-PropWM300mmHospitalJ-44           J-36           45.3820485822456       300
66-PropWM300mmHospitalJ-36           J-37           61.1082602227364       300
67-PropWM300mmHospitalJ-37           J-38           43.5544391693597       300
68-PropWM300mmHospitalJ-38           J-40                34.59       300
69-PropWM300mmHospitalJ-40           J-39                22.02       300
70-PropWM300mmLoadingDockJ-42           H-13                 4.94       300
71-PropWM300mmLoadingDockH-13           J-41                54.59       300
72-PropWM300mmLoadingDockJ-41           H-8            10.281839107194       300
73-PropWM300mmLoadingDockH-8            J-39           18.8763427083242       300
74-PropWM300mmLoadingDockJ-39           J-43           23.4020520143924       300
80-PropWM300mmRdLJ-13           J-14           17.9428667770884       300
48-PropWM300mmHospitalJ-29           J-47           37.9955088729321       300
48B-PropWM300mmHospitalJ-47           J-28                35.74       300
83-PropWM300mm J-47           H-16                31.85       300
84-PropWM150mm H-16           H-17                47.38       150
5B-ExWM150mmPrestonSt366028H185     H-19           118.755824075502       150
5-ExWM150mmPrestonStH-19           366028H219     51.0338192356705       150
44-PropWM300mmHospitalJ-1            688-A          11.7604930134715       300
44-PropWM300mmHospital(2)688-B          J-2            23.8506572610621       300
22-PropWM300mmRdAJ-E3           691-A          21.8758265595292       300
22-PropWM300mmRdA(2)691-B          J-18           31.0182402514265       300
```

34-PropWM300mmRdE(2)J-183 J-24 34.93 300
76-PropWM300mmHospitalServiceJ-183 J-45(HospitalService) 28.02
300
79-PropWM300mmHospitalServiceJ-9 J-23(HospitalService) 28.03
300

| | | | | |
|---|---|---|---|---|
| 1 | T-501 | UOHI | 11.80 | 150 |
| 2 | J-31 | T-501 | 10.52 | 300 |
| 3 | T-501 | H-10 | 79.65 | 300 |
| 6 | J-28 | TEE-34 | 11.16 | 300 |
| 7 | TEE-34 | H-17 | 21.77 | 150 |
| 8 | TEE-34 | H-18 | 26.77 | 150 |
| 9 | J-8 | H-14 | 56.95 | 300 |



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm | |
|---|---|---|---|---|---|
| 10 | H-14 | J-9 | 3.82 | 300 | |
| 11 | J-9 | J-183 | 5.50 | 300 | |
| 12 | J-48 | J-49(CUPService) | 11.60 | 200 | |
| 13 | J-24 | J-10 | 4.00 | 300 | |
| 14 | J-10 | J-48 | 4.00 | 300 | |
| 15 | J-48 | H-3 | 34.80 | 300 | |
| 16 | H-3 | H-11 | 78.65 | 300 | |
| 5 | H-20 | J-12 | 19.09 | 300 | |
| 17 | J-43 | H-12 | 7.75 | 300 | |
| 18 | H-12 | J-46 | 29.78 | 300 | |
| 19 | J-46 | J-11 | 5.05 | 300 | |
| 20 | J-11 | H-20 | 15.82 | 300 | |
| FIRESERVICEMETER2688-A | | 688-B | #N/A | 300 | Valve |
| FIRESERVICEMETER1691-A | | 691-B | #N/A | 300 | Valve |

Node Results:

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-22 | 0.00 | 107.67 | 41.57 | 0.00 |
| J-21 | 0.00 | 107.54 | 41.97 | 0.00 |
| J-20 | 0.00 | 107.59 | 42.25 | 0.00 |
| J-19 | 0.00 | 107.60 | 43.47 | 0.00 |
| J-8 | 0.00 | 102.77 | 26.17 | 0.00 |
| J-7 | 0.00 | 103.18 | 26.29 | 0.00 |
| J-6 | 0.00 | 104.02 | 30.78 | 0.00 |
| J-5 | 0.00 | 104.42 | 28.85 | 0.00 |
| J-4 | 0.00 | 105.73 | 34.26 | 0.00 |
| J-3 | 0.00 | 106.35 | 34.89 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-2 | 0.00 | 106.86 | 42.74 | 0.00 |
| J-1 | 0.00 | 107.56 | 43.60 | 0.00 |
| J-12 | 0.00 | 105.33 | 38.20 | 0.00 |
| J-13 | 0.00 | 105.38 | 38.45 | 0.00 |
| J-14 | 0.00 | 105.49 | 38.84 | 0.00 |
| J-15 | 0.00 | 106.35 | 37.01 | 0.00 |
| J-16 | 0.00 | 106.35 | 37.95 | 0.00 |
| J-17 | 0.00 | 106.76 | 41.17 | 0.00 |
| J-18 | 0.00 | 106.98 | 43.30 | 0.00 |
| J-11 | 0.00 | 105.11 | 37.67 | 0.00 |
| J-10 | 0.00 | 101.70 | 28.17 | 0.00 |
| J-9 | 0.00 | 102.08 | 27.52 | 0.00 |
| J-23(HospitalService) | 8.96 | 102.08 | 25.17 | 0.00 |
| J-E1 | 0.00 | 107.79 | 43.87 | 0.00 |
| J-E2 | 0.00 | 107.67 | 42.08 | 0.00 |
| J-E3 | 0.00 | 107.52 | 45.24 | 0.00 |
| J-E4 | 0.00 | 107.54 | 42.45 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-E7 | 0.00 | 107.59 | 44.00 | 0.00 |
| J-E8 | 0.00 | 107.60 | 44.51 | 0.00 |
| J-24 | 0.00 | 101.73 | 28.06 | 0.00 |
| J-25 | 0.00 | 105.90 | 38.39 | 0.00 |
| J-26(PGService) | 1.70 | 105.90 | 35.29 | 0.00 |
| J-E6 | 0.00 | 107.55 | 42.92 | 0.00 |
| J-E5 | 0.00 | 107.55 | 42.97 | 0.00 |
| J-E9 | 0.00 | 107.60 | 44.85 | 0.00 |
| J-E10 | 0.00 | 107.60 | 44.91 | 0.00 |
| J-E11 | 0.00 | 107.60 | 41.52 | 0.00 |
| J-27(CUPService) | 7.59 | 101.73 | 28.12 | 0.00 |
| J-28 | 0.00 | 106.35 | 35.41 | 0.00 |
| J-29 | 0.00 | 106.35 | 34.85 | 0.00 |
| J-30(CUPService) | 7.59 | 101.70 | 28.21 | 0.00 |
| J-31 | 0.00 | 101.53 | 29.27 | 0.00 |
| J-32 | 0.00 | 102.20 | 26.62 | 0.00 |
| J-33 | 0.00 | 102.43 | 27.66 | 0.00 |
| J-34 | 0.00 | 102.84 | 26.56 | 0.00 |
| J-35 | 0.00 | 102.98 | 22.97 | 0.00 |
| J-36 | 0.00 | 103.68 | 26.97 | 0.00 |
| J-37 | 0.00 | 104.06 | 35.92 | 0.00 |
| J-38 | 0.00 | 104.34 | 36.89 | 0.00 |
| J-39 | 0.00 | 104.69 | 37.33 | 0.00 |
| J-40 | 0.00 | 104.56 | 37.67 | 0.00 |
| J-41 | 0.00 | 104.69 | 34.79 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-42 | 0.00 | 104.69 | 34.98 | 0.00 |
| J-43 | 0.00 | 104.84 | 37.77 | 0.00 |
| J-45(HospitalService) | 8.96 | 102.03 | 25.13 | 0.00 |
| J-46 | 0.00 | 105.08 | 37.99 | 0.00 |
| J-44 | 0.00 | 103.40 | 25.36 | 0.00 |
| J-47 | 0.00 | 106.35 | 34.86 | 0.00 |
| J-183 | 0.00 | 102.03 | 27.62 | 0.00 |
| H-1 | 0.00 | 106.93 | 39.58 | 0.00 |
| H-2 | 0.00 | 106.21 | 35.30 | 0.00 |
| H-3 | 95.00 | 101.49 | 25.99 | 0.00 |
| H-4 | 0.00 | 103.86 | 27.11 | 0.00 |
| H-5 | 0.00 | 105.64 | 35.77 | 0.00 |
| H-6 | 0.00 | 103.03 | 23.00 | 0.00 |
| 366028H031 | 0.00 | 107.55 | 42.82 | 0.00 |
| 366028H029 | 0.00 | 107.58 | 42.39 | 0.00 |
| 366028H030 | 0.00 | 107.55 | 42.47 | 0.00 |
| 366028H185 | 0.00 | 107.60 | 41.22 | 0.00 |
| 366028H219 | 0.00 | 107.60 | 44.51 | 0.00 |
| H-12 | 0.00 | 104.89 | 34.65 | 0.00 |
| H-13 | 0.00 | 104.69 | 34.61 | 0.00 |
| H-14 | 0.00 | 102.13 | 24.69 | 0.00 |
| H-15 | 0.00 | 104.70 | 29.50 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality | |
|---|---|---|---|---|---|
| H-7 | 0.00 | 105.86 | 30.51 | 0.00 | |
| H-8 | 0.00 | 104.69 | 34.17 | 0.00 | |
| H-9 | 0.00 | 102.67 | 24.56 | 0.00 | |
| H-10 | 0.00 | 102.08 | 25.22 | 0.00 | |
| H-11 | 72.00 | 101.50 | 26.55 | 0.00 | |
| H-16 | 0.00 | 106.35 | 26.94 | 0.00 | |
| H-18 | 0.00 | 106.35 | 29.54 | 0.00 | |
| H-17 | 0.00 | 106.35 | 26.40 | 0.00 | |
| H-19 | 0.00 | 107.60 | 43.80 | 0.00 | |
| 688-A | 0.00 | 107.42 | 43.47 | 0.00 | |
| 688-B | 0.00 | 107.13 | 40.05 | 0.00 | |
| 691-A | 0.00 | 107.38 | 45.86 | 0.00 | |
| 691-B | 0.00 | 107.19 | 40.60 | 0.00 | |
| UOHI | 8.87 | 101.54 | 26.78 | 0.00 | |
| T-501 | 0.00 | 101.58 | 29.48 | 0.00 | |
| TEE-34 | 0.00 | 106.35 | 34.62 | 0.00 | |
| J-48 | 0.00 | 101.68 | 28.29 | 0.00 | |
| J-49(CUPService) | 7.59 | 101.67 | 28.31 | 0.00 | |
| H-20 | 0.00 | 105.21 | 37.37 | 0.00 | |
| R-1 | -29.11 | 107.60 | 0.00 | 0.00 | Reservoir |

```
R-2                 -189.15    107.80      0.00      0.00 Reservoir

Link Results:
----------------------------------------------------------------------
Link                   Flow  VelocityUnit Headloss    Status
ID                      LPS       m/s      m/km
----------------------------------------------------------------------
43-PropWM300mmHospital     125.32      1.77     11.32      Open
32-PropWM300mmRdL     -91.23      1.29      6.29      Open
21-ExWM400mmCarlingAve     189.15      0.24      0.06      Open
20-ExWM400mmCarlingAve      63.83      0.51      1.69      Open
16-ExWM400mmCarlingAve      29.11      0.23      0.40      Open
8-ExWM400mmCarlingAve      29.11      0.23      0.40      Open
45-PropWM300mmHospital     125.32      1.77     11.32      Open
19-PropWM150mmResearchB       0.00      0.00      0.00    Closed
15-PropWM150mmCarlingV-T#3       0.00      0.00      0.00    Closed
9-PropWM150mmCarlingV-T#2       0.00      0.00      0.00    Closed
7-PropWM150mmCarlingV-T#1       0.00      0.00      0.00    Closed
23-PropWM300mmRdA      92.94      1.31      6.51      Open
24-PropWM300mmRdA      92.94      1.31      6.51      Open
37-PropWM300mmRdD     125.33      1.77     11.32      Open
36-PropWM300mmRdD     125.33      1.77     11.32      Open
28-PropWM300mmRdB      92.93      1.31      6.51      Open
30-PropWM300mmRdB      91.23      1.29      6.29      Open
29-PropWM150mmPGService       1.70      0.10      0.16      Open
14-ExWM400mmCarlingAve      29.11      0.23      0.40      Open
17-ExWM400mmCarlingAve      63.83      0.51      1.69      Open
```



```
Link Results: (continued)
----------------------------------------------------------------------
Link                   Flow  VelocityUnit Headloss    Status
ID                      LPS       m/s      m/km
----------------------------------------------------------------------
18-ExWM400mmCarlingAve      63.83      0.51      1.69      Open
10-ExWM400mmCarlingAve      29.11      0.23      0.40      Open
13-ExWM400mmCarlingAve      29.11      0.23      0.39      Open
11-ExWM150mmCarlingAve       0.00      0.00      0.00      Open
12-ExWM150mmCarlingAve       0.00      0.00      0.00      Open
6-ExWM400mmCarlingAve      29.11      0.23      0.39      Open
4-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
31-PropWM300mmRdB     -91.23      1.29      6.29      Open
25-PropWM300mmRdA      92.94      1.31      6.51      Open
40-PropWM300mmHospital     125.33      1.77     11.32      Open
39-PropWM300mmHospital     125.33      1.77     11.32      Open
42-PropWM300mmHospital     125.33      1.77     11.32      Open
41-PropWM300mmHospital     125.33      1.77     11.32      Open
38-PropWM300mmHospital     125.33      1.77     11.32      Open
1-ExWM400mmCarlingAve      29.11      0.04      0.00      Open
```

```
3-ExWM400mmCarlingAve      29.11      0.23      0.40      Open
5A-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
46-PropWM200mmCUPService       7.59      0.24      0.53      Open
27-PropWM300mmRdB      92.93      1.31      6.51      Open
26-PropWM300mmRdA       0.00      0.00      0.00      Open
47-PropWM300mmHospital       0.00      0.00      0.00      Open
49-PropWM300mmRdA       0.00      0.00      0.00      Open
50-PropWM300mmRdE     125.33      1.77     11.32      Open
51-PropWM300mmRdE     125.33      1.77     11.32      Open
56-PropWM300mmRdE     -82.36      1.17      5.20      Open
57-PropWM200mmCUPService       7.59      0.24      0.53      Open
59-PropWM300mmRdE     -91.23      1.29      6.29      Open
60-PropWM300mmRdE     -91.23      1.29      6.29      Open
61-PropWM300mmRdE     -91.23      1.29      6.29      Open
62-PropWM300mmRdE     -91.23      1.29      6.29      Open
63-PropWM300mmRdE     -91.23      1.29      6.29      Open
64-PropWM300mmHospital     -91.23      1.29      6.29      Open
65-PropWM300mmHospital     -91.23      1.29      6.29      Open
66-PropWM300mmHospital     -91.23      1.29      6.29      Open
67-PropWM300mmHospital     -91.23      1.29      6.29      Open
68-PropWM300mmHospital     -91.23      1.29      6.29      Open
69-PropWM300mmHospital     -91.23      1.29      6.29      Open
70-PropWM300mmLoadingDock       0.00      0.00      0.00      Open
71-PropWM300mmLoadingDock       0.00      0.00      0.00      Open
72-PropWM300mmLoadingDock       0.00      0.00      0.00      Open
73-PropWM300mmLoadingDock       0.00      0.00      0.00      Open
74-PropWM300mmLoadingDock     -91.23      1.29      6.29      Open
80-PropWM300mmRdL     -91.23      1.29      6.29      Open
48-PropWM300mmHospital       0.00      0.00      0.00      Open
48B-PropWM300mmHospital      -0.08      0.00      0.00      Open
83-PropWM300mm        0.07      0.00      0.00      Open
84-PropWM150mm        0.07      0.00      0.00      Open
```



Link Results: (continued)

```
---------------------------------------------------------------------
Link                  Flow  VelocityUnit Headloss    Status
ID                     LPS       m/s      m/km
---------------------------------------------------------------------
5B-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
5-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
44-PropWM300mmHospital     125.32      1.77     11.32      Open
44-PropWM300mmHospital(2)     125.32      1.77     11.32      Open
22-PropWM300mmRdA      92.94      1.31      6.51      Open
22-PropWM300mmRdA(2)      92.94      1.31      6.51      Open
34-PropWM300mmRdE(2)     107.41      1.52      8.51      Open
76-PropWM300mmHospitalService       8.96      0.13      0.09      Open
79-PropWM300mmHospitalService       8.96      0.13      0.09      Open
1                     8.87      0.50      3.44      Open
```

| | | | | |
|---|---|---|---|---|
| 2 | -82.36 | 1.17 | 5.20 | Open |
| 3 | -91.23 | 1.29 | 6.29 | Open |
| 6 | -0.07 | 0.00 | 0.00 | Open |
| 7 | -0.07 | 0.00 | 0.00 | Open |
| 8 | 0.00 | 0.00 | 0.00 | Open |
| 9 | 125.33 | 1.77 | 11.32 | Open |
| 10 | 125.33 | 1.77 | 11.32 | Open |
| 11 | 116.37 | 1.65 | 9.87 | Open |
| 12 | 7.59 | 0.24 | 0.53 | Open |
| 13 | 99.82 | 1.41 | 7.43 | Open |
| 14 | 92.23 | 1.30 | 6.42 | Open |
| 15 | 84.64 | 1.20 | 5.47 | Open |
| 16 | -10.36 | 0.15 | 0.11 | Open |
| 5 | -91.23 | 1.29 | 6.29 | Open |
| 17 | -91.23 | 1.29 | 6.29 | Open |
| 18 | -91.23 | 1.29 | 6.29 | Open |
| 19 | -91.23 | 1.29 | 6.29 | Open |
| 20 | -91.23 | 1.29 | 6.29 | Open |
| FIRESERVICEMETER2 | 125.32 | 1.77 | 0.30 | Open Valve |
| FIRESERVICEMETER1 | 92.94 | 1.31 | 0.19 | Open Valve |

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

Input File: NCD-Case 1 FRONT ENTRY.net

Scenario: with hospital loop
Date: 2024-07-19 11:25:02 AM

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 43-PropWM300mmHospitalJ-2 | J-3 | | 44.3429614279853 | 300 |
| 32-PropWM300mmRdLJ-12 | J-13 | | 8.10 | 300 |
| 21-ExWM400mmCarlingAveR-2 | J-E1 | | 148.67 | 1000 |
| 20-ExWM400mmCarlingAveJ-E1 | J-E2 | | 72.06 | 400 |
| 16-ExWM400mmCarlingAveJ-E4 | J-E3 | | 53.8905996515422 | 400 |
| 8-ExWM400mmCarlingAveJ-E8 | J-E7 | | 30.3005394242057 | 400 |
| 45-PropWM300mmHospitalJ-E1 | J-1 | | 20.64 | 300 |
| 19-PropWM150mmResearchBJ-E2 | J-22 | | 30.3462421119232 | 150 |
| 15-PropWM150mmCarlingV-T#3J-E4 | J-21 | | 30.9676844497797 | 150 |
| 9-PropWM150mmCarlingV-T#2J-E7 | J-20 | | 31.0736886830009 | 150 |
| 7-PropWM150mmCarlingV-T#1J-E8 | J-19 | | 31.2526179381906 | 150 |
| 23-PropWM300mmRdAJ-18 | H-1 | | 8.34306529014965 | 300 |
| 24-PropWM300mmRdAH-1 | J-17 | | 26.2370276682741 | 300 |
| 37-PropWM300mmRdDJ-6 | H-4 | | 14.21 | 300 |
| 36-PropWM300mmRdDH-4 | J-7 | | 59.70 | 300 |
| 28-PropWM300mmRdBH-2 | J-25 | | 47.92 | 300 |
| 30-PropWM300mmRdBJ-25 | H-5 | | 42.00 | 300 |
| 29-PropWM150mmPGServiceJ-25 | J-26(PGService) | | 16.98 | 150 |
| 14-ExWM400mmCarlingAve366028H031 | J-E4 | | 29.2340814798819 | 400 |
| 17-ExWM400mmCarlingAve366028H029 | J-E3 | | 35.0957871684793 | 400 |
| 18-ExWM400mmCarlingAveJ-E2 | 366028H029 | | 54.4871678813318 | 400 |
| 10-ExWM400mmCarlingAveJ-E7 | J-E6 | | 86.5525765463542 | 400 |
| 13-ExWM400mmCarlingAveJ-E6 | 366028H031 | | 7.73250133830889 | 400 |
| 11-ExWM150mmCarlingAveJ-E6 | J-E5 | | 7.45726728454382 | 150 |
| 12-ExWM150mmCarlingAveJ-E5 | 366028H030 | | 90.9465713866359 | 150 |
| 6-ExWM400mmCarlingAveJ-E9 | J-E8 | | 0.382945097269914 | 400 |
| 4-ExWM150mmPrestonStJ-E9 | 366028H219 | | 40.1973470697933 | 150 |
| 31-PropWM300mmRdBJ-14 | H-5 | | 22.94 | 300 |
| 25-PropWM300mmRdAJ-17 | J-16 | | 62.29 | 300 |
| 40-PropWM300mmHospitalJ-4 | H-15 | | 91.57 | 300 |
| 39-PropWM300mmHospitalH-15 | J-5 | | 24.29 | 300 |

```
42-PropWM300mmHospitalJ-3            H-7                 43.89       300
41-PropWM300mmHospitalH-7            J-4                 10.80       300
38-PropWM300mmHospitalJ-5            J-6            35.8431820756787       300
1-ExWM400mmCarlingAveR-1            J-E10               19.39      1000
3-ExWM400mmCarlingAveJ-E10          J-E9           0.399488044413268       400
```

```
Page 2                                    Scenario: with hospital loop
Link - Node Table: (continued)
----------------------------------------------------------------------
Link           Start          End                 Length  Diameter
ID             Node           Node                     m        mm
----------------------------------------------------------------------
5A-ExWM150mmPrestonStJ-E11          366028H185     45.2635914858321       150
46-PropWM200mmCUPServiceJ-27(CUPService)J-24                11.58       200
27-PropWM300mmRdBJ-16           H-2                 21.58       300
26-PropWM300mmRdAJ-16           J-15                21.35       300
47-PropWM300mmHospitalJ-3            J-29           12.8116327584704       300
49-PropWM300mmRdAJ-28           J-15                34.67       300
50-PropWM300mmRdEJ-7            H-6                 13.31       300
51-PropWM300mmRdEH-6            J-8                 22.67       300
56-PropWM300mmRdEH-11           J-31                 5.74       300
57-PropWM200mmCUPServiceJ-30(CUPService)J-10                11.59       200
59-PropWM300mmRdEH-10           J-32                19.01       300
60-PropWM300mmRdEJ-32           J-33           35.9527228433413       300
61-PropWM300mmRdEJ-33           H-9            38.6955804752682       300
62-PropWM300mmRdEH-9            J-34           26.326879710781       300
63-PropWM300mmRdEJ-34           J-35           22.6847258729083       300
64-PropWM300mmHospitalJ-35           J-44           66.2303194539337       300
65-PropWM300mmHospitalJ-44           J-36           45.3820485822456       300
66-PropWM300mmHospitalJ-36           J-37           61.1082602227364       300
67-PropWM300mmHospitalJ-37           J-38           43.5544391693597       300
68-PropWM300mmHospitalJ-38           J-40                34.59       300
69-PropWM300mmHospitalJ-40           J-39                22.02       300
70-PropWM300mmLoadingDockJ-42           H-13                 4.94       300
71-PropWM300mmLoadingDockH-13           J-41                54.59       300
72-PropWM300mmLoadingDockJ-41           H-8            10.281839107194       300
73-PropWM300mmLoadingDockH-8            J-39           18.8763427083242       300
74-PropWM300mmLoadingDockJ-39           J-43           23.4020520143924       300
80-PropWM300mmRdLJ-13           J-14           17.9428667770884       300
48-PropWM300mmHospitalJ-29           J-47           37.9955088729321       300
48B-PropWM300mmHospitalJ-47           J-28                35.74       300
83-PropWM300mm J-47           H-16                31.85       300
84-PropWM150mm H-16           H-17                47.38       150
5B-ExWM150mmPrestonSt366028H185     H-19           118.755824075502       150
5-ExWM150mmPrestonStH-19           366028H219     51.0338192356705       150
44-PropWM300mmHospitalJ-1            688-A          11.7604930134715       300
44-PropWM300mmHospital(2)688-B          J-2            23.8506572610621       300
22-PropWM300mmRdAJ-E3           691-A          21.8758265595292       300
22-PropWM300mmRdA(2)691-B          J-18           31.0182402514265       300
```

34-PropWM300mmRdE(2)J-183 J-24 34.93 300
76-PropWM300mmHospitalServiceJ-45(HospitalService)J-183 28.02
300
79-PropWM300mmHospitalServiceJ-23(HospitalService)J-9 28.03
300

| | | | | |
|---|---|---|---|---|
| 1 | UOHI | T-501 | 11.80 | 150 |
| 2 | J-31 | T-501 | 10.52 | 300 |
| 3 | T-501 | H-10 | 79.65 | 300 |
| 6 | J-28 | TEE-34 | 11.16 | 300 |
| 7 | TEE-34 | H-17 | 21.77 | 150 |
| 8 | TEE-34 | H-18 | 26.77 | 150 |
| 9 | J-8 | H-14 | 56.95 | 300 |



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm | |
|---|---|---|---|---|---|
| 10 | H-14 | J-9 | 3.82 | 300 | |
| 11 | J-9 | J-183 | 5.50 | 300 | |
| 12 | J-48 | J-49(CUPService) | 11.60 | 200 | |
| 13 | J-24 | J-10 | 4.00 | 300 | |
| 14 | J-10 | J-48 | 4.00 | 300 | |
| 15 | J-48 | H-3 | 34.80 | 300 | |
| 16 | H-3 | H-11 | 78.65 | 300 | |
| 5 | H-20 | J-12 | 19.09 | 300 | |
| 17 | J-43 | H-12 | 7.75 | 300 | |
| 18 | H-12 | J-46 | 29.78 | 300 | |
| 19 | J-46 | J-11 | 5.05 | 300 | |
| 20 | J-11 | H-20 | 15.82 | 300 | |
| FIRESERVICEMETER2688-A | | 688-B | #N/A | 300 | Valve |
| FIRESERVICEMETER1691-A | | 691-B | #N/A | 300 | Valve |

Node Results:

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-22 | 0.00 | 107.65 | 41.54 | 0.00 |
| J-21 | 0.00 | 107.56 | 41.99 | 0.00 |
| J-20 | 0.00 | 107.75 | 42.42 | 0.00 |
| J-19 | 0.00 | 107.80 | 43.67 | 0.00 |
| J-8 | 0.00 | 104.80 | 28.20 | 0.00 |
| J-7 | 0.00 | 104.82 | 27.93 | 0.00 |
| J-6 | 0.00 | 104.85 | 31.62 | 0.00 |
| J-5 | 0.00 | 104.87 | 29.30 | 0.00 |
| J-4 | 0.00 | 104.92 | 33.45 | 0.00 |
| J-3 | 0.00 | 105.16 | 33.70 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-2 | 0.00 | 106.05 | 41.94 | 0.00 |
| J-1 | 0.00 | 107.37 | 43.41 | 0.00 |
| J-12 | 0.00 | 105.22 | 38.09 | 0.00 |
| J-13 | 0.00 | 105.22 | 38.29 | 0.00 |
| J-14 | 0.00 | 105.23 | 38.58 | 0.00 |
| J-15 | 0.00 | 105.17 | 35.83 | 0.00 |
| J-16 | 0.00 | 105.33 | 36.93 | 0.00 |
| J-17 | 0.00 | 106.08 | 40.50 | 0.00 |
| J-18 | 0.00 | 106.50 | 42.83 | 0.00 |
| J-11 | 0.00 | 105.19 | 37.75 | 0.00 |
| J-10 | 0.00 | 104.77 | 31.23 | 0.00 |
| J-9 | 0.00 | 104.77 | 30.21 | 0.00 |
| J-23(HospitalService) | 8.96 | 104.77 | 27.86 | 0.00 |
| J-E1 | 0.00 | 107.79 | 43.86 | 0.00 |
| J-E2 | 0.00 | 107.65 | 42.06 | 0.00 |
| J-E3 | 0.00 | 107.47 | 45.19 | 0.00 |
| J-E4 | 0.00 | 107.56 | 42.47 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-E7 | 0.00 | 107.75 | 44.16 | 0.00 |
| J-E8 | 0.00 | 107.80 | 44.71 | 0.00 |
| J-24 | 0.00 | 104.77 | 31.10 | 0.00 |
| J-25 | 0.00 | 105.28 | 37.76 | 0.00 |
| J-26(PGService) | 1.70 | 105.27 | 34.67 | 0.00 |
| J-E6 | 0.00 | 107.62 | 42.98 | 0.00 |
| J-E5 | 0.00 | 107.62 | 43.03 | 0.00 |
| J-E9 | 0.00 | 107.80 | 45.05 | 0.00 |
| J-E10 | 0.00 | 107.80 | 45.11 | 0.00 |
| J-E11 | 0.00 | 107.80 | 41.72 | 0.00 |
| J-27(CUPService) | 7.59 | 104.77 | 31.16 | 0.00 |
| J-28 | 0.00 | 104.90 | 33.96 | 0.00 |
| J-29 | 0.00 | 105.08 | 33.58 | 0.00 |
| J-30(CUPService) | 7.59 | 104.77 | 31.28 | 0.00 |
| J-31 | 0.00 | 104.81 | 32.55 | 0.00 |
| J-32 | 0.00 | 104.88 | 29.30 | 0.00 |
| J-33 | 0.00 | 104.91 | 30.13 | 0.00 |
| J-34 | 0.00 | 104.95 | 28.67 | 0.00 |
| J-35 | 0.00 | 104.96 | 24.95 | 0.00 |
| J-36 | 0.00 | 105.04 | 28.33 | 0.00 |
| J-37 | 0.00 | 105.08 | 36.94 | 0.00 |
| J-38 | 0.00 | 105.11 | 37.66 | 0.00 |
| J-39 | 0.00 | 105.15 | 37.78 | 0.00 |
| J-40 | 0.00 | 105.13 | 38.25 | 0.00 |
| J-41 | 0.00 | 105.15 | 35.24 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-42 | 0.00 | 105.15 | 35.44 | 0.00 |
| J-43 | 0.00 | 105.16 | 38.09 | 0.00 |
| J-45(HospitalService) | 8.96 | 104.77 | 27.87 | 0.00 |
| J-46 | 0.00 | 105.19 | 38.10 | 0.00 |
| J-44 | 0.00 | 105.01 | 26.97 | 0.00 |
| J-47 | 0.00 | 104.85 | 33.36 | 0.00 |
| J-183 | 0.00 | 104.77 | 30.35 | 0.00 |
| H-1 | 0.00 | 106.40 | 39.05 | 0.00 |
| H-2 | 0.00 | 105.31 | 34.40 | 0.00 |
| H-3 | 0.00 | 104.78 | 29.28 | 0.00 |
| H-4 | 0.00 | 104.85 | 28.10 | 0.00 |
| H-5 | 0.00 | 105.25 | 35.38 | 0.00 |
| H-6 | 0.00 | 104.81 | 24.78 | 0.00 |
| 366028H031 | 0.00 | 107.60 | 42.88 | 0.00 |
| 366028H029 | 0.00 | 107.54 | 42.36 | 0.00 |
| 366028H030 | 0.00 | 107.62 | 42.53 | 0.00 |
| 366028H185 | 0.00 | 107.80 | 41.42 | 0.00 |
| 366028H219 | 0.00 | 107.80 | 44.71 | 0.00 |
| H-12 | 0.00 | 105.17 | 34.93 | 0.00 |
| H-13 | 0.00 | 105.15 | 35.06 | 0.00 |
| H-14 | 0.00 | 104.78 | 27.34 | 0.00 |
| H-15 | 0.00 | 104.88 | 29.68 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality | |
|---|---|---|---|---|---|
| H-7 | 60.00 | 104.93 | 29.59 | 0.00 | |
| H-8 | 0.00 | 105.15 | 34.62 | 0.00 | |
| H-9 | 0.00 | 104.93 | 26.81 | 0.00 | |
| H-10 | 0.00 | 104.87 | 28.00 | 0.00 | |
| H-11 | 0.00 | 104.81 | 29.86 | 0.00 | |
| H-16 | 95.00 | 104.46 | 25.05 | 0.00 | |
| H-18 | 0.00 | 104.87 | 28.06 | 0.00 | |
| H-17 | 95.00 | 102.33 | 22.39 | 0.00 | |
| H-19 | 0.00 | 107.80 | 44.00 | 0.00 | |
| 688-A | 0.00 | 107.13 | 43.18 | 0.00 | |
| 688-B | 0.00 | 106.53 | 39.45 | 0.00 | |
| 691-A | 0.00 | 107.21 | 45.69 | 0.00 | |
| 691-B | 0.00 | 106.88 | 40.30 | 0.00 | |
| UOHI | 8.87 | 104.77 | 30.00 | 0.00 | |
| T-501 | 0.00 | 104.82 | 32.71 | 0.00 | |
| TEE-34 | 0.00 | 104.87 | 33.15 | 0.00 | |
| J-48 | 0.00 | 104.77 | 31.38 | 0.00 | |
| J-49(CUPService) | 7.59 | 104.77 | 31.40 | 0.00 | |
| H-20 | 0.00 | 105.20 | 37.37 | 0.00 | |
| R-1 | -61.30 | 107.80 | 0.00 | 0.00 | Reservoir |

```
R-2                 -239.96    107.80      0.00      0.00 Reservoir

Link Results:
----------------------------------------------------------------------
Link                   Flow  VelocityUnit Headloss    Status
ID                      LPS       m/s      m/km
----------------------------------------------------------------------
43-PropWM300mmHospital     171.23      2.42     20.18      Open
32-PropWM300mmRdL     -27.28      0.39      0.67      Open
21-ExWM400mmCarlingAve     239.96      0.31      0.09      Open
20-ExWM400mmCarlingAve      68.74      0.55      1.94      Open
16-ExWM400mmCarlingAve      61.30      0.49      1.57      Open
8-ExWM400mmCarlingAve      61.30      0.49      1.57      Open
45-PropWM300mmHospital     171.23      2.42     20.18      Open
19-PropWM150mmResearchB       0.00      0.00      0.00    Closed
15-PropWM150mmCarlingV-T#3       0.00      0.00      0.00    Closed
9-PropWM150mmCarlingV-T#2       0.00      0.00      0.00    Closed
7-PropWM150mmCarlingV-T#1       0.00      0.00      0.00    Closed
23-PropWM300mmRdA     130.03      1.84     12.12      Open
24-PropWM300mmRdA     130.03      1.84     12.12      Open
37-PropWM300mmRdD      22.28      0.32      0.46      Open
36-PropWM300mmRdD      22.28      0.32      0.46      Open
28-PropWM300mmRdB      28.98      0.41      0.75      Open
30-PropWM300mmRdB      27.28      0.39      0.67      Open
29-PropWM150mmPGService       1.70      0.10      0.16      Open
14-ExWM400mmCarlingAve      61.30      0.49      1.57      Open
17-ExWM400mmCarlingAve      68.74      0.55      1.94      Open
```



```
Link Results: (continued)
----------------------------------------------------------------------
Link                   Flow  VelocityUnit Headloss    Status
ID                      LPS       m/s      m/km
----------------------------------------------------------------------
18-ExWM400mmCarlingAve      68.74      0.55      1.94      Open
10-ExWM400mmCarlingAve      61.30      0.49      1.57      Open
13-ExWM400mmCarlingAve      61.30      0.49      1.57      Open
11-ExWM150mmCarlingAve       0.00      0.00      0.00      Open
12-ExWM150mmCarlingAve       0.00      0.00      0.00      Open
6-ExWM400mmCarlingAve      61.30      0.49      1.58      Open
4-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
31-PropWM300mmRdB     -27.28      0.39      0.67      Open
25-PropWM300mmRdA     130.03      1.84     12.12      Open
40-PropWM300mmHospital      22.28      0.32      0.46      Open
39-PropWM300mmHospital      22.28      0.32      0.46      Open
42-PropWM300mmHospital      82.28      1.16      5.19      Open
41-PropWM300mmHospital      22.28      0.32      0.46      Open
38-PropWM300mmHospital      22.28      0.32      0.46      Open
1-ExWM400mmCarlingAve      61.30      0.08      0.01      Open
```

| | | | | |
|---|---|---|---|---|
| 3-ExWM400mmCarlingAve | 61.30 | 0.49 | 1.56 | Open |
| 5A-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 46-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 27-PropWM300mmRdB | 28.98 | 0.41 | 0.75 | Open |
| 26-PropWM300mmRdA | 101.05 | 1.43 | 7.60 | Open |
| 47-PropWM300mmHospital | 88.95 | 1.26 | 6.00 | Open |
| 49-PropWM300mmRdA | -101.05 | 1.43 | 7.60 | Open |
| 50-PropWM300mmRdE | 22.28 | 0.32 | 0.46 | Open |
| 51-PropWM300mmRdE | 22.28 | 0.32 | 0.46 | Open |
| 56-PropWM300mmRdE | -18.41 | 0.26 | 0.32 | Open |
| 57-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 59-PropWM300mmRdE | -27.28 | 0.39 | 0.67 | Open |
| 60-PropWM300mmRdE | -27.28 | 0.39 | 0.67 | Open |
| 61-PropWM300mmRdE | -27.28 | 0.39 | 0.67 | Open |
| 62-PropWM300mmRdE | -27.28 | 0.39 | 0.67 | Open |
| 63-PropWM300mmRdE | -27.28 | 0.39 | 0.67 | Open |
| 64-PropWM300mmHospital | -27.28 | 0.39 | 0.67 | Open |
| 65-PropWM300mmHospital | -27.28 | 0.39 | 0.67 | Open |
| 66-PropWM300mmHospital | -27.28 | 0.39 | 0.67 | Open |
| 67-PropWM300mmHospital | -27.28 | 0.39 | 0.67 | Open |
| 68-PropWM300mmHospital | -27.28 | 0.39 | 0.67 | Open |
| 69-PropWM300mmHospital | -27.28 | 0.39 | 0.67 | Open |
| 70-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 71-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 72-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 73-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 74-PropWM300mmLoadingDock | -27.28 | 0.39 | 0.67 | Open |
| 80-PropWM300mmRdL | -27.28 | 0.39 | 0.67 | Open |
| 48-PropWM300mmHospital | 88.95 | 1.26 | 6.00 | Open |
| 48B-PropWM300mmHospital | -41.59 | 0.59 | 1.47 | Open |
| 83-PropWM300mm | 130.54 | 1.85 | 12.21 | Open |
| 84-PropWM150mm | 35.54 | 2.01 | 44.99 | Open |



Link Results: (continued)

| Link ID | Flow LPS | VelocityUnit m/s | Headloss m/km | Status |
|---|---|---|---|---|
| 5B-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 5-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 44-PropWM300mmHospital | 171.23 | 2.42 | 20.18 | Open |
| 44-PropWM300mmHospital(2) | 171.23 | 2.42 | 20.18 | Open |
| 22-PropWM300mmRdA | 130.03 | 1.84 | 12.12 | Open |
| 22-PropWM300mmRdA(2) | 130.03 | 1.84 | 12.12 | Open |
| 34-PropWM300mmRdE(2) | 4.36 | 0.06 | 0.02 | Open |
| 76-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |
| 79-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |
| 1 | -8.87 | 0.50 | 3.44 | Open |

| | | | | |
|---|---|---|---|---|
| 2 | -18.41 | 0.26 | 0.32 | Open |
| 3 | -27.28 | 0.39 | 0.67 | Open |
| 6 | 59.46 | 0.84 | 2.85 | Open |
| 7 | 59.46 | 3.36 | 116.73 | Open |
| 8 | 0.00 | 0.00 | 0.00 | Open |
| 9 | 22.28 | 0.32 | 0.46 | Open |
| 10 | 22.28 | 0.32 | 0.46 | Open |
| 11 | 13.32 | 0.19 | 0.18 | Open |
| 12 | 7.59 | 0.24 | 0.53 | Open |
| 13 | -3.23 | 0.05 | 0.01 | Open |
| 14 | -10.82 | 0.15 | 0.12 | Open |
| 15 | -18.41 | 0.26 | 0.32 | Open |
| 16 | -18.41 | 0.26 | 0.32 | Open |
| 5 | -27.28 | 0.39 | 0.67 | Open |
| 17 | -27.28 | 0.39 | 0.67 | Open |
| 18 | -27.28 | 0.39 | 0.67 | Open |
| 19 | -27.28 | 0.39 | 0.67 | Open |
| 20 | -27.28 | 0.39 | 0.67 | Open |
| FIRESERVICEMETER2 | 171.23 | 2.42 | 0.60 | Open Valve |
| FIRESERVICEMETER1 | 130.03 | 1.84 | 0.33 | Open Valve |

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

Input File: NCD-Case 1 PAVILLION.net

Scenario: with hospital loop
Date: 2024-07-19 11:25:02 AM

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 43-PropWM300mmHospitalJ-2 | J-3 | | 44.3429614279853 | 300 |
| 32-PropWM300mmRdLJ-12 | J-13 | | 8.10173833723436 | 300 |
| 21-ExWM400mmCarlingAveR-2 | J-E1 | | 148.67 | 1000 |
| 20-ExWM400mmCarlingAveJ-E1 | J-E2 | | 72.0604746626472 | 400 |
| 16-ExWM400mmCarlingAveJ-E4 | J-E3 | | 53.8905996515422 | 400 |
| 8-ExWM400mmCarlingAveJ-E8 | J-E7 | | 30.3005394242057 | 400 |
| 45-PropWM300mmHospitalJ-E1 | J-1 | | 20.6394832517881 | 300 |
| 19-PropWM150mmResearchBJ-E2 | J-22 | | 30.3462421119232 | 150 |
| 15-PropWM150mmCarlingV-T#3J-E4 | J-21 | | 30.9676844497797 | 150 |
| 9-PropWM150mmCarlingV-T#2J-E7 | J-20 | | 31.0736886830009 | 150 |
| 7-PropWM150mmCarlingV-T#1J-E8 | J-19 | | 31.2526179381906 | 150 |
| 23-PropWM300mmRdAJ-18 | H-1 | | 8.34306529014965 | 300 |
| 24-PropWM300mmRdAH-1 | J-17 | | 26.2370276682741 | 300 |
| 37-PropWM300mmRdDJ-6 | H-4 | | 14.21 | 300 |
| 36-PropWM300mmRdDH-4 | J-7 | | 59.70 | 300 |
| 28-PropWM300mmRdBH-2 | J-25 | | 47.9195248882866 | 300 |
| 30-PropWM300mmRdBJ-25 | H-5 | | 42.0036195237461 | 300 |
| 29-PropWM150mmPGServiceJ-25 | J-26(PGService) | | 16.98 | 150 |
| 14-ExWM400mmCarlingAve366028H031 | J-E4 | | 29.2340814798819 | 400 |
| 17-ExWM400mmCarlingAve366028H029 | J-E3 | | 35.0957871684793 | 400 |
| 18-ExWM400mmCarlingAveJ-E2 | 366028H029 | | 54.4871678813318 | 400 |
| 10-ExWM400mmCarlingAveJ-E7 | J-E6 | | 86.5525765463542 | 400 |
| 13-ExWM400mmCarlingAveJ-E6 | 366028H031 | | 7.73250133830889 | 400 |
| 11-ExWM150mmCarlingAveJ-E6 | J-E5 | | 7.45726728454382 | 150 |
| 12-ExWM150mmCarlingAveJ-E5 | 366028H030 | | 90.9465713866359 | 150 |
| 6-ExWM400mmCarlingAveJ-E9 | J-E8 | | 0.382945097269914 | 400 |
| 4-ExWM150mmPrestonStJ-E9 | 366028H219 | | 40.1973470697933 | 150 |
| 31-PropWM300mmRdBJ-14 | H-5 | | 22.941571844959 | 300 |
| 25-PropWM300mmRdAJ-17 | J-16 | | 62.2851182626027 | 300 |
| 33-PropWM300mmRdLH-12 | J-12 | | 28.8853068075771 | 300 |
| 40-PropWM300mmHospitalJ-4 | H-15 | | 91.57 | 300 |

| | | | | |
|---|---|---|---|---|
| 39-PropWM300mmHospitalH-15 | J-5 | 24.29 | 300 | |
| 42-PropWM300mmHospitalJ-3 | H-7 | 43.89 | 300 | |
| 41-PropWM300mmHospitalH-7 | J-4 | 10.80 | 300 | |
| 38-PropWM300mmHospitalJ-5 | J-6 | 35.8431820756787 | 300 | |
| 1-ExWM400mmCarlingAveR-1 | J-E10 | 0.217566858316817 | 1000 | |



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 3-ExWM400mmCarlingAveJ-E10 | J-E9 | 0.399488044413268 | 400 | |
| 5A-ExWM150mmPrestonStJ-E11 | 366028H185 | 45.2635914858321 | 150 | |
| 46-PropWM200mmCUPServiceJ-27(CUPService) | J-24 | 11.58 | 200 | |
| 27-PropWM300mmRdBJ-16 | H-2 | 21.5808707602312 | 300 | |
| 26-PropWM300mmRdAJ-16 | J-15 | 21.3543962701595 | 300 | |
| 47-PropWM300mmHospitalJ-3 | J-29 | 12.8116327584704 | 300 | |
| 49-PropWM300mmRdAJ-28 | J-15 | 34.6655277241037 | 300 | |
| 50-PropWM300mmRdEJ-7 | H-6 | 13.31 | 300 | |
| 51-PropWM300mmRdEH-6 | J-8 | 22.67 | 300 | |
| 56-PropWM300mmRdEH-11 | J-31 | 5.74 | 300 | |
| 57-PropWM200mmCUPServiceJ-30(CUPService) | J-10 | 11.59 | 200 | |
| 59-PropWM300mmRdEH-10 | J-32 | 19.01 | 300 | |
| 60-PropWM300mmRdEJ-32 | J-33 | 35.9527228433413 | 300 | |
| 61-PropWM300mmRdEJ-33 | H-9 | 38.6955804752682 | 300 | |
| 62-PropWM300mmRdEH-9 | J-34 | 26.326879710781 | 300 | |
| 63-PropWM300mmRdEJ-34 | J-35 | 22.6847258729083 | 300 | |
| 64-PropWM300mmHospitalJ-35 | J-44 | 66.2303194539337 | 300 | |
| 65-PropWM300mmHospitalJ-44 | J-36 | 45.3820485822456 | 300 | |
| 66-PropWM300mmHospitalJ-36 | J-37 | 61.1082602227364 | 300 | |
| 67-PropWM300mmHospitalJ-37 | J-38 | 43.5544391693597 | 300 | |
| 68-PropWM300mmHospitalJ-38 | J-40 | 34.5857153250994 | 300 | |
| 69-PropWM300mmHospitalJ-40 | J-39 | 22.0228385256111 | 300 | |
| 70-PropWM300mmLoadingDockJ-42 | H-13 | 4.94 | 300 | |
| 71-PropWM300mmLoadingDockH-13 | J-41 | 54.59 | 300 | |
| 72-PropWM300mmLoadingDockJ-41 | H-8 | 10.281839107194 | 300 | |
| 73-PropWM300mmLoadingDockH-8 | J-39 | 18.8763427083242 | 300 | |
| 74-PropWM300mmLoadingDockJ-39 | J-43 | 23.4020520143924 | 300 | |
| 75-PropWM300mmRdLJ-43 | J-46 | 37.5282521890565 | 300 | |
| 77-PropWM300mmRdLJ-46 | J-11 | 5.05366092600287 | 300 | |
| 78-PropWM300mmRdLJ-11 | H-12 | 6.0260271211011 | 300 | |
| 80-PropWM300mmRdLJ-13 | J-14 | 17.9428667770884 | 300 | |
| 48-PropWM300mmHospitalJ-29 | J-47 | 37.9955088729321 | 300 | |
| 48B-PropWM300mmHospitalJ-47 | J-28 | 35.7449782977257 | 300 | |
| 83-PropWM300mm J-47 | H-16 | 31.85 | 300 | |
| 84-PropWM150mm H-16 | H-17 | 47.38 | 150 | |
| 5B-ExWM150mmPrestonSt366028H185 | H-19 | 118.755824075502 | 150 | |
| 5-ExWM150mmPrestonStH-19 | 366028H219 | 51.0338192356705 | 150 | |

```
  44-PropWM300mmHospitalJ-1            688-A          11.7604930134715       300
  44-PropWM300mmHospital(2)688-B          J-2            23.8506572610621       300
  22-PropWM300mmRdAJ-E3           691-A          21.8758265595292       300
  22-PropWM300mmRdA(2)691-B          J-18           31.0182402514265       300
  34-PropWM300mmRdE(2)J-183          J-24                23.44       300
  76-PropWM300mmHospitalServiceJ-45(HospitalService)J-183               28.02
300
  79-PropWM300mmHospitalServiceJ-23(HospitalService)J-9                 28.03
300
  1              UOHI           T-501               11.80       150
  2              J-31           T-501               10.52       300
  3              T-501          H-10                79.65       300
```



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm | |
|---|---|---|---|---|---|
| 6 | J-28 | TEE-34 | 11.16 | 300 | |
| 7 | TEE-34 | H-17 | 21.77 | 150 | |
| 8 | TEE-34 | H-18 | 26.77 | 150 | |
| 9 | J-8 | H-14 | 56.95 | 300 | |
| 10 | H-14 | J-9 | 14.32 | 300 | |
| 11 | J-9 | J-183 | 6.50 | 300 | |
| 12 | J-48 | J-49(CUPService) | 11.60 | 200 | |
| 13 | J-24 | J-10 | 4.00 | 300 | |
| 14 | J-10 | J-48 | 4.00 | 300 | |
| 15 | J-48 | H-3 | 34.80 | 300 | |
| 16 | H-3 | H-11 | 78.65 | 300 | |
| FIRESERVICEMETER2688-A | 688-B | | #N/A | 300 | Valve |
| FIRESERVICEMETER1691-A | 691-B | | #N/A | 300 | Valve |

Node Results:

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-22 | 0.00 | 106.98 | 40.88 | 0.00 |
| J-21 | 0.00 | 106.91 | 41.35 | 0.00 |
| J-20 | 0.00 | 107.06 | 41.73 | 0.00 |
| J-19 | 0.00 | 107.10 | 42.97 | 0.00 |
| J-8 | 0.00 | 105.04 | 25.73 | 0.00 |
| J-7 | 0.00 | 105.08 | 25.21 | 0.00 |
| J-6 | 0.00 | 105.15 | 29.19 | 0.00 |
| J-5 | 0.00 | 105.18 | 29.89 | 0.00 |
| J-4 | 0.00 | 105.29 | 31.09 | 0.00 |
| J-3 | 0.00 | 105.34 | 31.27 | 0.00 |
| J-2 | 0.00 | 105.94 | 38.70 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-1 | 0.00 | 106.81 | 40.20 | 0.00 |
| J-12 | 0.00 | 105.15 | 35.33 | 0.00 |
| J-13 | 0.00 | 105.15 | 35.52 | 0.00 |
| J-14 | 0.00 | 105.15 | 35.81 | 0.00 |
| J-15 | 0.00 | 105.05 | 33.04 | 0.00 |
| J-16 | 0.00 | 105.20 | 34.02 | 0.00 |
| J-17 | 0.00 | 105.78 | 37.49 | 0.00 |
| J-18 | 0.00 | 106.10 | 39.73 | 0.00 |
| J-11 | 0.00 | 105.14 | 34.96 | 0.00 |
| J-10 | 0.00 | 104.97 | 31.40 | 0.00 |
| J-9 | 0.00 | 104.98 | 26.88 | 0.00 |
| J-23(HospitalService) | 8.96 | 104.98 | 33.55 | 0.00 |
| J-E1 | 0.00 | 107.09 | 40.62 | 0.00 |
| J-E2 | 0.00 | 106.98 | 41.40 | 0.00 |
| J-E3 | 0.00 | 106.85 | 41.87 | 0.00 |
| J-E4 | 0.00 | 106.91 | 41.83 | 0.00 |
| J-E7 | 0.00 | 107.06 | 43.48 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-E8 | 0.00 | 107.10 | 44.01 | 0.00 |
| J-24 | 0.00 | 104.97 | 31.40 | 0.00 |
| J-25 | 0.00 | 105.17 | 34.94 | 0.00 |
| J-26(PGService) | 1.70 | 105.17 | 34.56 | 0.00 |
| J-E6 | 0.00 | 106.96 | 42.32 | 0.00 |
| J-E5 | 0.00 | 106.96 | 42.37 | 0.00 |
| J-E9 | 0.00 | 107.10 | 44.35 | 0.00 |
| J-E10 | 0.00 | 107.10 | 44.41 | 0.00 |
| J-E11 | 0.00 | 107.10 | 41.02 | 0.00 |
| J-27(CUPService) | 7.59 | 104.96 | 31.35 | 0.00 |
| J-28 | 0.00 | 104.82 | 31.14 | 0.00 |
| J-29 | 0.00 | 105.23 | 31.00 | 0.00 |
| J-30(CUPService) | 7.59 | 104.96 | 31.47 | 0.00 |
| J-31 | 0.00 | 104.98 | 30.28 | 0.00 |
| J-32 | 0.00 | 105.01 | 26.72 | 0.00 |
| J-33 | 0.00 | 105.02 | 27.49 | 0.00 |
| J-34 | 0.00 | 105.04 | 26.09 | 0.00 |
| J-35 | 0.00 | 105.04 | 23.10 | 0.00 |
| J-36 | 0.00 | 105.07 | 25.44 | 0.00 |
| J-37 | 0.00 | 105.09 | 33.69 | 0.00 |
| J-38 | 0.00 | 105.10 | 35.01 | 0.00 |
| J-39 | 0.00 | 105.12 | 35.27 | 0.00 |
| J-40 | 0.00 | 105.11 | 33.91 | 0.00 |
| J-41 | 0.00 | 105.12 | 35.21 | 0.00 |
| J-42 | 0.00 | 105.12 | 35.41 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-43 | 0.00 | 105.13 | 35.37 | 0.00 |
| J-45(HospitalService) | 8.96 | 104.97 | 33.55 | 0.00 |
| J-46 | 0.00 | 105.14 | 35.00 | 0.00 |
| J-44 | 0.00 | 105.06 | 24.37 | 0.00 |
| J-47 | 0.00 | 104.92 | 30.73 | 0.00 |
| J-183 | 0.00 | 104.97 | 27.91 | 0.00 |
| H-1 | 0.00 | 106.02 | 38.84 | 0.00 |
| H-2 | 0.00 | 105.19 | 33.97 | 0.00 |
| H-3 | 0.00 | 104.97 | 29.47 | 0.00 |
| H-4 | 0.00 | 105.13 | 28.38 | 0.00 |
| H-5 | 0.00 | 105.16 | 35.29 | 0.00 |
| H-6 | 0.00 | 105.07 | 25.04 | 0.00 |
| 366028H031 | 0.00 | 106.95 | 42.22 | 0.00 |
| 366028H029 | 0.00 | 106.90 | 41.72 | 0.00 |
| 366028H030 | 0.00 | 106.96 | 41.87 | 0.00 |
| 366028H185 | 0.00 | 107.10 | 40.72 | 0.00 |
| 366028H219 | 0.00 | 107.10 | 44.01 | 0.00 |
| H-12 | 0.00 | 105.14 | 34.71 | 0.00 |
| H-13 | 0.00 | 105.12 | 35.03 | 0.00 |
| H-14 | 0.00 | 104.99 | 27.57 | 0.00 |
| H-15 | 0.00 | 105.20 | 29.90 | 0.00 |
| H-7 | 0.00 | 105.30 | 29.95 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality | |
|---|---|---|---|---|---|
| H-8 | 0.00 | 105.12 | 34.59 | 0.00 | |
| H-9 | 0.00 | 105.03 | 26.91 | 0.00 | |
| H-10 | 0.00 | 105.00 | 28.13 | 0.00 | |
| H-11 | 0.00 | 104.98 | 30.02 | 0.00 | |
| H-16 | 10.00 | 104.85 | 25.44 | 0.00 | |
| H-18 | 95.00 | 97.20 | 20.40 | 0.00 | |
| H-17 | 95.00 | 102.35 | 22.41 | 0.00 | |
| H-19 | 0.00 | 107.10 | 43.30 | 0.00 | |
| 688-A | 0.00 | 106.65 | 39.57 | 0.00 | |
| 688-B | 0.00 | 106.27 | 39.19 | 0.00 | |
| 691-A | 0.00 | 106.64 | 40.06 | 0.00 | |
| 691-B | 0.00 | 106.39 | 39.81 | 0.00 | |
| UOHI | 8.87 | 104.94 | 31.27 | 0.00 | |
| T-501 | 0.00 | 104.98 | 32.87 | 0.00 | |
| TEE-34 | 0.00 | 104.64 | 32.92 | 0.00 | |
| J-48 | 0.00 | 104.97 | 31.37 | 0.00 | |
| J-49(CUPService) | 7.59 | 104.96 | 31.59 | 0.00 | |
| R-1 | -53.14 | 107.10 | 0.00 | 0.00 | Reservoir |
| R-2 | -198.12 | 107.10 | 0.00 | 0.00 | Reservoir |

Link Results:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 43-PropWM300mmHospital | 138.42 | 1.96 | 13.61 | Open |
| 32-PropWM300mmRdL | -17.05 | 0.24 | 0.28 | Open |
| 21-ExWM400mmCarlingAve | 198.12 | 0.25 | 0.06 | Open |
| 20-ExWM400mmCarlingAve | 59.70 | 0.48 | 1.50 | Open |
| 16-ExWM400mmCarlingAve | 53.14 | 0.42 | 1.21 | Open |
| 8-ExWM400mmCarlingAve | 53.14 | 0.42 | 1.21 | Open |
| 45-PropWM300mmHospital | 138.42 | 1.96 | 13.61 | Open |
| 19-PropWM150mmResearchB | 0.00 | 0.00 | 0.00 | Closed |
| 15-PropWM150mmCarlingV-T#3 | 0.00 | 0.00 | 0.00 | Closed |
| 9-PropWM150mmCarlingV-T#2 | 0.00 | 0.00 | 0.00 | Closed |
| 7-PropWM150mmCarlingV-T#1 | 0.00 | 0.00 | 0.00 | Closed |
| 23-PropWM300mmRdA | 112.84 | 1.60 | 9.32 | Open |
| 24-PropWM300mmRdA | 112.84 | 1.60 | 9.32 | Open |
| 37-PropWM300mmRdD | 32.51 | 0.46 | 0.93 | Open |
| 36-PropWM300mmRdD | 32.51 | 0.46 | 0.93 | Open |
| 28-PropWM300mmRdB | 18.75 | 0.27 | 0.34 | Open |
| 30-PropWM300mmRdB | 17.05 | 0.24 | 0.28 | Open |
| 29-PropWM150mmPGService | 1.70 | 0.10 | 0.16 | Open |
| 14-ExWM400mmCarlingAve | 53.14 | 0.42 | 1.21 | Open |
| 17-ExWM400mmCarlingAve | 59.70 | 0.48 | 1.50 | Open |
| 18-ExWM400mmCarlingAve | 59.70 | 0.48 | 1.50 | Open |
| 10-ExWM400mmCarlingAve | 53.14 | 0.42 | 1.21 | Open |



Link Results: (continued)

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 13-ExWM400mmCarlingAve | 53.14 | 0.42 | 1.21 | Open |
| 11-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 12-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 6-ExWM400mmCarlingAve | 53.14 | 0.42 | 1.21 | Open |
| 4-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 31-PropWM300mmRdB | -17.05 | 0.24 | 0.28 | Open |
| 25-PropWM300mmRdA | 112.84 | 1.60 | 9.32 | Open |
| 33-PropWM300mmRdL | -17.05 | 0.24 | 0.28 | Open |
| 40-PropWM300mmHospital | 32.51 | 0.46 | 0.93 | Open |
| 39-PropWM300mmHospital | 32.51 | 0.46 | 0.93 | Open |
| 42-PropWM300mmHospital | 32.51 | 0.46 | 0.93 | Open |
| 41-PropWM300mmHospital | 32.51 | 0.46 | 0.93 | Open |
| 38-PropWM300mmHospital | 32.51 | 0.46 | 0.93 | Open |
| 1-ExWM400mmCarlingAve | 53.14 | 0.07 | 0.00 | Open |
| 3-ExWM400mmCarlingAve | 53.14 | 0.42 | 1.21 | Open |

| | | | | |
|---|---|---|---|---|
| 5A-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 46-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 27-PropWM300mmRdB | 18.75 | 0.27 | 0.34 | Open |
| 26-PropWM300mmRdA | 94.09 | 1.33 | 6.66 | Open |
| 47-PropWM300mmHospital | 105.91 | 1.50 | 8.29 | Open |
| 49-PropWM300mmRdA | -94.09 | 1.33 | 6.66 | Open |
| 50-PropWM300mmRdE | 32.51 | 0.46 | 0.93 | Open |
| 51-PropWM300mmRdE | 32.51 | 0.46 | 0.93 | Open |
| 56-PropWM300mmRdE | -8.18 | 0.12 | 0.07 | Open |
| 57-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 59-PropWM300mmRdE | -17.05 | 0.24 | 0.28 | Open |
| 60-PropWM300mmRdE | -17.05 | 0.24 | 0.28 | Open |
| 61-PropWM300mmRdE | -17.05 | 0.24 | 0.28 | Open |
| 62-PropWM300mmRdE | -17.05 | 0.24 | 0.28 | Open |
| 63-PropWM300mmRdE | -17.05 | 0.24 | 0.28 | Open |
| 64-PropWM300mmHospital | -17.05 | 0.24 | 0.28 | Open |
| 65-PropWM300mmHospital | -17.05 | 0.24 | 0.28 | Open |
| 66-PropWM300mmHospital | -17.05 | 0.24 | 0.28 | Open |
| 67-PropWM300mmHospital | -17.05 | 0.24 | 0.28 | Open |
| 68-PropWM300mmHospital | -17.05 | 0.24 | 0.28 | Open |
| 69-PropWM300mmHospital | -17.05 | 0.24 | 0.28 | Open |
| 70-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 71-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 72-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 73-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 74-PropWM300mmLoadingDock | -17.05 | 0.24 | 0.28 | Open |
| 75-PropWM300mmRdL | -17.05 | 0.24 | 0.28 | Open |
| 77-PropWM300mmRdL | -17.05 | 0.24 | 0.28 | Open |
| 78-PropWM300mmRdL | -17.05 | 0.24 | 0.28 | Open |
| 80-PropWM300mmRdL | -17.05 | 0.24 | 0.28 | Open |
| 48-PropWM300mmHospital | 105.91 | 1.50 | 8.29 | Open |
| 48B-PropWM300mmHospital | 57.16 | 0.81 | 2.64 | Open |



Link Results: (continued)

| Link ID | Flow LPS | VelocityUnit m/s | Headloss m/km | Status |
|---|---|---|---|---|
| 83-PropWM300mm | 48.76 | 0.69 | 1.97 | Open |
| 84-PropWM150mm | 38.76 | 2.19 | 52.83 | Open |
| 5B-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 5-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 44-PropWM300mmHospital | 138.42 | 1.96 | 13.61 | Open |
| 44-PropWM300mmHospital(2) | 138.42 | 1.96 | 13.61 | Open |
| 22-PropWM300mmRdA | 112.84 | 1.60 | 9.32 | Open |
| 22-PropWM300mmRdA(2) | 112.84 | 1.60 | 9.32 | Open |
| 34-PropWM300mmRdE(2) | 14.59 | 0.21 | 0.21 | Open |
| 76-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |

| | | | | |
|---|---|---|---|---|
| 79-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |
| 1 | -8.87 | 0.50 | 3.44 | Open |
| 2 | -8.18 | 0.12 | 0.07 | Open |
| 3 | -17.05 | 0.24 | 0.28 | Open |
| 6 | 151.24 | 2.14 | 16.04 | Open |
| 7 | 56.24 | 3.18 | 105.30 | Open |
| 8 | 95.00 | 5.38 | 277.99 | Open |
| 9 | 32.51 | 0.46 | 0.93 | Open |
| 10 | 32.51 | 0.46 | 0.93 | Open |
| 11 | 23.55 | 0.33 | 0.51 | Open |
| 12 | 7.59 | 0.24 | 0.53 | Open |
| 13 | 7.00 | 0.10 | 0.05 | Open |
| 14 | -0.59 | 0.01 | 0.00 | Open |
| 15 | -8.18 | 0.12 | 0.07 | Open |
| 16 | -8.18 | 0.12 | 0.07 | Open |
| FIRESERVICEMETER2 | 138.42 | 1.96 | 0.38 | Open Valve |
| FIRESERVICEMETER1 | 112.84 | 1.60 | 0.26 | Open Valve |

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

Input File: NCD-Case 1 PODIUM.net

Scenario: with hospital loop
Date: 2024-07-19 11:25:02 AM

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 43-PropWM300mmHospitalJ-2 | J-3 | | 44.3429614279853 | 300 |
| 32-PropWM300mmRdLJ-12 | J-13 | | 8.10173833723436 | 300 |
| 21-ExWM400mmCarlingAveR-2 | J-E1 | | 148.67 | 1000 |
| 20-ExWM400mmCarlingAveJ-E1 | J-E2 | | 72.0604746626472 | 400 |
| 16-ExWM400mmCarlingAveJ-E4 | J-E3 | | 53.8905996515422 | 400 |
| 8-ExWM400mmCarlingAveJ-E8 | J-E7 | | 30.3005394242057 | 400 |
| 45-PropWM300mmHospitalJ-E1 | J-1 | | 20.6394832517881 | 300 |
| 19-PropWM150mmResearchBJ-E2 | J-22 | | 30.3462421119232 | 150 |
| 15-PropWM150mmCarlingV-T#3J-E4 | J-21 | | 30.9676844497797 | 150 |
| 9-PropWM150mmCarlingV-T#2J-E7 | J-20 | | 31.0736886830009 | 150 |
| 7-PropWM150mmCarlingV-T#1J-E8 | J-19 | | 31.2526179381906 | 150 |
| 23-PropWM300mmRdAJ-18 | H-1 | | 8.34306529014965 | 300 |
| 24-PropWM300mmRdAH-1 | J-17 | | 26.2370276682741 | 300 |
| 37-PropWM300mmRdDJ-6 | H-4 | | 14.21 | 300 |
| 36-PropWM300mmRdDH-4 | J-7 | | 59.70 | 300 |
| 28-PropWM300mmRdBH-2 | J-25 | | 47.9195248882866 | 300 |
| 30-PropWM300mmRdBJ-25 | H-5 | | 42.0036195237461 | 300 |
| 29-PropWM150mmPGServiceJ-25 | J-26(PGService) | | 16.98 | 150 |
| 14-ExWM400mmCarlingAve366028H031 | J-E4 | | 29.2340814798819 | 400 |
| 17-ExWM400mmCarlingAve366028H029 | J-E3 | | 35.0957871684793 | 400 |
| 18-ExWM400mmCarlingAveJ-E2 | 366028H029 | | 54.4871678813318 | 400 |
| 10-ExWM400mmCarlingAveJ-E7 | J-E6 | | 86.5525765463542 | 400 |
| 13-ExWM400mmCarlingAveJ-E6 | 366028H031 | | 7.73250133830889 | 400 |
| 11-ExWM150mmCarlingAveJ-E6 | J-E5 | | 7.45726728454382 | 150 |
| 12-ExWM150mmCarlingAveJ-E5 | 366028H030 | | 90.9465713866359 | 150 |
| 6-ExWM400mmCarlingAveJ-E9 | J-E8 | | 0.382945097269914 | 400 |
| 4-ExWM150mmPrestonStJ-E9 | 366028H219 | | 40.1973470697933 | 150 |
| 31-PropWM300mmRdBJ-14 | H-5 | | 22.941571844959 | 300 |
| 25-PropWM300mmRdAJ-17 | J-16 | | 62.2851182626027 | 300 |
| 33-PropWM300mmRdLH-12 | J-12 | | 28.8853068075771 | 300 |
| 40-PropWM300mmHospitalJ-4 | H-15 | | 91.57 | 300 |

| | | | | |
|---|---|---|---|---|
| 39-PropWM300mmHospitalH-15 | J-5 | 24.29 | 300 | |
| 42-PropWM300mmHospitalJ-3 | H-7 | 43.89 | 300 | |
| 41-PropWM300mmHospitalH-7 | J-4 | 10.80 | 300 | |
| 38-PropWM300mmHospitalJ-5 | J-6 | 35.8431820756787 | 300 | |
| 1-ExWM400mmCarlingAveR-1 | J-E10 | 0.217566858316817 | 1000 | |



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 3-ExWM400mmCarlingAveJ-E10 | J-E9 | 0.399488044413268 | 400 | |
| 5A-ExWM150mmPrestonStJ-E11 | 366028H185 | 45.2635914858321 | 150 | |
| 46-PropWM200mmCUPServiceJ-27(CUPService) | J-24 | 11.58 | 200 | |
| 27-PropWM300mmRdBJ-16 | H-2 | 21.5808707602312 | 300 | |
| 26-PropWM300mmRdAJ-16 | J-15 | 21.3543962701595 | 300 | |
| 47-PropWM300mmHospitalJ-3 | J-29 | 12.8116327584704 | 300 | |
| 49-PropWM300mmRdAJ-28 | J-15 | 34.6655277241037 | 300 | |
| 50-PropWM300mmRdEJ-7 | H-6 | 13.31 | 300 | |
| 51-PropWM300mmRdEH-6 | J-8 | 22.67 | 300 | |
| 56-PropWM300mmRdEH-11 | J-31 | 5.74 | 300 | |
| 57-PropWM200mmCUPServiceJ-30(CUPService) | J-10 | 11.59 | 200 | |
| 59-PropWM300mmRdEH-10 | J-32 | 19.01 | 300 | |
| 60-PropWM300mmRdEJ-32 | J-33 | 35.9527228433413 | 300 | |
| 61-PropWM300mmRdEJ-33 | H-9 | 38.6955804752682 | 300 | |
| 62-PropWM300mmRdEH-9 | J-34 | 26.326879710781 | 300 | |
| 63-PropWM300mmRdEJ-34 | J-35 | 22.6847258729083 | 300 | |
| 64-PropWM300mmHospitalJ-35 | J-44 | 66.2303194539337 | 300 | |
| 65-PropWM300mmHospitalJ-44 | J-36 | 45.3820485822456 | 300 | |
| 66-PropWM300mmHospitalJ-36 | J-37 | 61.1082602227364 | 300 | |
| 67-PropWM300mmHospitalJ-37 | J-38 | 43.5544391693597 | 300 | |
| 68-PropWM300mmHospitalJ-38 | J-40 | 34.5857153250994 | 300 | |
| 69-PropWM300mmHospitalJ-40 | J-39 | 22.0228385256111 | 300 | |
| 70-PropWM300mmLoadingDockJ-42 | H-13 | 4.94 | 300 | |
| 71-PropWM300mmLoadingDockH-13 | J-41 | 54.59 | 300 | |
| 72-PropWM300mmLoadingDockJ-41 | H-8 | 10.281839107194 | 300 | |
| 73-PropWM300mmLoadingDockH-8 | J-39 | 18.8763427083242 | 300 | |
| 74-PropWM300mmLoadingDockJ-39 | J-43 | 23.4020520143924 | 300 | |
| 75-PropWM300mmRdLJ-43 | J-46 | 37.5282521890565 | 300 | |
| 77-PropWM300mmRdLJ-46 | J-11 | 5.05366092600287 | 300 | |
| 78-PropWM300mmRdLJ-11 | H-12 | 6.0260271211011 | 300 | |
| 80-PropWM300mmRdLJ-13 | J-14 | 17.9428667770884 | 300 | |
| 48-PropWM300mmHospitalJ-29 | J-47 | 37.9955088729321 | 300 | |
| 48B-PropWM300mmHospitalJ-47 | J-28 | 35.7449782977257 | 300 | |
| 83-PropWM300mm J-47 | H-16 | 31.85 | 300 | |
| 84-PropWM150mm H-16 | H-17 | 47.38 | 150 | |
| 5B-ExWM150mmPrestonSt366028H185 | H-19 | 118.755824075502 | 150 | |
| 5-ExWM150mmPrestonStH-19 | 366028H219 | 51.0338192356705 | 150 | |

```
  44-PropWM300mmHospitalJ-1            688-A          11.7604930134715       300
  44-PropWM300mmHospital(2)688-B          J-2            23.8506572610621       300
  22-PropWM300mmRdAJ-E3           691-A          21.8758265595292       300
  22-PropWM300mmRdA(2)691-B          J-18           31.0182402514265       300
  34-PropWM300mmRdE(2)J-183          J-24                23.44       300
  76-PropWM300mmHospitalServiceJ-45(HospitalService)J-183               28.02
300
  79-PropWM300mmHospitalServiceJ-23(HospitalService)J-9                 28.03
300
  1              UOHI           T-501               11.80       150
  2              J-31           T-501               10.52       300
  3              T-501          H-10                79.65       300
```



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm | |
|---|---|---|---|---|---|
| 6 | J-28 | TEE-34 | 11.16 | 300 | |
| 7 | TEE-34 | H-17 | 21.77 | 150 | |
| 8 | TEE-34 | H-18 | 26.77 | 150 | |
| 9 | J-8 | H-14 | 56.95 | 300 | |
| 10 | H-14 | J-9 | 14.32 | 300 | |
| 11 | J-9 | J-183 | 6.50 | 300 | |
| 12 | J-48 | J-49(CUPService) | 11.60 | 200 | |
| 13 | J-24 | J-10 | 4.00 | 300 | |
| 14 | J-10 | J-48 | 4.00 | 300 | |
| 15 | J-48 | H-3 | 34.80 | 300 | |
| 16 | H-3 | H-11 | 78.65 | 300 | |
| FIRESERVICEMETER2688-A | 688-B | | #N/A | 300 | Valve |
| FIRESERVICEMETER1691-A | 691-B | | #N/A | 300 | Valve |

Node Results:

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-22 | 0.00 | 106.94 | 40.84 | 0.00 |
| J-21 | 0.00 | 106.85 | 41.29 | 0.00 |
| J-20 | 0.00 | 107.05 | 41.72 | 0.00 |
| J-19 | 0.00 | 107.10 | 42.97 | 0.00 |
| J-8 | 0.00 | 99.82 | 20.52 | 0.00 |
| J-7 | 0.00 | 100.36 | 20.50 | 0.00 |
| J-6 | 0.00 | 101.45 | 25.50 | 0.00 |
| J-5 | 0.00 | 101.98 | 26.70 | 0.00 |
| J-4 | 0.00 | 103.70 | 29.50 | 0.00 |
| J-3 | 0.00 | 104.51 | 30.43 | 0.00 |
| J-2 | 0.00 | 105.38 | 38.15 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-1 | 0.00 | 106.68 | 40.07 | 0.00 |
| J-12 | 0.00 | 103.47 | 33.65 | 0.00 |
| J-13 | 0.00 | 103.52 | 33.89 | 0.00 |
| J-14 | 0.00 | 103.64 | 34.31 | 0.00 |
| J-15 | 0.00 | 104.54 | 32.53 | 0.00 |
| J-16 | 0.00 | 104.57 | 33.39 | 0.00 |
| J-17 | 0.00 | 105.34 | 37.06 | 0.00 |
| J-18 | 0.00 | 105.77 | 39.40 | 0.00 |
| J-11 | 0.00 | 103.23 | 33.06 | 0.00 |
| J-10 | 0.00 | 98.92 | 25.36 | 0.00 |
| J-9 | 0.00 | 98.95 | 20.87 | 0.00 |
| J-23(HospitalService) | 8.96 | 98.95 | 27.54 | 0.00 |
| J-E1 | 0.00 | 107.09 | 40.61 | 0.00 |
| J-E2 | 0.00 | 106.94 | 41.36 | 0.00 |
| J-E3 | 0.00 | 106.76 | 41.79 | 0.00 |
| J-E4 | 0.00 | 106.85 | 41.77 | 0.00 |
| J-E7 | 0.00 | 107.05 | 43.46 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-E8 | 0.00 | 107.10 | 44.01 | 0.00 |
| J-24 | 0.00 | 98.92 | 25.36 | 0.00 |
| J-25 | 0.00 | 104.08 | 33.85 | 0.00 |
| J-26(PGService) | 1.70 | 104.08 | 33.47 | 0.00 |
| J-E6 | 0.00 | 106.91 | 42.28 | 0.00 |
| J-E5 | 0.00 | 106.91 | 42.33 | 0.00 |
| J-E9 | 0.00 | 107.10 | 44.35 | 0.00 |
| J-E10 | 0.00 | 107.10 | 44.41 | 0.00 |
| J-E11 | 0.00 | 107.10 | 41.02 | 0.00 |
| J-27(CUPService) | 7.59 | 98.92 | 25.32 | 0.00 |
| J-28 | 0.00 | 104.51 | 30.82 | 0.00 |
| J-29 | 0.00 | 104.50 | 30.27 | 0.00 |
| J-30(CUPService) | 7.59 | 98.91 | 25.43 | 0.00 |
| J-31 | 0.00 | 99.39 | 24.70 | 0.00 |
| J-32 | 0.00 | 100.11 | 21.84 | 0.00 |
| J-33 | 0.00 | 100.36 | 22.84 | 0.00 |
| J-34 | 0.00 | 100.80 | 21.86 | 0.00 |
| J-35 | 0.00 | 100.95 | 19.01 | 0.00 |
| J-36 | 0.00 | 101.70 | 22.08 | 0.00 |
| J-37 | 0.00 | 102.11 | 30.72 | 0.00 |
| J-38 | 0.00 | 102.41 | 32.32 | 0.00 |
| J-39 | 0.00 | 102.79 | 32.94 | 0.00 |
| J-40 | 0.00 | 102.64 | 31.45 | 0.00 |
| J-41 | 0.00 | 102.79 | 32.88 | 0.00 |
| J-42 | 0.00 | 102.79 | 33.08 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-43 | 0.00 | 102.95 | 33.20 | 0.00 |
| J-45(HospitalService) | 8.96 | 98.94 | 27.53 | 0.00 |
| J-46 | 0.00 | 103.20 | 33.06 | 0.00 |
| J-44 | 0.00 | 101.39 | 20.71 | 0.00 |
| J-47 | 0.00 | 104.48 | 30.29 | 0.00 |
| J-183 | 0.00 | 98.94 | 21.89 | 0.00 |
| H-1 | 0.00 | 105.67 | 38.49 | 0.00 |
| H-2 | 0.00 | 104.42 | 33.20 | 0.00 |
| H-3 | 95.00 | 98.92 | 23.43 | 0.00 |
| H-4 | 0.00 | 101.24 | 24.50 | 0.00 |
| H-5 | 0.00 | 103.80 | 33.93 | 0.00 |
| H-6 | 0.00 | 100.16 | 20.14 | 0.00 |
| 366028H031 | 0.00 | 106.90 | 42.17 | 0.00 |
| 366028H029 | 0.00 | 106.83 | 41.65 | 0.00 |
| 366028H030 | 0.00 | 106.91 | 41.83 | 0.00 |
| 366028H185 | 0.00 | 107.10 | 40.72 | 0.00 |
| 366028H219 | 0.00 | 107.10 | 44.01 | 0.00 |
| H-12 | 0.00 | 103.27 | 32.85 | 0.00 |
| H-13 | 0.00 | 102.79 | 32.70 | 0.00 |
| H-14 | 95.00 | 98.98 | 21.57 | 0.00 |
| H-15 | 0.00 | 102.34 | 27.04 | 0.00 |
| H-7 | 0.00 | 103.86 | 28.51 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality | |
|---|---|---|---|---|---|
| H-8 | 0.00 | 102.79 | 32.26 | 0.00 | |
| H-9 | 0.00 | 100.62 | 22.51 | 0.00 | |
| H-10 | 0.00 | 99.99 | 23.13 | 0.00 | |
| H-11 | 0.00 | 99.36 | 24.41 | 0.00 | |
| H-16 | 60.00 | 104.40 | 24.99 | 0.00 | |
| H-18 | 0.00 | 104.50 | 27.69 | 0.00 | |
| H-17 | 0.00 | 104.47 | 24.52 | 0.00 | |
| H-19 | 0.00 | 107.10 | 43.30 | 0.00 | |
| 688-A | 0.00 | 106.44 | 39.37 | 0.00 | |
| 688-B | 0.00 | 105.86 | 38.78 | 0.00 | |
| 691-A | 0.00 | 106.49 | 39.91 | 0.00 | |
| 691-B | 0.00 | 106.15 | 39.57 | 0.00 | |
| UOHI | 8.87 | 99.41 | 25.75 | 0.00 | |
| T-501 | 0.00 | 99.45 | 27.35 | 0.00 | |
| TEE-34 | 0.00 | 104.50 | 32.78 | 0.00 | |
| J-48 | 0.00 | 98.92 | 25.33 | 0.00 | |
| J-49(CUPService) | 7.59 | 98.91 | 25.55 | 0.00 | |
| R-1 | -62.09 | 107.10 | 0.00 | 0.00 | Reservoir |
| R-2 | -239.17 | 107.10 | 0.00 | 0.00 | Reservoir |

Link Results:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 43-PropWM300mmHospital | 169.51 | 2.40 | 19.81 | Open |
| 32-PropWM300mmRdL | -94.73 | 1.34 | 6.74 | Open |
| 21-ExWM400mmCarlingAve | 239.17 | 0.30 | 0.09 | Open |
| 20-ExWM400mmCarlingAve | 69.66 | 0.55 | 1.99 | Open |
| 16-ExWM400mmCarlingAve | 62.09 | 0.49 | 1.61 | Open |
| 8-ExWM400mmCarlingAve | 62.09 | 0.49 | 1.61 | Open |
| 45-PropWM300mmHospital | 169.51 | 2.40 | 19.81 | Open |
| 19-PropWM150mmResearchB | 0.00 | 0.00 | 0.00 | Closed |
| 15-PropWM150mmCarlingV-T#3 | 0.00 | 0.00 | 0.00 | Closed |
| 9-PropWM150mmCarlingV-T#2 | 0.00 | 0.00 | 0.00 | Closed |
| 7-PropWM150mmCarlingV-T#1 | 0.00 | 0.00 | 0.00 | Closed |
| 23-PropWM300mmRdA | 131.75 | 1.86 | 12.42 | Open |
| 24-PropWM300mmRdA | 131.75 | 1.86 | 12.42 | Open |
| 37-PropWM300mmRdD | 144.83 | 2.05 | 14.80 | Open |
| 36-PropWM300mmRdD | 144.83 | 2.05 | 14.80 | Open |
| 28-PropWM300mmRdB | 96.43 | 1.36 | 6.97 | Open |
| 30-PropWM300mmRdB | 94.73 | 1.34 | 6.74 | Open |
| 29-PropWM150mmPGService | 1.70 | 0.10 | 0.16 | Open |
| 14-ExWM400mmCarlingAve | 62.09 | 0.49 | 1.61 | Open |
| 17-ExWM400mmCarlingAve | 69.66 | 0.55 | 1.99 | Open |
| 18-ExWM400mmCarlingAve | 69.66 | 0.55 | 1.99 | Open |
| 10-ExWM400mmCarlingAve | 62.09 | 0.49 | 1.61 | Open |



Link Results: (continued)

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 13-ExWM400mmCarlingAve | 62.09 | 0.49 | 1.61 | Open |
| 11-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 12-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 6-ExWM400mmCarlingAve | 62.09 | 0.49 | 1.60 | Open |
| 4-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 31-PropWM300mmRdB | -94.73 | 1.34 | 6.74 | Open |
| 25-PropWM300mmRdA | 131.75 | 1.86 | 12.42 | Open |
| 33-PropWM300mmRdL | -94.73 | 1.34 | 6.74 | Open |
| 40-PropWM300mmHospital | 144.83 | 2.05 | 14.80 | Open |
| 39-PropWM300mmHospital | 144.83 | 2.05 | 14.80 | Open |
| 42-PropWM300mmHospital | 144.83 | 2.05 | 14.80 | Open |
| 41-PropWM300mmHospital | 144.83 | 2.05 | 14.80 | Open |
| 38-PropWM300mmHospital | 144.83 | 2.05 | 14.80 | Open |
| 1-ExWM400mmCarlingAve | 62.09 | 0.08 | 0.00 | Open |
| 3-ExWM400mmCarlingAve | 62.09 | 0.49 | 1.63 | Open |

| | | | | |
|---|---|---|---|---|
| 5A-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 46-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 27-PropWM300mmRdB | 96.43 | 1.36 | 6.97 | Open |
| 26-PropWM300mmRdA | 35.32 | 0.50 | 1.08 | Open |
| 47-PropWM300mmHospital | 24.68 | 0.35 | 0.56 | Open |
| 49-PropWM300mmRdA | -35.32 | 0.50 | 1.08 | Open |
| 50-PropWM300mmRdE | 144.83 | 2.05 | 14.80 | Open |
| 51-PropWM300mmRdE | 144.83 | 2.05 | 14.80 | Open |
| 56-PropWM300mmRdE | -85.86 | 1.21 | 5.62 | Open |
| 57-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 59-PropWM300mmRdE | -94.73 | 1.34 | 6.74 | Open |
| 60-PropWM300mmRdE | -94.73 | 1.34 | 6.74 | Open |
| 61-PropWM300mmRdE | -94.73 | 1.34 | 6.74 | Open |
| 62-PropWM300mmRdE | -94.73 | 1.34 | 6.74 | Open |
| 63-PropWM300mmRdE | -94.73 | 1.34 | 6.74 | Open |
| 64-PropWM300mmHospital | -94.73 | 1.34 | 6.74 | Open |
| 65-PropWM300mmHospital | -94.73 | 1.34 | 6.74 | Open |
| 66-PropWM300mmHospital | -94.73 | 1.34 | 6.74 | Open |
| 67-PropWM300mmHospital | -94.73 | 1.34 | 6.74 | Open |
| 68-PropWM300mmHospital | -94.73 | 1.34 | 6.74 | Open |
| 69-PropWM300mmHospital | -94.73 | 1.34 | 6.74 | Open |
| 70-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 71-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 72-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 73-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 74-PropWM300mmLoadingDock | -94.73 | 1.34 | 6.74 | Open |
| 75-PropWM300mmRdL | -94.73 | 1.34 | 6.74 | Open |
| 77-PropWM300mmRdL | -94.73 | 1.34 | 6.74 | Open |
| 78-PropWM300mmRdL | -94.73 | 1.34 | 6.74 | Open |
| 80-PropWM300mmRdL | -94.73 | 1.34 | 6.74 | Open |
| 48-PropWM300mmHospital | 24.68 | 0.35 | 0.56 | Open |
| 48B-PropWM300mmHospital | -29.64 | 0.42 | 0.78 | Open |



Link Results: (continued)

| Link ID | Flow LPS | VelocityUnit m/s | Headloss m/km | Status |
|---|---|---|---|---|
| 83-PropWM300mm | 54.32 | 0.77 | 2.41 | Open |
| 84-PropWM150mm | -5.68 | 0.32 | 1.51 | Open |
| 5B-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 5-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 44-PropWM300mmHospital | 169.51 | 2.40 | 19.81 | Open |
| 44-PropWM300mmHospital(2) | 169.51 | 2.40 | 19.81 | Open |
| 22-PropWM300mmRdA | 131.75 | 1.86 | 12.42 | Open |
| 22-PropWM300mmRdA(2) | 131.75 | 1.86 | 12.42 | Open |
| 34-PropWM300mmRdE(2) | 31.91 | 0.45 | 0.90 | Open |
| 76-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |

| | | | | |
|---|---|---|---|---|
| 79-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |
| 1 | -8.87 | 0.50 | 3.44 | Open |
| 2 | -85.86 | 1.21 | 5.62 | Open |
| 3 | -94.73 | 1.34 | 6.74 | Open |
| 6 | 5.68 | 0.08 | 0.04 | Open |
| 7 | 5.68 | 0.32 | 1.51 | Open |
| 8 | 0.00 | 0.00 | 0.00 | Open |
| 9 | 144.83 | 2.05 | 14.80 | Open |
| 10 | 49.83 | 0.70 | 2.05 | Open |
| 11 | 40.87 | 0.58 | 1.42 | Open |
| 12 | 7.59 | 0.24 | 0.53 | Open |
| 13 | 24.32 | 0.34 | 0.54 | Open |
| 14 | 16.73 | 0.24 | 0.27 | Open |
| 15 | 9.14 | 0.13 | 0.09 | Open |
| 16 | -85.86 | 1.21 | 5.62 | Open |
| FIRESERVICEMETER2 | 169.51 | 2.40 | 0.59 | Open Valve |
| FIRESERVICEMETER1 | 131.75 | 1.86 | 0.34 | Open Valve |

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

Input File: NCD-Case 1 TOWER A.net

Scenario: with hospital loop
Date: 2024-07-19 11:25:02 AM

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 43-PropWM300mmHospitalJ-2 | J-3 | | 44.3429614279853 | 300 |
| 32-PropWM300mmRdLJ-12 | J-13 | | 8.10173833723436 | 300 |
| 21-ExWM400mmCarlingAveR-2 | J-E1 | | 148.67 | 1000 |
| 20-ExWM400mmCarlingAveJ-E1 | J-E2 | | 72.0604746626472 | 400 |
| 16-ExWM400mmCarlingAveJ-E4 | J-E3 | | 53.8905996515422 | 400 |
| 8-ExWM400mmCarlingAveJ-E8 | J-E7 | | 30.3005394242057 | 400 |
| 45-PropWM300mmHospitalJ-E1 | J-1 | | 20.6394832517881 | 300 |
| 19-PropWM150mmResearchBJ-E2 | J-22 | | 30.3462421119232 | 150 |
| 15-PropWM150mmCarlingV-T#3J-E4 | J-21 | | 30.9676844497797 | 150 |
| 9-PropWM150mmCarlingV-T#2J-E7 | J-20 | | 31.0736886830009 | 150 |
| 7-PropWM150mmCarlingV-T#1J-E8 | J-19 | | 31.2526179381906 | 150 |
| 23-PropWM300mmRdAJ-18 | H-1 | | 8.34306529014965 | 300 |
| 24-PropWM300mmRdAH-1 | J-17 | | 26.2370276682741 | 300 |
| 37-PropWM300mmRdDJ-6 | H-4 | | 14.21 | 300 |
| 36-PropWM300mmRdDH-4 | J-7 | | 59.70 | 300 |
| 28-PropWM300mmRdBH-2 | J-25 | | 47.9195248882866 | 300 |
| 30-PropWM300mmRdBJ-25 | H-5 | | 42.0036195237461 | 300 |
| 29-PropWM150mmPGServiceJ-25 | J-26(PGService) | | 16.98 | 150 |
| 14-ExWM400mmCarlingAve366028H031 | J-E4 | | 29.2340814798819 | 400 |
| 17-ExWM400mmCarlingAve366028H029 | J-E3 | | 35.0957871684793 | 400 |
| 18-ExWM400mmCarlingAveJ-E2 | 366028H029 | | 54.4871678813318 | 400 |
| 10-ExWM400mmCarlingAveJ-E7 | J-E6 | | 86.5525765463542 | 400 |
| 13-ExWM400mmCarlingAveJ-E6 | 366028H031 | | 7.73250133830889 | 400 |
| 11-ExWM150mmCarlingAveJ-E6 | J-E5 | | 7.45726728454382 | 150 |
| 12-ExWM150mmCarlingAveJ-E5 | 366028H030 | | 90.9465713866359 | 150 |
| 6-ExWM400mmCarlingAveJ-E9 | J-E8 | | 0.382945097269914 | 400 |
| 4-ExWM150mmPrestonStJ-E9 | 366028H219 | | 40.1973470697933 | 150 |
| 31-PropWM300mmRdBJ-14 | H-5 | | 22.941571844959 | 300 |
| 25-PropWM300mmRdAJ-17 | J-16 | | 62.2851182626027 | 300 |
| 33-PropWM300mmRdLH-12 | J-12 | | 28.8853068075771 | 300 |
| 40-PropWM300mmHospitalJ-4 | H-15 | | 91.57 | 300 |

| | | | | |
|---|---|---|---|---|
| 39-PropWM300mmHospitalH-15 | J-5 | 24.29 | 300 | |
| 42-PropWM300mmHospitalJ-3 | H-7 | 43.89 | 300 | |
| 41-PropWM300mmHospitalH-7 | J-4 | 10.80 | 300 | |
| 38-PropWM300mmHospitalJ-5 | J-6 | 35.8431820756787 | 300 | |
| 1-ExWM400mmCarlingAveR-1 | J-E10 | 0.217566858316817 | 1000 | |



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 3-ExWM400mmCarlingAveJ-E10 | J-E9 | 0.399488044413268 | 400 | |
| 5A-ExWM150mmPrestonStJ-E11 | 366028H185 | 45.2635914858321 | 150 | |
| 46-PropWM200mmCUPServiceJ-27(CUPService) | J-24 | 11.58 | 200 | |
| 27-PropWM300mmRdBJ-16 | H-2 | 21.5808707602312 | 300 | |
| 26-PropWM300mmRdAJ-16 | J-15 | 21.3543962701595 | 300 | |
| 47-PropWM300mmHospitalJ-3 | J-29 | 12.8116327584704 | 300 | |
| 49-PropWM300mmRdAJ-28 | J-15 | 34.6655277241037 | 300 | |
| 50-PropWM300mmRdEJ-7 | H-6 | 13.31 | 300 | |
| 51-PropWM300mmRdEH-6 | J-8 | 22.67 | 300 | |
| 56-PropWM300mmRdEH-11 | J-31 | 5.74 | 300 | |
| 57-PropWM200mmCUPServiceJ-30(CUPService) | J-10 | 11.59 | 200 | |
| 59-PropWM300mmRdEH-10 | J-32 | 19.01 | 300 | |
| 60-PropWM300mmRdEJ-32 | J-33 | 35.9527228433413 | 300 | |
| 61-PropWM300mmRdEJ-33 | H-9 | 38.6955804752682 | 300 | |
| 62-PropWM300mmRdEH-9 | J-34 | 26.326879710781 | 300 | |
| 63-PropWM300mmRdEJ-34 | J-35 | 22.6847258729083 | 300 | |
| 64-PropWM300mmHospitalJ-35 | J-44 | 66.2303194539337 | 300 | |
| 65-PropWM300mmHospitalJ-44 | J-36 | 45.3820485822456 | 300 | |
| 66-PropWM300mmHospitalJ-36 | J-37 | 61.1082602227364 | 300 | |
| 67-PropWM300mmHospitalJ-37 | J-38 | 43.5544391693597 | 300 | |
| 68-PropWM300mmHospitalJ-38 | J-40 | 34.5857153250994 | 300 | |
| 69-PropWM300mmHospitalJ-40 | J-39 | 22.0228385256111 | 300 | |
| 70-PropWM300mmLoadingDockJ-42 | H-13 | 4.94 | 300 | |
| 71-PropWM300mmLoadingDockH-13 | J-41 | 54.59 | 300 | |
| 72-PropWM300mmLoadingDockJ-41 | H-8 | 10.281839107194 | 300 | |
| 73-PropWM300mmLoadingDockH-8 | J-39 | 18.8763427083242 | 300 | |
| 74-PropWM300mmLoadingDockJ-39 | J-43 | 23.4020520143924 | 300 | |
| 75-PropWM300mmRdLJ-43 | J-46 | 37.5282521890565 | 300 | |
| 77-PropWM300mmRdLJ-46 | J-11 | 5.05366092600287 | 300 | |
| 78-PropWM300mmRdLJ-11 | H-12 | 6.0260271211011 | 300 | |
| 80-PropWM300mmRdLJ-13 | J-14 | 17.9428667770884 | 300 | |
| 48-PropWM300mmHospitalJ-29 | J-47 | 37.9955088729321 | 300 | |
| 48B-PropWM300mmHospitalJ-47 | J-28 | 35.7449782977257 | 300 | |
| 83-PropWM300mm J-47 | H-16 | 31.85 | 300 | |
| 84-PropWM150mm H-16 | H-17 | 47.38 | 150 | |
| 5B-ExWM150mmPrestonSt366028H185 | H-19 | 118.755824075502 | 150 | |
| 5-ExWM150mmPrestonStH-19 | 366028H219 | 51.0338192356705 | 150 | |

```
  44-PropWM300mmHospitalJ-1            688-A          11.7604930134715       300
  44-PropWM300mmHospital(2)688-B          J-2            23.8506572610621       300
  22-PropWM300mmRdAJ-E3           691-A          21.8758265595292       300
  22-PropWM300mmRdA(2)691-B          J-18           31.0182402514265       300
  34-PropWM300mmRdE(2)J-183          J-24                23.44       300
  76-PropWM300mmHospitalServiceJ-45(HospitalService)J-183               28.02
300
  79-PropWM300mmHospitalServiceJ-23(HospitalService)J-9                 28.03
300
  1              UOHI           T-501               11.80       150
  2              J-31           T-501               10.52       300
  3              T-501          H-10                79.65       300
```



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm | |
|---|---|---|---|---|---|
| 6 | J-28 | TEE-34 | 11.16 | 300 | |
| 7 | TEE-34 | H-17 | 21.77 | 150 | |
| 8 | TEE-34 | H-18 | 26.77 | 150 | |
| 9 | J-8 | H-14 | 56.95 | 300 | |
| 10 | H-14 | J-9 | 14.32 | 300 | |
| 11 | J-9 | J-183 | 6.50 | 300 | |
| 12 | J-48 | J-49(CUPService) | 11.60 | 200 | |
| 13 | J-24 | J-10 | 4.00 | 300 | |
| 14 | J-10 | J-48 | 4.00 | 300 | |
| 15 | J-48 | H-3 | 34.80 | 300 | |
| 16 | H-3 | H-11 | 78.65 | 300 | |
| FIRESERVICEMETER2688-A | 688-B | | #N/A | 300 | Valve |
| FIRESERVICEMETER1691-A | 691-B | | #N/A | 300 | Valve |

Node Results:

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-22 | 0.00 | 106.95 | 40.85 | 0.00 |
| J-21 | 0.00 | 106.86 | 41.30 | 0.00 |
| J-20 | 0.00 | 107.05 | 41.72 | 0.00 |
| J-19 | 0.00 | 107.10 | 42.97 | 0.00 |
| J-8 | 0.00 | 101.06 | 21.76 | 0.00 |
| J-7 | 0.00 | 101.20 | 21.34 | 0.00 |
| J-6 | 0.00 | 101.48 | 25.53 | 0.00 |
| J-5 | 0.00 | 101.62 | 26.33 | 0.00 |
| J-4 | 0.00 | 102.81 | 28.61 | 0.00 |
| J-3 | 0.00 | 104.40 | 30.33 | 0.00 |
| J-2 | 0.00 | 105.32 | 38.08 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-1 | 0.00 | 106.66 | 40.05 | 0.00 |
| J-12 | 0.00 | 103.98 | 34.16 | 0.00 |
| J-13 | 0.00 | 104.02 | 34.39 | 0.00 |
| J-14 | 0.00 | 104.10 | 34.76 | 0.00 |
| J-15 | 0.00 | 104.65 | 32.64 | 0.00 |
| J-16 | 0.00 | 104.70 | 33.52 | 0.00 |
| J-17 | 0.00 | 105.43 | 37.15 | 0.00 |
| J-18 | 0.00 | 105.84 | 39.47 | 0.00 |
| J-11 | 0.00 | 103.83 | 33.65 | 0.00 |
| J-10 | 0.00 | 100.91 | 27.35 | 0.00 |
| J-9 | 0.00 | 100.86 | 22.77 | 0.00 |
| J-23(HospitalService) | 8.96 | 100.85 | 29.43 | 0.00 |
| J-E1 | 0.00 | 107.09 | 40.61 | 0.00 |
| J-E2 | 0.00 | 106.95 | 41.37 | 0.00 |
| J-E3 | 0.00 | 106.78 | 41.81 | 0.00 |
| J-E4 | 0.00 | 106.86 | 41.78 | 0.00 |
| J-E7 | 0.00 | 107.05 | 43.47 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-E8 | 0.00 | 107.10 | 44.01 | 0.00 |
| J-24 | 0.00 | 100.90 | 27.34 | 0.00 |
| J-25 | 0.00 | 104.38 | 34.15 | 0.00 |
| J-26(PGService) | 1.70 | 104.38 | 33.77 | 0.00 |
| J-E6 | 0.00 | 106.92 | 42.29 | 0.00 |
| J-E5 | 0.00 | 106.92 | 42.34 | 0.00 |
| J-E9 | 0.00 | 107.10 | 44.35 | 0.00 |
| J-E10 | 0.00 | 107.10 | 44.41 | 0.00 |
| J-E11 | 0.00 | 107.10 | 41.02 | 0.00 |
| J-27(CUPService) | 7.59 | 100.89 | 27.29 | 0.00 |
| J-28 | 0.00 | 104.58 | 30.90 | 0.00 |
| J-29 | 0.00 | 104.43 | 30.20 | 0.00 |
| J-30(CUPService) | 7.59 | 100.90 | 27.42 | 0.00 |
| J-31 | 0.00 | 101.33 | 26.64 | 0.00 |
| J-32 | 0.00 | 101.80 | 23.53 | 0.00 |
| J-33 | 0.00 | 101.96 | 24.44 | 0.00 |
| J-34 | 0.00 | 102.24 | 23.31 | 0.00 |
| J-35 | 0.00 | 102.34 | 20.40 | 0.00 |
| J-36 | 0.00 | 102.83 | 23.21 | 0.00 |
| J-37 | 0.00 | 103.10 | 31.71 | 0.00 |
| J-38 | 0.00 | 103.29 | 33.21 | 0.00 |
| J-39 | 0.00 | 103.54 | 33.69 | 0.00 |
| J-40 | 0.00 | 103.44 | 32.25 | 0.00 |
| J-41 | 0.00 | 103.54 | 33.63 | 0.00 |
| J-42 | 0.00 | 103.54 | 33.83 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-43 | 0.00 | 103.64 | 33.90 | 0.00 |
| J-45(HospitalService) | 8.96 | 100.86 | 29.44 | 0.00 |
| J-46 | 0.00 | 103.81 | 33.67 | 0.00 |
| J-44 | 0.00 | 102.63 | 21.95 | 0.00 |
| J-47 | 0.00 | 104.51 | 30.32 | 0.00 |
| J-183 | 0.00 | 100.86 | 23.80 | 0.00 |
| H-1 | 0.00 | 105.74 | 38.57 | 0.00 |
| H-2 | 0.00 | 104.60 | 33.38 | 0.00 |
| H-3 | 0.00 | 101.04 | 25.55 | 0.00 |
| H-4 | 0.00 | 101.43 | 24.68 | 0.00 |
| H-5 | 0.00 | 104.20 | 34.33 | 0.00 |
| H-6 | 0.00 | 101.15 | 21.13 | 0.00 |
| 366028H031 | 0.00 | 106.91 | 42.18 | 0.00 |
| 366028H029 | 0.00 | 106.85 | 41.66 | 0.00 |
| 366028H030 | 0.00 | 106.92 | 41.84 | 0.00 |
| 366028H185 | 0.00 | 107.10 | 40.72 | 0.00 |
| 366028H219 | 0.00 | 107.10 | 44.01 | 0.00 |
| H-12 | 0.00 | 103.86 | 33.43 | 0.00 |
| H-13 | 0.00 | 103.54 | 33.46 | 0.00 |
| H-14 | 95.00 | 100.85 | 23.44 | 0.00 |
| H-15 | 60.00 | 101.71 | 26.41 | 0.00 |
| H-7 | 95.00 | 102.94 | 27.60 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality | |
|---|---|---|---|---|---|
| H-8 | 0.00 | 103.54 | 33.01 | 0.00 | |
| H-9 | 0.00 | 102.13 | 24.02 | 0.00 | |
| H-10 | 0.00 | 101.72 | 24.86 | 0.00 | |
| H-11 | 0.00 | 101.31 | 26.37 | 0.00 | |
| H-16 | 0.00 | 104.51 | 25.10 | 0.00 | |
| H-18 | 0.00 | 104.58 | 27.76 | 0.00 | |
| H-17 | 0.00 | 104.56 | 24.61 | 0.00 | |
| H-19 | 0.00 | 107.10 | 43.30 | 0.00 | |
| 688-A | 0.00 | 106.42 | 39.34 | 0.00 | |
| 688-B | 0.00 | 105.81 | 38.73 | 0.00 | |
| 691-A | 0.00 | 106.52 | 39.94 | 0.00 | |
| 691-B | 0.00 | 106.21 | 39.63 | 0.00 | |
| UOHI | 8.87 | 101.33 | 27.66 | 0.00 | |
| T-501 | 0.00 | 101.37 | 29.27 | 0.00 | |
| TEE-34 | 0.00 | 104.58 | 32.85 | 0.00 | |
| J-48 | 0.00 | 100.92 | 27.32 | 0.00 | |
| J-49(CUPService) | 7.59 | 100.91 | 27.55 | 0.00 | |
| R-1 | -60.44 | 107.10 | 0.00 | 0.00 | Reservoir |
| R-2 | -240.82 | 107.10 | 0.00 | 0.00 | Reservoir |

Link Results:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 43-PropWM300mmHospital | 173.12 | 2.45 | 20.59 | Open |
| 32-PropWM300mmRdL | -75.09 | 1.06 | 4.38 | Open |
| 21-ExWM400mmCarlingAve | 240.82 | 0.31 | 0.09 | Open |
| 20-ExWM400mmCarlingAve | 67.70 | 0.54 | 1.89 | Open |
| 16-ExWM400mmCarlingAve | 60.44 | 0.48 | 1.53 | Open |
| 8-ExWM400mmCarlingAve | 60.44 | 0.48 | 1.53 | Open |
| 45-PropWM300mmHospital | 173.12 | 2.45 | 20.59 | Open |
| 19-PropWM150mmResearchB | 0.00 | 0.00 | 0.00 | Closed |
| 15-PropWM150mmCarlingV-T#3 | 0.00 | 0.00 | 0.00 | Closed |
| 9-PropWM150mmCarlingV-T#2 | 0.00 | 0.00 | 0.00 | Closed |
| 7-PropWM150mmCarlingV-T#1 | 0.00 | 0.00 | 0.00 | Closed |
| 23-PropWM300mmRdA | 128.14 | 1.81 | 11.80 | Open |
| 24-PropWM300mmRdA | 128.14 | 1.81 | 11.80 | Open |
| 37-PropWM300mmRdD | 69.47 | 0.98 | 3.80 | Open |
| 36-PropWM300mmRdD | 69.47 | 0.98 | 3.80 | Open |
| 28-PropWM300mmRdB | 76.79 | 1.09 | 4.57 | Open |
| 30-PropWM300mmRdB | 75.09 | 1.06 | 4.38 | Open |
| 29-PropWM150mmPGService | 1.70 | 0.10 | 0.16 | Open |
| 14-ExWM400mmCarlingAve | 60.44 | 0.48 | 1.53 | Open |
| 17-ExWM400mmCarlingAve | 67.70 | 0.54 | 1.89 | Open |
| 18-ExWM400mmCarlingAve | 67.70 | 0.54 | 1.89 | Open |
| 10-ExWM400mmCarlingAve | 60.44 | 0.48 | 1.53 | Open |



Link Results: (continued)

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 13-ExWM400mmCarlingAve | 60.44 | 0.48 | 1.53 | Open |
| 11-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 12-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 6-ExWM400mmCarlingAve | 60.44 | 0.48 | 1.53 | Open |
| 4-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 31-PropWM300mmRdB | -75.09 | 1.06 | 4.38 | Open |
| 25-PropWM300mmRdA | 128.14 | 1.81 | 11.80 | Open |
| 33-PropWM300mmRdL | -75.09 | 1.06 | 4.38 | Open |
| 40-PropWM300mmHospital | 129.47 | 1.83 | 12.03 | Open |
| 39-PropWM300mmHospital | 69.47 | 0.98 | 3.80 | Open |
| 42-PropWM300mmHospital | 224.47 | 3.18 | 33.32 | Open |
| 41-PropWM300mmHospital | 129.47 | 1.83 | 12.03 | Open |
| 38-PropWM300mmHospital | 69.47 | 0.98 | 3.80 | Open |
| 1-ExWM400mmCarlingAve | 60.44 | 0.08 | 0.00 | Open |
| 3-ExWM400mmCarlingAve | 60.44 | 0.48 | 1.54 | Open |

| | | | | |
|---|---|---|---|---|
| 5A-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 46-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 27-PropWM300mmRdB | 76.79 | 1.09 | 4.57 | Open |
| 26-PropWM300mmRdA | 51.36 | 0.73 | 2.17 | Open |
| 47-PropWM300mmHospital | -51.36 | 0.73 | 2.17 | Open |
| 49-PropWM300mmRdA | -51.36 | 0.73 | 2.17 | Open |
| 50-PropWM300mmRdE | 69.47 | 0.98 | 3.80 | Open |
| 51-PropWM300mmRdE | 69.47 | 0.98 | 3.80 | Open |
| 56-PropWM300mmRdE | -66.22 | 0.94 | 3.47 | Open |
| 57-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 59-PropWM300mmRdE | -75.09 | 1.06 | 4.38 | Open |
| 60-PropWM300mmRdE | -75.09 | 1.06 | 4.38 | Open |
| 61-PropWM300mmRdE | -75.09 | 1.06 | 4.38 | Open |
| 62-PropWM300mmRdE | -75.09 | 1.06 | 4.38 | Open |
| 63-PropWM300mmRdE | -75.09 | 1.06 | 4.38 | Open |
| 64-PropWM300mmHospital | -75.09 | 1.06 | 4.38 | Open |
| 65-PropWM300mmHospital | -75.09 | 1.06 | 4.38 | Open |
| 66-PropWM300mmHospital | -75.09 | 1.06 | 4.38 | Open |
| 67-PropWM300mmHospital | -75.09 | 1.06 | 4.38 | Open |
| 68-PropWM300mmHospital | -75.09 | 1.06 | 4.38 | Open |
| 69-PropWM300mmHospital | -75.09 | 1.06 | 4.38 | Open |
| 70-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 71-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 72-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 73-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 74-PropWM300mmLoadingDock | -75.09 | 1.06 | 4.38 | Open |
| 75-PropWM300mmRdL | -75.09 | 1.06 | 4.38 | Open |
| 77-PropWM300mmRdL | -75.09 | 1.06 | 4.38 | Open |
| 78-PropWM300mmRdL | -75.09 | 1.06 | 4.38 | Open |
| 80-PropWM300mmRdL | -75.09 | 1.06 | 4.38 | Open |
| 48-PropWM300mmHospital | -51.36 | 0.73 | 2.17 | Open |
| 48B-PropWM300mmHospital | -46.95 | 0.66 | 1.84 | Open |



Link Results: (continued)

| Link ID | Flow LPS | VelocityUnit m/s | Headloss m/km | Status |
|---|---|---|---|---|
| 83-PropWM300mm | -4.41 | 0.06 | 0.02 | Open |
| 84-PropWM150mm | -4.41 | 0.25 | 0.94 | Open |
| 5B-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 5-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 44-PropWM300mmHospital | 173.12 | 2.45 | 20.59 | Open |
| 44-PropWM300mmHospital(2) | 173.12 | 2.45 | 20.59 | Open |
| 22-PropWM300mmRdA | 128.14 | 1.81 | 11.80 | Open |
| 22-PropWM300mmRdA(2) | 128.14 | 1.81 | 11.80 | Open |
| 34-PropWM300mmRdE(2) | -43.45 | 0.61 | 1.59 | Open |
| 76-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |

| | | | | |
|---|---|---|---|---|
| 79-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |
| 1 | -8.87 | 0.50 | 3.44 | Open |
| 2 | -66.22 | 0.94 | 3.47 | Open |
| 3 | -75.09 | 1.06 | 4.38 | Open |
| 6 | 4.41 | 0.06 | 0.02 | Open |
| 7 | 4.41 | 0.25 | 0.94 | Open |
| 8 | 0.00 | 0.00 | 0.00 | Open |
| 9 | 69.47 | 0.98 | 3.80 | Open |
| 10 | -25.53 | 0.36 | 0.59 | Open |
| 11 | -34.49 | 0.49 | 1.04 | Open |
| 12 | 7.59 | 0.24 | 0.53 | Open |
| 13 | -51.04 | 0.72 | 2.14 | Open |
| 14 | -58.63 | 0.83 | 2.77 | Open |
| 15 | -66.22 | 0.94 | 3.47 | Open |
| 16 | -66.22 | 0.94 | 3.47 | Open |
| FIRESERVICEMETER2 | 173.12 | 2.45 | 0.61 | Open Valve |
| FIRESERVICEMETER1 | 128.14 | 1.81 | 0.31 | Open Valve |

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

Input File: NCD-Case 1 TOWER B.net

Scenario: with hospital loop
Date: 2024-07-19 11:25:02 AM

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 43-PropWM300mmHospitalJ-2 | J-3 | | 44.3429614279853 | 300 |
| 32-PropWM300mmRdLJ-12 | J-13 | | 8.10173833723436 | 300 |
| 21-ExWM400mmCarlingAveR-2 | J-E1 | | 148.67 | 1000 |
| 20-ExWM400mmCarlingAveJ-E1 | J-E2 | | 72.0604746626472 | 400 |
| 16-ExWM400mmCarlingAveJ-E4 | J-E3 | | 53.8905996515422 | 400 |
| 8-ExWM400mmCarlingAveJ-E8 | J-E7 | | 30.3005394242057 | 400 |
| 45-PropWM300mmHospitalJ-E1 | J-1 | | 20.6394832517881 | 300 |
| 19-PropWM150mmResearchBJ-E2 | J-22 | | 30.3462421119232 | 150 |
| 15-PropWM150mmCarlingV-T#3J-E4 | J-21 | | 30.9676844497797 | 150 |
| 9-PropWM150mmCarlingV-T#2J-E7 | J-20 | | 31.0736886830009 | 150 |
| 7-PropWM150mmCarlingV-T#1J-E8 | J-19 | | 31.2526179381906 | 150 |
| 23-PropWM300mmRdAJ-18 | H-1 | | 8.34306529014965 | 300 |
| 24-PropWM300mmRdAH-1 | J-17 | | 26.2370276682741 | 300 |
| 37-PropWM300mmRdDJ-6 | H-4 | | 14.21 | 300 |
| 36-PropWM300mmRdDH-4 | J-7 | | 59.70 | 300 |
| 28-PropWM300mmRdBH-2 | J-25 | | 47.9195248882866 | 300 |
| 30-PropWM300mmRdBJ-25 | H-5 | | 42.0036195237461 | 300 |
| 29-PropWM150mmPGServiceJ-25 | J-26(PGService) | | 16.98 | 150 |
| 14-ExWM400mmCarlingAve366028H031 | J-E4 | | 29.2340814798819 | 400 |
| 17-ExWM400mmCarlingAve366028H029 | J-E3 | | 35.0957871684793 | 400 |
| 18-ExWM400mmCarlingAveJ-E2 | 366028H029 | | 54.4871678813318 | 400 |
| 10-ExWM400mmCarlingAveJ-E7 | J-E6 | | 86.5525765463542 | 400 |
| 13-ExWM400mmCarlingAveJ-E6 | 366028H031 | | 7.73250133830889 | 400 |
| 11-ExWM150mmCarlingAveJ-E6 | J-E5 | | 7.45726728454382 | 150 |
| 12-ExWM150mmCarlingAveJ-E5 | 366028H030 | | 90.9465713866359 | 150 |
| 6-ExWM400mmCarlingAveJ-E9 | J-E8 | | 0.382945097269914 | 400 |
| 4-ExWM150mmPrestonStJ-E9 | 366028H219 | | 40.1973470697933 | 150 |
| 31-PropWM300mmRdBJ-14 | H-5 | | 22.941571844959 | 300 |
| 25-PropWM300mmRdAJ-17 | J-16 | | 62.2851182626027 | 300 |
| 33-PropWM300mmRdLH-12 | J-12 | | 28.8853068075771 | 300 |
| 40-PropWM300mmHospitalJ-4 | H-15 | | 91.57 | 300 |

| | | | | |
|---|---|---|---|---|
| 39-PropWM300mmHospitalH-15 | J-5 | 24.29 | 300 | |
| 42-PropWM300mmHospitalJ-3 | H-7 | 43.89 | 300 | |
| 41-PropWM300mmHospitalH-7 | J-4 | 10.80 | 300 | |
| 38-PropWM300mmHospitalJ-5 | J-6 | 35.8431820756787 | 300 | |
| 1-ExWM400mmCarlingAveR-1 | J-E10 | 0.217566858316817 | 1000 | |



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 3-ExWM400mmCarlingAveJ-E10 | J-E9 | 0.399488044413268 | 400 | |
| 5A-ExWM150mmPrestonStJ-E11 | 366028H185 | 45.2635914858321 | 150 | |
| 46-PropWM200mmCUPServiceJ-27(CUPService) | J-24 | 11.58 | 200 | |
| 27-PropWM300mmRdBJ-16 | H-2 | 21.5808707602312 | 300 | |
| 26-PropWM300mmRdAJ-16 | J-15 | 21.3543962701595 | 300 | |
| 47-PropWM300mmHospitalJ-3 | J-29 | 12.8116327584704 | 300 | |
| 49-PropWM300mmRdAJ-28 | J-15 | 34.6655277241037 | 300 | |
| 50-PropWM300mmRdEJ-7 | H-6 | 13.31 | 300 | |
| 51-PropWM300mmRdEH-6 | J-8 | 22.67 | 300 | |
| 56-PropWM300mmRdEH-11 | J-31 | 5.74 | 300 | |
| 57-PropWM200mmCUPServiceJ-30(CUPService) | J-10 | 11.59 | 200 | |
| 59-PropWM300mmRdEH-10 | J-32 | 19.01 | 300 | |
| 60-PropWM300mmRdEJ-32 | J-33 | 35.9527228433413 | 300 | |
| 61-PropWM300mmRdEJ-33 | H-9 | 38.6955804752682 | 300 | |
| 62-PropWM300mmRdEH-9 | J-34 | 26.326879710781 | 300 | |
| 63-PropWM300mmRdEJ-34 | J-35 | 22.6847258729083 | 300 | |
| 64-PropWM300mmHospitalJ-35 | J-44 | 66.2303194539337 | 300 | |
| 65-PropWM300mmHospitalJ-44 | J-36 | 45.3820485822456 | 300 | |
| 66-PropWM300mmHospitalJ-36 | J-37 | 61.1082602227364 | 300 | |
| 67-PropWM300mmHospitalJ-37 | J-38 | 43.5544391693597 | 300 | |
| 68-PropWM300mmHospitalJ-38 | J-40 | 34.5857153250994 | 300 | |
| 69-PropWM300mmHospitalJ-40 | J-39 | 22.0228385256111 | 300 | |
| 70-PropWM300mmLoadingDockJ-42 | H-13 | 4.94 | 300 | |
| 71-PropWM300mmLoadingDockH-13 | J-41 | 54.59 | 300 | |
| 72-PropWM300mmLoadingDockJ-41 | H-8 | 10.281839107194 | 300 | |
| 73-PropWM300mmLoadingDockH-8 | J-39 | 18.8763427083242 | 300 | |
| 74-PropWM300mmLoadingDockJ-39 | J-43 | 23.4020520143924 | 300 | |
| 75-PropWM300mmRdLJ-43 | J-46 | 37.5282521890565 | 300 | |
| 77-PropWM300mmRdLJ-46 | J-11 | 5.05366092600287 | 300 | |
| 78-PropWM300mmRdLJ-11 | H-12 | 6.0260271211011 | 300 | |
| 80-PropWM300mmRdLJ-13 | J-14 | 17.9428667770884 | 300 | |
| 48-PropWM300mmHospitalJ-29 | J-47 | 37.9955088729321 | 300 | |
| 48B-PropWM300mmHospitalJ-47 | J-28 | 35.7449782977257 | 300 | |
| 83-PropWM300mm J-47 | H-16 | 31.85 | 300 | |
| 84-PropWM150mm H-16 | H-17 | 47.38 | 150 | |
| 5B-ExWM150mmPrestonSt366028H185 | H-19 | 118.755824075502 | 150 | |
| 5-ExWM150mmPrestonStH-19 | 366028H219 | 51.0338192356705 | 150 | |

```
  44-PropWM300mmHospitalJ-1            688-A          11.7604930134715       300
  44-PropWM300mmHospital(2)688-B          J-2            23.8506572610621       300
  22-PropWM300mmRdAJ-E3           691-A          21.8758265595292       300
  22-PropWM300mmRdA(2)691-B          J-18           31.0182402514265       300
  34-PropWM300mmRdE(2)J-183          J-24                23.44       300
  76-PropWM300mmHospitalServiceJ-45(HospitalService)J-183               28.02
300
  79-PropWM300mmHospitalServiceJ-23(HospitalService)J-9                 28.03
300
  1              UOHI           T-501               11.80       150
  2              J-31           T-501               10.52       300
  3              T-501          H-10                79.65       300
```



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm | |
|---|---|---|---|---|---|
| 6 | J-28 | TEE-34 | 11.16 | 300 | |
| 7 | TEE-34 | H-17 | 21.77 | 150 | |
| 8 | TEE-34 | H-18 | 26.77 | 150 | |
| 9 | J-8 | H-14 | 56.95 | 300 | |
| 10 | H-14 | J-9 | 14.32 | 300 | |
| 11 | J-9 | J-183 | 6.50 | 300 | |
| 12 | J-48 | J-49(CUPService) | 11.60 | 200 | |
| 13 | J-24 | J-10 | 4.00 | 300 | |
| 14 | J-10 | J-48 | 4.00 | 300 | |
| 15 | J-48 | H-3 | 34.80 | 300 | |
| 16 | H-3 | H-11 | 78.65 | 300 | |
| FIRESERVICEMETER2688-A | 688-B | | #N/A | 300 | Valve |
| FIRESERVICEMETER1691-A | 691-B | | #N/A | 300 | Valve |

Node Results:

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-22 | 0.00 | 106.93 | 40.83 | 0.00 |
| J-21 | 0.00 | 106.82 | 41.26 | 0.00 |
| J-20 | 0.00 | 107.04 | 41.71 | 0.00 |
| J-19 | 0.00 | 107.10 | 42.97 | 0.00 |
| J-8 | 0.00 | 103.29 | 23.98 | 0.00 |
| J-7 | 0.00 | 103.45 | 23.58 | 0.00 |
| J-6 | 0.00 | 103.78 | 27.83 | 0.00 |
| J-5 | 0.00 | 103.95 | 28.66 | 0.00 |
| J-4 | 0.00 | 104.47 | 30.27 | 0.00 |
| J-3 | 0.00 | 104.72 | 30.65 | 0.00 |
| J-2 | 0.00 | 105.53 | 38.29 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-1 | 0.00 | 106.71 | 40.10 | 0.00 |
| J-12 | 0.00 | 102.76 | 32.95 | 0.00 |
| J-13 | 0.00 | 102.79 | 33.16 | 0.00 |
| J-14 | 0.00 | 102.86 | 33.52 | 0.00 |
| J-15 | 0.00 | 104.27 | 32.26 | 0.00 |
| J-16 | 0.00 | 104.28 | 33.10 | 0.00 |
| J-17 | 0.00 | 105.13 | 36.85 | 0.00 |
| J-18 | 0.00 | 105.61 | 39.24 | 0.00 |
| J-11 | 0.00 | 102.63 | 32.46 | 0.00 |
| J-10 | 0.00 | 102.87 | 29.30 | 0.00 |
| J-9 | 0.00 | 102.96 | 24.87 | 0.00 |
| J-23(HospitalService) | 8.96 | 102.96 | 31.54 | 0.00 |
| J-E1 | 0.00 | 107.09 | 40.62 | 0.00 |
| J-E2 | 0.00 | 106.93 | 41.34 | 0.00 |
| J-E3 | 0.00 | 106.73 | 41.76 | 0.00 |
| J-E4 | 0.00 | 106.82 | 41.74 | 0.00 |
| J-E7 | 0.00 | 107.04 | 43.46 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-E8 | 0.00 | 107.10 | 44.01 | 0.00 |
| J-24 | 0.00 | 102.87 | 29.31 | 0.00 |
| J-25 | 0.00 | 103.44 | 33.21 | 0.00 |
| J-26(PGService) | 1.70 | 103.43 | 32.83 | 0.00 |
| J-E6 | 0.00 | 106.89 | 42.26 | 0.00 |
| J-E5 | 0.00 | 106.89 | 42.31 | 0.00 |
| J-E9 | 0.00 | 107.10 | 44.35 | 0.00 |
| J-E10 | 0.00 | 107.10 | 44.41 | 0.00 |
| J-E11 | 0.00 | 107.10 | 41.02 | 0.00 |
| J-27(CUPService) | 7.59 | 102.87 | 29.26 | 0.00 |
| J-28 | 0.00 | 104.27 | 30.59 | 0.00 |
| J-29 | 0.00 | 104.65 | 30.42 | 0.00 |
| J-30(CUPService) | 7.59 | 102.86 | 29.37 | 0.00 |
| J-31 | 0.00 | 102.73 | 28.03 | 0.00 |
| J-32 | 0.00 | 102.65 | 24.37 | 0.00 |
| J-33 | 0.00 | 102.63 | 25.11 | 0.00 |
| J-34 | 0.00 | 102.59 | 23.65 | 0.00 |
| J-35 | 0.00 | 102.57 | 20.63 | 0.00 |
| J-36 | 0.00 | 102.50 | 22.87 | 0.00 |
| J-37 | 0.00 | 102.46 | 31.07 | 0.00 |
| J-38 | 0.00 | 102.43 | 32.34 | 0.00 |
| J-39 | 0.00 | 102.39 | 32.55 | 0.00 |
| J-40 | 0.00 | 102.41 | 31.21 | 0.00 |
| J-41 | 0.00 | 102.19 | 32.29 | 0.00 |
| J-42 | 0.00 | 101.82 | 32.12 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-43 | 0.00 | 102.48 | 32.73 | 0.00 |
| J-45(HospitalService) | 8.96 | 102.94 | 31.51 | 0.00 |
| J-46 | 0.00 | 102.62 | 32.48 | 0.00 |
| J-44 | 0.00 | 102.53 | 21.84 | 0.00 |
| J-47 | 0.00 | 104.44 | 30.24 | 0.00 |
| J-183 | 0.00 | 102.94 | 25.88 | 0.00 |
| H-1 | 0.00 | 105.50 | 38.32 | 0.00 |
| H-2 | 0.00 | 104.02 | 32.80 | 0.00 |
| H-3 | 0.00 | 102.82 | 27.32 | 0.00 |
| H-4 | 0.00 | 103.72 | 26.97 | 0.00 |
| H-5 | 60.00 | 102.94 | 33.07 | 0.00 |
| H-6 | 0.00 | 103.39 | 23.36 | 0.00 |
| 366028H031 | 0.00 | 106.88 | 42.15 | 0.00 |
| 366028H029 | 0.00 | 106.81 | 41.62 | 0.00 |
| 366028H030 | 0.00 | 106.89 | 41.81 | 0.00 |
| 366028H185 | 0.00 | 107.10 | 40.72 | 0.00 |
| 366028H219 | 0.00 | 107.10 | 44.01 | 0.00 |
| H-12 | 0.00 | 102.66 | 32.23 | 0.00 |
| H-13 | 95.00 | 101.82 | 31.74 | 0.00 |
| H-14 | 0.00 | 103.03 | 25.61 | 0.00 |
| H-15 | 0.00 | 104.06 | 28.75 | 0.00 |
| H-7 | 0.00 | 104.52 | 29.18 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality | |
|---|---|---|---|---|---|
| H-8 | 0.00 | 102.26 | 31.74 | 0.00 | |
| H-9 | 0.00 | 102.60 | 24.49 | 0.00 | |
| H-10 | 0.00 | 102.66 | 25.80 | 0.00 | |
| H-11 | 0.00 | 102.73 | 27.78 | 0.00 | |
| H-16 | 0.00 | 104.43 | 25.02 | 0.00 | |
| H-18 | 95.00 | 96.77 | 19.97 | 0.00 | |
| H-17 | 0.00 | 104.28 | 24.33 | 0.00 | |
| H-19 | 0.00 | 107.10 | 43.30 | 0.00 | |
| 688-A | 0.00 | 106.50 | 39.42 | 0.00 | |
| 688-B | 0.00 | 105.96 | 38.88 | 0.00 | |
| 691-A | 0.00 | 106.43 | 39.85 | 0.00 | |
| 691-B | 0.00 | 106.04 | 39.46 | 0.00 | |
| UOHI | 8.87 | 102.68 | 29.01 | 0.00 | |
| T-501 | 0.00 | 102.72 | 30.61 | 0.00 | |
| TEE-34 | 0.00 | 104.21 | 32.48 | 0.00 | |
| J-48 | 0.00 | 102.86 | 29.26 | 0.00 | |
| J-49(CUPService) | 7.59 | 102.85 | 29.49 | 0.00 | |
| R-1 | -65.57 | 107.10 | 0.00 | 0.00 | Reservoir |
| R-2 | -235.69 | 107.10 | 0.00 | 0.00 | Reservoir |

Link Results:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 43-PropWM300mmHospital | 161.91 | 2.29 | 18.19 | Open |
| 32-PropWM300mmRdL | -68.13 | 0.96 | 3.66 | Open |
| 21-ExWM400mmCarlingAve | 235.69 | 0.30 | 0.09 | Open |
| 20-ExWM400mmCarlingAve | 73.77 | 0.59 | 2.21 | Open |
| 16-ExWM400mmCarlingAve | 65.57 | 0.52 | 1.78 | Open |
| 8-ExWM400mmCarlingAve | 65.57 | 0.52 | 1.78 | Open |
| 45-PropWM300mmHospital | 161.91 | 2.29 | 18.19 | Open |
| 19-PropWM150mmResearchB | 0.00 | 0.00 | 0.00 | Closed |
| 15-PropWM150mmCarlingV-T#3 | 0.00 | 0.00 | 0.00 | Closed |
| 9-PropWM150mmCarlingV-T#2 | 0.00 | 0.00 | 0.00 | Closed |
| 7-PropWM150mmCarlingV-T#1 | 0.00 | 0.00 | 0.00 | Closed |
| 23-PropWM300mmRdA | 139.35 | 1.97 | 13.78 | Open |
| 24-PropWM300mmRdA | 139.35 | 1.97 | 13.78 | Open |
| 37-PropWM300mmRdD | 76.43 | 1.08 | 4.53 | Open |
| 36-PropWM300mmRdD | 76.43 | 1.08 | 4.53 | Open |
| 28-PropWM300mmRdB | 129.83 | 1.84 | 12.09 | Open |
| 30-PropWM300mmRdB | 128.13 | 1.81 | 11.80 | Open |
| 29-PropWM150mmPGService | 1.70 | 0.10 | 0.16 | Open |
| 14-ExWM400mmCarlingAve | 65.57 | 0.52 | 1.78 | Open |
| 17-ExWM400mmCarlingAve | 73.77 | 0.59 | 2.21 | Open |
| 18-ExWM400mmCarlingAve | 73.77 | 0.59 | 2.21 | Open |
| 10-ExWM400mmCarlingAve | 65.57 | 0.52 | 1.78 | Open |



Link Results: (continued)

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 13-ExWM400mmCarlingAve | 65.57 | 0.52 | 1.78 | Open |
| 11-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 12-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 6-ExWM400mmCarlingAve | 65.57 | 0.52 | 1.77 | Open |
| 4-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 31-PropWM300mmRdB | -68.13 | 0.96 | 3.66 | Open |
| 25-PropWM300mmRdA | 139.35 | 1.97 | 13.78 | Open |
| 33-PropWM300mmRdL | -68.13 | 0.96 | 3.66 | Open |
| 40-PropWM300mmHospital | 76.43 | 1.08 | 4.53 | Open |
| 39-PropWM300mmHospital | 76.43 | 1.08 | 4.53 | Open |
| 42-PropWM300mmHospital | 76.43 | 1.08 | 4.53 | Open |
| 41-PropWM300mmHospital | 76.43 | 1.08 | 4.53 | Open |
| 38-PropWM300mmHospital | 76.43 | 1.08 | 4.53 | Open |
| 1-ExWM400mmCarlingAve | 65.57 | 0.08 | 0.00 | Open |
| 3-ExWM400mmCarlingAve | 65.57 | 0.52 | 1.79 | Open |

| | | | | |
|---|---|---|---|---|
| 5A-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 46-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 27-PropWM300mmRdB | 129.83 | 1.84 | 12.09 | Open |
| 26-PropWM300mmRdA | 9.51 | 0.13 | 0.10 | Open |
| 47-PropWM300mmHospital | 85.49 | 1.21 | 5.57 | Open |
| 49-PropWM300mmRdA | -9.51 | 0.13 | 0.10 | Open |
| 50-PropWM300mmRdE | 76.43 | 1.08 | 4.53 | Open |
| 51-PropWM300mmRdE | 76.43 | 1.08 | 4.53 | Open |
| 56-PropWM300mmRdE | 35.74 | 0.51 | 1.11 | Open |
| 57-PropWM200mmCUPService | -7.59 | 0.24 | 0.53 | Open |
| 59-PropWM300mmRdE | 26.87 | 0.38 | 0.65 | Open |
| 60-PropWM300mmRdE | 26.87 | 0.38 | 0.65 | Open |
| 61-PropWM300mmRdE | 26.87 | 0.38 | 0.65 | Open |
| 62-PropWM300mmRdE | 26.87 | 0.38 | 0.65 | Open |
| 63-PropWM300mmRdE | 26.87 | 0.38 | 0.65 | Open |
| 64-PropWM300mmHospital | 26.87 | 0.38 | 0.65 | Open |
| 65-PropWM300mmHospital | 26.87 | 0.38 | 0.65 | Open |
| 66-PropWM300mmHospital | 26.87 | 0.38 | 0.65 | Open |
| 67-PropWM300mmHospital | 26.87 | 0.38 | 0.65 | Open |
| 68-PropWM300mmHospital | 26.87 | 0.38 | 0.65 | Open |
| 69-PropWM300mmHospital | 26.87 | 0.38 | 0.65 | Open |
| 70-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 71-PropWM300mmLoadingDock | -95.00 | 1.34 | 6.78 | Open |
| 72-PropWM300mmLoadingDock | -95.00 | 1.34 | 6.78 | Open |
| 73-PropWM300mmLoadingDock | -95.00 | 1.34 | 6.78 | Open |
| 74-PropWM300mmLoadingDock | -68.13 | 0.96 | 3.66 | Open |
| 75-PropWM300mmRdL | -68.13 | 0.96 | 3.66 | Open |
| 77-PropWM300mmRdL | -68.13 | 0.96 | 3.66 | Open |
| 78-PropWM300mmRdL | -68.13 | 0.96 | 3.66 | Open |
| 80-PropWM300mmRdL | -68.13 | 0.96 | 3.66 | Open |
| 48-PropWM300mmHospital | 85.49 | 1.21 | 5.57 | Open |
| 48B-PropWM300mmHospital | 76.89 | 1.09 | 4.58 | Open |



Link Results: (continued)

| Link ID | Flow LPS | VelocityUnit m/s | Headloss m/km | Status |
|---|---|---|---|---|
| 83-PropWM300mm | 8.60 | 0.12 | 0.08 | Open |
| 84-PropWM150mm | 8.60 | 0.49 | 3.25 | Open |
| 5B-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 5-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 44-PropWM300mmHospital | 161.91 | 2.29 | 18.19 | Open |
| 44-PropWM300mmHospital(2) | 161.91 | 2.29 | 18.19 | Open |
| 22-PropWM300mmRdA | 139.35 | 1.97 | 13.78 | Open |
| 22-PropWM300mmRdA(2) | 139.35 | 1.97 | 13.78 | Open |
| 34-PropWM300mmRdE(2) | 58.51 | 0.83 | 2.76 | Open |
| 76-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |

| | | | | |
|---|---|---|---|---|
| 79-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |
| 1 | -8.87 | 0.50 | 3.44 | Open |
| 2 | 35.74 | 0.51 | 1.11 | Open |
| 3 | 26.87 | 0.38 | 0.65 | Open |
| 6 | 86.40 | 1.22 | 5.69 | Open |
| 7 | -8.60 | 0.49 | 3.25 | Open |
| 8 | 95.00 | 5.38 | 277.99 | Open |
| 9 | 76.43 | 1.08 | 4.53 | Open |
| 10 | 76.43 | 1.08 | 4.53 | Open |
| 11 | 67.47 | 0.95 | 3.59 | Open |
| 12 | 7.59 | 0.24 | 0.53 | Open |
| 13 | 50.92 | 0.72 | 2.13 | Open |
| 14 | 43.33 | 0.61 | 1.58 | Open |
| 15 | 35.74 | 0.51 | 1.11 | Open |
| 16 | 35.74 | 0.51 | 1.11 | Open |
| FIRESERVICEMETER2 | 161.91 | 2.29 | 0.54 | Open Valve |
| FIRESERVICEMETER1 | 139.35 | 1.97 | 0.39 | Open Valve |

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

Input File: NCD-Case 1 UOHI.net

Scenario: with hospital loop
Date: 2024-07-19 11:25:02 AM

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 43-PropWM300mmHospitalJ-2 | J-3 | | 44.3429614279853 | 300 |
| 32-PropWM300mmRdLJ-12 | J-13 | | 8.10173833723436 | 300 |
| 21-ExWM400mmCarlingAveR-2 | J-E1 | | 148.67 | 1000 |
| 20-ExWM400mmCarlingAveJ-E1 | J-E2 | | 72.0604746626472 | 400 |
| 16-ExWM400mmCarlingAveJ-E4 | J-E3 | | 53.8905996515422 | 400 |
| 8-ExWM400mmCarlingAveJ-E8 | J-E7 | | 30.3005394242057 | 400 |
| 45-PropWM300mmHospitalJ-E1 | J-1 | | 20.6394832517881 | 300 |
| 19-PropWM150mmResearchBJ-E2 | J-22 | | 30.3462421119232 | 150 |
| 15-PropWM150mmCarlingV-T#3J-E4 | J-21 | | 30.9676844497797 | 150 |
| 9-PropWM150mmCarlingV-T#2J-E7 | J-20 | | 31.0736886830009 | 150 |
| 7-PropWM150mmCarlingV-T#1J-E8 | J-19 | | 31.2526179381906 | 150 |
| 23-PropWM300mmRdAJ-18 | H-1 | | 8.34306529014965 | 300 |
| 24-PropWM300mmRdAH-1 | J-17 | | 26.2370276682741 | 300 |
| 37-PropWM300mmRdDJ-6 | H-4 | | 14.21 | 300 |
| 36-PropWM300mmRdDH-4 | J-7 | | 59.70 | 300 |
| 28-PropWM300mmRdBH-2 | J-25 | | 47.9195248882866 | 300 |
| 30-PropWM300mmRdBJ-25 | H-5 | | 42.0036195237461 | 300 |
| 29-PropWM150mmPGServiceJ-25 | J-26(PGService) | | 16.98 | 150 |
| 14-ExWM400mmCarlingAve366028H031 | J-E4 | | 29.2340814798819 | 400 |
| 17-ExWM400mmCarlingAve366028H029 | J-E3 | | 35.0957871684793 | 400 |
| 18-ExWM400mmCarlingAveJ-E2 | 366028H029 | | 54.4871678813318 | 400 |
| 10-ExWM400mmCarlingAveJ-E7 | J-E6 | | 86.5525765463542 | 400 |
| 13-ExWM400mmCarlingAveJ-E6 | 366028H031 | | 7.73250133830889 | 400 |
| 11-ExWM150mmCarlingAveJ-E6 | J-E5 | | 7.45726728454382 | 150 |
| 12-ExWM150mmCarlingAveJ-E5 | 366028H030 | | 90.9465713866359 | 150 |
| 6-ExWM400mmCarlingAveJ-E9 | J-E8 | | 0.382945097269914 | 400 |
| 4-ExWM150mmPrestonStJ-E9 | 366028H219 | | 40.1973470697933 | 150 |
| 31-PropWM300mmRdBJ-14 | H-5 | | 22.941571844959 | 300 |
| 25-PropWM300mmRdAJ-17 | J-16 | | 62.2851182626027 | 300 |
| 33-PropWM300mmRdLH-12 | J-12 | | 28.8853068075771 | 300 |
| 40-PropWM300mmHospitalJ-4 | H-15 | | 91.57 | 300 |

| | | | | |
|---|---|---|---|---|
| 39-PropWM300mmHospitalH-15 | J-5 | 24.29 | 300 | |
| 42-PropWM300mmHospitalJ-3 | H-7 | 43.89 | 300 | |
| 41-PropWM300mmHospitalH-7 | J-4 | 10.80 | 300 | |
| 38-PropWM300mmHospitalJ-5 | J-6 | 35.8431820756787 | 300 | |
| 1-ExWM400mmCarlingAveR-1 | J-E10 | 0.217566858316817 | 1000 | |



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 3-ExWM400mmCarlingAveJ-E10 | J-E9 | 0.399488044413268 | 400 | |
| 5A-ExWM150mmPrestonStJ-E11 | 366028H185 | 45.2635914858321 | 150 | |
| 46-PropWM200mmCUPServiceJ-27(CUPService) | J-24 | 11.58 | 200 | |
| 27-PropWM300mmRdBJ-16 | H-2 | 21.5808707602312 | 300 | |
| 26-PropWM300mmRdAJ-16 | J-15 | 21.3543962701595 | 300 | |
| 47-PropWM300mmHospitalJ-3 | J-29 | 12.8116327584704 | 300 | |
| 49-PropWM300mmRdAJ-28 | J-15 | 34.6655277241037 | 300 | |
| 50-PropWM300mmRdEJ-7 | H-6 | 13.31 | 300 | |
| 51-PropWM300mmRdEH-6 | J-8 | 22.67 | 300 | |
| 56-PropWM300mmRdEH-11 | J-31 | 5.74 | 300 | |
| 57-PropWM200mmCUPServiceJ-30(CUPService) | J-10 | 11.59 | 200 | |
| 59-PropWM300mmRdEH-10 | J-32 | 19.01 | 300 | |
| 60-PropWM300mmRdEJ-32 | J-33 | 35.9527228433413 | 300 | |
| 61-PropWM300mmRdEJ-33 | H-9 | 38.6955804752682 | 300 | |
| 62-PropWM300mmRdEH-9 | J-34 | 26.326879710781 | 300 | |
| 63-PropWM300mmRdEJ-34 | J-35 | 22.6847258729083 | 300 | |
| 64-PropWM300mmHospitalJ-35 | J-44 | 66.2303194539337 | 300 | |
| 65-PropWM300mmHospitalJ-44 | J-36 | 45.3820485822456 | 300 | |
| 66-PropWM300mmHospitalJ-36 | J-37 | 61.1082602227364 | 300 | |
| 67-PropWM300mmHospitalJ-37 | J-38 | 43.5544391693597 | 300 | |
| 68-PropWM300mmHospitalJ-38 | J-40 | 34.5857153250994 | 300 | |
| 69-PropWM300mmHospitalJ-40 | J-39 | 22.0228385256111 | 300 | |
| 70-PropWM300mmLoadingDockJ-42 | H-13 | 4.94 | 300 | |
| 71-PropWM300mmLoadingDockH-13 | J-41 | 54.59 | 300 | |
| 72-PropWM300mmLoadingDockJ-41 | H-8 | 10.281839107194 | 300 | |
| 73-PropWM300mmLoadingDockH-8 | J-39 | 18.8763427083242 | 300 | |
| 74-PropWM300mmLoadingDockJ-39 | J-43 | 23.4020520143924 | 300 | |
| 75-PropWM300mmRdLJ-43 | J-46 | 37.5282521890565 | 300 | |
| 77-PropWM300mmRdLJ-46 | J-11 | 5.05366092600287 | 300 | |
| 78-PropWM300mmRdLJ-11 | H-12 | 6.0260271211011 | 300 | |
| 80-PropWM300mmRdLJ-13 | J-14 | 17.9428667770884 | 300 | |
| 48-PropWM300mmHospitalJ-29 | J-47 | 37.9955088729321 | 300 | |
| 48B-PropWM300mmHospitalJ-47 | J-28 | 35.7449782977257 | 300 | |
| 83-PropWM300mm J-47 | H-16 | 31.85 | 300 | |
| 84-PropWM150mm H-16 | H-17 | 47.38 | 150 | |
| 5B-ExWM150mmPrestonSt366028H185 | H-19 | 118.755824075502 | 150 | |
| 5-ExWM150mmPrestonStH-19 | 366028H219 | 51.0338192356705 | 150 | |

```
  44-PropWM300mmHospitalJ-1            688-A          11.7604930134715       300
  44-PropWM300mmHospital(2)688-B          J-2            23.8506572610621       300
  22-PropWM300mmRdAJ-E3           691-A          21.8758265595292       300
  22-PropWM300mmRdA(2)691-B          J-18           31.0182402514265       300
  34-PropWM300mmRdE(2)J-183          J-24                23.44       300
  76-PropWM300mmHospitalServiceJ-45(HospitalService)J-183               28.02
300
  79-PropWM300mmHospitalServiceJ-23(HospitalService)J-9                 28.03
300
  1              UOHI           T-501               11.80       150
  2              J-31           T-501               10.52       300
  3              T-501          H-10                79.65       300
```



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm | |
|---|---|---|---|---|---|
| 6 | J-28 | TEE-34 | 11.16 | 300 | |
| 7 | TEE-34 | H-17 | 21.77 | 150 | |
| 8 | TEE-34 | H-18 | 26.77 | 150 | |
| 9 | J-8 | H-14 | 56.95 | 300 | |
| 10 | H-14 | J-9 | 14.32 | 300 | |
| 11 | J-9 | J-183 | 6.50 | 300 | |
| 12 | J-48 | J-49(CUPService) | 11.60 | 200 | |
| 13 | J-24 | J-10 | 4.00 | 300 | |
| 14 | J-10 | J-48 | 4.00 | 300 | |
| 15 | J-48 | H-3 | 34.80 | 300 | |
| 16 | H-3 | H-11 | 78.65 | 300 | |
| FIRESERVICEMETER2688-A | 688-B | | #N/A | 300 | Valve |
| FIRESERVICEMETER1691-A | 691-B | | #N/A | 300 | Valve |

Node Results:

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-22 | 0.00 | 106.94 | 40.84 | 0.00 |
| J-21 | 0.00 | 106.84 | 41.28 | 0.00 |
| J-20 | 0.00 | 107.05 | 41.71 | 0.00 |
| J-19 | 0.00 | 107.10 | 42.97 | 0.00 |
| J-8 | 0.00 | 100.09 | 20.79 | 0.00 |
| J-7 | 0.00 | 100.60 | 20.74 | 0.00 |
| J-6 | 0.00 | 101.65 | 25.69 | 0.00 |
| J-5 | 0.00 | 102.15 | 26.87 | 0.00 |
| J-4 | 0.00 | 103.79 | 29.59 | 0.00 |
| J-3 | 0.00 | 104.57 | 30.50 | 0.00 |
| J-2 | 0.00 | 105.42 | 38.19 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-1 | 0.00 | 106.69 | 40.08 | 0.00 |
| J-12 | 0.00 | 101.66 | 31.85 | 0.00 |
| J-13 | 0.00 | 101.81 | 32.18 | 0.00 |
| J-14 | 0.00 | 102.12 | 32.78 | 0.00 |
| J-15 | 0.00 | 104.50 | 32.48 | 0.00 |
| J-16 | 0.00 | 104.48 | 33.31 | 0.00 |
| J-17 | 0.00 | 105.28 | 37.00 | 0.00 |
| J-18 | 0.00 | 105.72 | 39.36 | 0.00 |
| J-11 | 0.00 | 101.06 | 30.88 | 0.00 |
| J-10 | 0.00 | 98.70 | 25.14 | 0.00 |
| J-9 | 0.00 | 99.08 | 21.00 | 0.00 |
| J-23(HospitalService) | 8.96 | 99.08 | 27.66 | 0.00 |
| J-E1 | 0.00 | 107.09 | 40.62 | 0.00 |
| J-E2 | 0.00 | 106.94 | 41.36 | 0.00 |
| J-E3 | 0.00 | 106.75 | 41.78 | 0.00 |
| J-E4 | 0.00 | 106.84 | 41.76 | 0.00 |
| J-E7 | 0.00 | 107.05 | 43.46 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-E8 | 0.00 | 107.10 | 44.01 | 0.00 |
| J-24 | 0.00 | 98.74 | 25.18 | 0.00 |
| J-25 | 0.00 | 103.25 | 33.02 | 0.00 |
| J-26(PGService) | 1.70 | 103.25 | 32.64 | 0.00 |
| J-E6 | 0.00 | 106.91 | 42.27 | 0.00 |
| J-E5 | 0.00 | 106.91 | 42.32 | 0.00 |
| J-E9 | 0.00 | 107.10 | 44.35 | 0.00 |
| J-E10 | 0.00 | 107.10 | 44.41 | 0.00 |
| J-E11 | 0.00 | 107.10 | 41.02 | 0.00 |
| J-27(CUPService) | 7.59 | 98.73 | 25.14 | 0.00 |
| J-28 | 0.00 | 104.52 | 30.84 | 0.00 |
| J-29 | 0.00 | 104.56 | 30.33 | 0.00 |
| J-30(CUPService) | 7.59 | 98.69 | 25.22 | 0.00 |
| J-31 | 0.00 | 98.31 | 23.62 | 0.00 |
| J-32 | 0.00 | 98.65 | 20.37 | 0.00 |
| J-33 | 0.00 | 98.76 | 21.25 | 0.00 |
| J-34 | 0.00 | 98.97 | 20.04 | 0.00 |
| J-35 | 0.00 | 99.04 | 17.10 | 0.00 |
| J-36 | 0.00 | 99.39 | 19.77 | 0.00 |
| J-37 | 0.00 | 99.59 | 28.20 | 0.00 |
| J-38 | 0.00 | 99.73 | 29.65 | 0.00 |
| J-39 | 0.00 | 99.91 | 30.07 | 0.00 |
| J-40 | 0.00 | 99.84 | 28.65 | 0.00 |
| J-41 | 0.00 | 99.71 | 29.81 | 0.00 |
| J-42 | 0.00 | 99.34 | 29.64 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-43 | 0.00 | 100.31 | 30.57 | 0.00 |
| J-45(HospitalService) | 8.96 | 99.00 | 27.58 | 0.00 |
| J-46 | 0.00 | 100.97 | 30.84 | 0.00 |
| J-44 | 0.00 | 99.25 | 18.57 | 0.00 |
| J-47 | 0.00 | 104.54 | 30.35 | 0.00 |
| J-183 | 0.00 | 99.00 | 21.94 | 0.00 |
| H-1 | 0.00 | 105.62 | 38.44 | 0.00 |
| H-2 | 0.00 | 104.10 | 32.88 | 0.00 |
| H-3 | 60.00 | 98.40 | 22.92 | 0.00 |
| H-4 | 0.00 | 101.44 | 24.70 | 0.00 |
| H-5 | 0.00 | 102.52 | 32.65 | 0.00 |
| H-6 | 0.00 | 100.41 | 20.39 | 0.00 |
| 366028H031 | 0.00 | 106.89 | 42.17 | 0.00 |
| 366028H029 | 0.00 | 106.83 | 41.64 | 0.00 |
| 366028H030 | 0.00 | 106.91 | 41.82 | 0.00 |
| 366028H185 | 0.00 | 107.10 | 40.72 | 0.00 |
| 366028H219 | 0.00 | 107.10 | 44.01 | 0.00 |
| H-12 | 0.00 | 101.16 | 30.74 | 0.00 |
| H-13 | 95.00 | 99.34 | 29.26 | 0.00 |
| H-14 | 0.00 | 99.28 | 21.87 | 0.00 |
| H-15 | 0.00 | 102.50 | 27.20 | 0.00 |
| H-7 | 0.00 | 103.95 | 28.60 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality | |
|---|---|---|---|---|---|
| H-8 | 0.00 | 99.78 | 29.26 | 0.00 | |
| H-9 | 0.00 | 98.88 | 20.78 | 0.00 | |
| H-10 | 0.00 | 98.58 | 21.73 | 0.00 | |
| H-11 | 95.00 | 98.29 | 23.35 | 0.00 | |
| H-16 | 0.00 | 104.54 | 25.12 | 0.00 | |
| H-18 | 0.00 | 104.52 | 27.70 | 0.00 | |
| H-17 | 0.00 | 104.52 | 24.57 | 0.00 | |
| H-19 | 0.00 | 107.10 | 43.30 | 0.00 | |
| 688-A | 0.00 | 106.46 | 39.38 | 0.00 | |
| 688-B | 0.00 | 105.89 | 38.81 | 0.00 | |
| 691-A | 0.00 | 106.47 | 39.89 | 0.00 | |
| 691-B | 0.00 | 106.12 | 39.54 | 0.00 | |
| UOHI | 8.87 | 98.29 | 24.63 | 0.00 | |
| T-501 | 0.00 | 98.33 | 26.24 | 0.00 | |
| TEE-34 | 0.00 | 104.52 | 32.79 | 0.00 | |
| J-48 | 0.00 | 98.67 | 25.08 | 0.00 | |
| J-49(CUPService) | 7.59 | 98.66 | 25.30 | 0.00 | |
| R-1 | -63.10 | 107.10 | 0.00 | 0.00 | Reservoir |
| R-2 | -238.16 | 107.10 | 0.00 | 0.00 | Reservoir |

Link Results:

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 43-PropWM300mmHospital | 167.32 | 2.37 | 19.33 | Open |
| 32-PropWM300mmRdL | -158.15 | 2.24 | 17.42 | Open |
| 21-ExWM400mmCarlingAve | 238.16 | 0.30 | 0.09 | Open |
| 20-ExWM400mmCarlingAve | 70.85 | 0.56 | 2.05 | Open |
| 16-ExWM400mmCarlingAve | 63.10 | 0.50 | 1.66 | Open |
| 8-ExWM400mmCarlingAve | 63.10 | 0.50 | 1.66 | Open |
| 45-PropWM300mmHospital | 167.32 | 2.37 | 19.33 | Open |
| 19-PropWM150mmResearchB | 0.00 | 0.00 | 0.00 | Closed |
| 15-PropWM150mmCarlingV-T#3 | 0.00 | 0.00 | 0.00 | Closed |
| 9-PropWM150mmCarlingV-T#2 | 0.00 | 0.00 | 0.00 | Closed |
| 7-PropWM150mmCarlingV-T#1 | 0.00 | 0.00 | 0.00 | Closed |
| 23-PropWM300mmRdA | 133.94 | 1.89 | 12.80 | Open |
| 24-PropWM300mmRdA | 133.94 | 1.89 | 12.80 | Open |
| 37-PropWM300mmRdD | 141.41 | 2.00 | 14.16 | Open |
| 36-PropWM300mmRdD | 141.41 | 2.00 | 14.16 | Open |
| 28-PropWM300mmRdB | 159.85 | 2.26 | 17.77 | Open |
| 30-PropWM300mmRdB | 158.15 | 2.24 | 17.42 | Open |
| 29-PropWM150mmPGService | 1.70 | 0.10 | 0.16 | Open |
| 14-ExWM400mmCarlingAve | 63.10 | 0.50 | 1.66 | Open |
| 17-ExWM400mmCarlingAve | 70.85 | 0.56 | 2.05 | Open |
| 18-ExWM400mmCarlingAve | 70.85 | 0.56 | 2.05 | Open |
| 10-ExWM400mmCarlingAve | 63.10 | 0.50 | 1.66 | Open |



Link Results: (continued)

| Link ID | Flow LPS | Velocity m/s | Unit Headloss m/km | Status |
|---|---|---|---|---|
| 13-ExWM400mmCarlingAve | 63.10 | 0.50 | 1.66 | Open |
| 11-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 12-ExWM150mmCarlingAve | 0.00 | 0.00 | 0.00 | Open |
| 6-ExWM400mmCarlingAve | 63.10 | 0.50 | 1.65 | Open |
| 4-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 31-PropWM300mmRdB | -158.15 | 2.24 | 17.42 | Open |
| 25-PropWM300mmRdA | 133.94 | 1.89 | 12.80 | Open |
| 33-PropWM300mmRdL | -158.15 | 2.24 | 17.42 | Open |
| 40-PropWM300mmHospital | 141.41 | 2.00 | 14.16 | Open |
| 39-PropWM300mmHospital | 141.41 | 2.00 | 14.16 | Open |
| 42-PropWM300mmHospital | 141.41 | 2.00 | 14.16 | Open |
| 41-PropWM300mmHospital | 141.41 | 2.00 | 14.16 | Open |
| 38-PropWM300mmHospital | 141.41 | 2.00 | 14.16 | Open |
| 1-ExWM400mmCarlingAve | 63.10 | 0.08 | 0.00 | Open |
| 3-ExWM400mmCarlingAve | 63.10 | 0.50 | 1.68 | Open |

```
5A-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
46-PropWM200mmCUPService      -7.59      0.24      0.53      Open
27-PropWM300mmRdB     159.85      2.26     17.77      Open
26-PropWM300mmRdA     -25.90      0.37      0.61      Open
47-PropWM300mmHospital      25.90      0.37      0.61      Open
49-PropWM300mmRdA      25.90      0.37      0.61      Open
50-PropWM300mmRdE     141.41      2.00     14.16      Open
51-PropWM300mmRdE     141.41      2.00     14.16      Open
56-PropWM300mmRdE     -54.28      0.77      2.40      Open
57-PropWM200mmCUPService      -7.59      0.24      0.53      Open
59-PropWM300mmRdE     -63.15      0.89      3.18      Open
60-PropWM300mmRdE     -63.15      0.89      3.18      Open
61-PropWM300mmRdE     -63.15      0.89      3.18      Open
62-PropWM300mmRdE     -63.15      0.89      3.18      Open
63-PropWM300mmRdE     -63.15      0.89      3.18      Open
64-PropWM300mmHospital     -63.15      0.89      3.18      Open
65-PropWM300mmHospital     -63.15      0.89      3.18      Open
66-PropWM300mmHospital     -63.15      0.89      3.18      Open
67-PropWM300mmHospital     -63.15      0.89      3.18      Open
68-PropWM300mmHospital     -63.15      0.89      3.18      Open
69-PropWM300mmHospital     -63.15      0.89      3.18      Open
70-PropWM300mmLoadingDock       0.00      0.00      0.00      Open
71-PropWM300mmLoadingDock     -95.00      1.34      6.78      Open
72-PropWM300mmLoadingDock     -95.00      1.34      6.78      Open
73-PropWM300mmLoadingDock     -95.00      1.34      6.78      Open
74-PropWM300mmLoadingDock    -158.15      2.24     17.42      Open
75-PropWM300mmRdL    -158.15      2.24     17.42      Open
77-PropWM300mmRdL    -158.15      2.24     17.42      Open
78-PropWM300mmRdL    -158.15      2.24     17.42      Open
80-PropWM300mmRdL    -158.15      2.24     17.42      Open
48-PropWM300mmHospital      25.90      0.37      0.61      Open
48B-PropWM300mmHospital      23.69      0.34      0.52      Open
```



Link Results: (continued)

```
---------------------------------------------------------------------
Link                  Flow  VelocityUnit Headloss    Status
ID                     LPS       m/s      m/km
---------------------------------------------------------------------
83-PropWM300mm        2.21      0.03      0.01      Open
84-PropWM150mm        2.21      0.13      0.26      Open
5B-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
5-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
44-PropWM300mmHospital     167.32      2.37     19.33      Open
44-PropWM300mmHospital(2)     167.32      2.37     19.33      Open
22-PropWM300mmRdA     133.94      1.89     12.80      Open
22-PropWM300mmRdA(2)     133.94      1.89     12.81      Open
34-PropWM300mmRdE(2)     123.49      1.75     11.02      Open
76-PropWM300mmHospitalService      -8.96      0.13      0.09      Open
```

| | | | | |
|---|---|---|---|---|
| 79-PropWM300mmHospitalService | -8.96 | 0.13 | 0.09 | Open |
| 1 | -8.87 | 0.50 | 3.44 | Open |
| 2 | -54.28 | 0.77 | 2.40 | Open |
| 3 | -63.15 | 0.89 | 3.18 | Open |
| 6 | -2.21 | 0.03 | 0.01 | Open |
| 7 | -2.21 | 0.13 | 0.26 | Open |
| 8 | 0.00 | 0.00 | 0.00 | Open |
| 9 | 141.41 | 2.00 | 14.16 | Open |
| 10 | 141.41 | 2.00 | 14.16 | Open |
| 11 | 132.45 | 1.87 | 12.54 | Open |
| 12 | 7.59 | 0.24 | 0.53 | Open |
| 13 | 115.90 | 1.64 | 9.80 | Open |
| 14 | 108.31 | 1.53 | 8.64 | Open |
| 15 | 100.72 | 1.42 | 7.55 | Open |
| 16 | 40.72 | 0.58 | 1.41 | Open |
| FIRESERVICEMETER2 | 167.32 | 2.37 | 0.57 | Open Valve |
| FIRESERVICEMETER1 | 133.94 | 1.89 | 0.35 | Open Valve |

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

Input File: NCD-Case 2.net

Scenario: with hospital loop
Date: 2024-07-19 11:25:02 AM

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 43-PropWM300mmHospitalJ-2 | J-3 | | 44.3429614279853 | 300 |
| 32-PropWM300mmRdLJ-12 | J-13 | | 8.10 | 300 |
| 21-ExWM400mmCarlingAveR-2 | J-E1 | | 148.67 | 1000 |
| 20-ExWM400mmCarlingAveJ-E1 | J-E2 | | 72.06 | 400 |
| 16-ExWM400mmCarlingAveJ-E4 | J-E3 | | 53.8905996515422 | 400 |
| 8-ExWM400mmCarlingAveJ-E8 | J-E7 | | 30.3005394242057 | 400 |
| 45-PropWM300mmHospitalJ-E1 | J-1 | | 20.64 | 300 |
| 19-PropWM150mmResearchBJ-E2 | J-22 | | 30.3462421119232 | 150 |
| 15-PropWM150mmCarlingV-T#3J-E4 | J-21 | | 30.9676844497797 | 150 |
| 9-PropWM150mmCarlingV-T#2J-E7 | J-20 | | 31.0736886830009 | 150 |
| 7-PropWM150mmCarlingV-T#1J-E8 | J-19 | | 31.2526179381906 | 150 |
| 23-PropWM300mmRdAJ-18 | H-1 | | 8.34306529014965 | 300 |
| 24-PropWM300mmRdAH-1 | J-17 | | 26.2370276682741 | 300 |
| 37-PropWM300mmRdDJ-6 | H-4 | | 14.21 | 300 |
| 36-PropWM300mmRdDH-4 | J-7 | | 59.70 | 300 |
| 28-PropWM300mmRdBH-2 | J-25 | | 47.92 | 300 |
| 30-PropWM300mmRdBJ-25 | H-5 | | 42.00 | 300 |
| 29-PropWM150mmPGServiceJ-25 | J-26(PGService) | | 16.98 | 150 |
| 14-ExWM400mmCarlingAve366028H031 | J-E4 | | 29.2340814798819 | 400 |
| 17-ExWM400mmCarlingAve366028H029 | J-E3 | | 35.0957871684793 | 400 |
| 18-ExWM400mmCarlingAveJ-E2 | 366028H029 | | 54.4871678813318 | 400 |
| 10-ExWM400mmCarlingAveJ-E7 | J-E6 | | 86.5525765463542 | 400 |
| 13-ExWM400mmCarlingAveJ-E6 | 366028H031 | | 7.73250133830889 | 400 |
| 11-ExWM150mmCarlingAveJ-E6 | J-E5 | | 7.45726728454382 | 150 |
| 12-ExWM150mmCarlingAveJ-E5 | 366028H030 | | 90.9465713866359 | 150 |
| 6-ExWM400mmCarlingAveJ-E9 | J-E8 | | 0.382945097269914 | 400 |
| 4-ExWM150mmPrestonStJ-E9 | 366028H219 | | 40.1973470697933 | 150 |
| 31-PropWM300mmRdBJ-14 | H-5 | | 22.94 | 300 |
| 25-PropWM300mmRdAJ-17 | J-16 | | 62.29 | 300 |
| 40-PropWM300mmHospitalJ-4 | H-15 | | 91.57 | 300 |
| 39-PropWM300mmHospitalH-15 | J-5 | | 24.29 | 300 |

```
42-PropWM300mmHospitalJ-3            H-7                 43.89       300
41-PropWM300mmHospitalH-7            J-4                 10.80       300
38-PropWM300mmHospitalJ-5            J-6            35.8431820756787       300
1-ExWM400mmCarlingAveR-1            J-E10          0.217566858316817      1000
3-ExWM400mmCarlingAveJ-E10          J-E9           0.399488044413268       400
```



Link - Node Table: (continued)

```
----------------------------------------------------------------------
Link           Start          End                 Length  Diameter
ID             Node           Node                     m        mm
----------------------------------------------------------------------
5A-ExWM150mmPrestonStJ-E11          366028H185     45.2635914858321       150
46-PropWM200mmCUPServiceJ-27(CUPService)J-24                11.58       200
27-PropWM300mmRdBJ-16           H-2                 21.58       300
26-PropWM300mmRdAJ-16           J-15                21.35       300
47-PropWM300mmHospitalJ-3            J-29           12.8116327584704       300
49-PropWM300mmRdAJ-28           J-15                34.67       300
50-PropWM300mmRdEJ-7            H-6                 13.31       300
51-PropWM300mmRdEH-6            J-8                 22.67       300
56-PropWM300mmRdEH-11           J-31                 5.74       300
57-PropWM200mmCUPServiceJ-30(CUPService)J-10                11.59       200
59-PropWM300mmRdEH-10           J-32                19.01       300
60-PropWM300mmRdEJ-32           J-33           35.9527228433413       300
61-PropWM300mmRdEJ-33           H-9            38.6955804752682       300
62-PropWM300mmRdEH-9            J-34           26.326879710781       300
63-PropWM300mmRdEJ-34           J-35           22.6847258729083       300
64-PropWM300mmHospitalJ-35           J-44           66.2303194539337       300
65-PropWM300mmHospitalJ-44           J-36           45.3820485822456       300
66-PropWM300mmHospitalJ-36           J-37           61.1082602227364       300
67-PropWM300mmHospitalJ-37           J-38           43.5544391693597       300
68-PropWM300mmHospitalJ-38           J-40                34.59       300
69-PropWM300mmHospitalJ-40           J-39                22.02       300
70-PropWM300mmLoadingDockJ-42           H-13                 4.94       300
71-PropWM300mmLoadingDockH-13           J-41                54.59       300
72-PropWM300mmLoadingDockJ-41           H-8            10.281839107194       300
73-PropWM300mmLoadingDockH-8            J-39           18.8763427083242       300
74-PropWM300mmLoadingDockJ-39           J-43           23.4020520143924       300
80-PropWM300mmRdLJ-13           J-14           17.9428667770884       300
48-PropWM300mmHospitalJ-29           J-47           37.9955088729321       300
48B-PropWM300mmHospitalJ-47           J-28                35.74       300
83-PropWM300mm J-47           H-16                31.85       300
84-PropWM150mm H-16           H-17                47.38       150
5B-ExWM150mmPrestonSt366028H185     H-19           118.755824075502       150
5-ExWM150mmPrestonStH-19           366028H219     51.0338192356705       150
44-PropWM300mmHospitalJ-1            688-A          11.7604930134715       300
44-PropWM300mmHospital(2)688-B          J-2            23.8506572610621       300
22-PropWM300mmRdAJ-E3           691-A          21.8758265595292       300
22-PropWM300mmRdA(2)691-B          J-18           31.0182402514265       300
```

34-PropWM300mmRdE(2)J-183 J-24 34.93 300
76-PropWM300mmHospitalServiceJ-45(HospitalService)J-183 28.02
300
79-PropWM300mmHospitalServiceJ-23(HospitalService)J-9 28.03
300

| | | | | |
|---|---|---|---|---|
| 1 | UOHI | T-501 | 11.80 | 150 |
| 2 | J-31 | T-501 | 10.52 | 300 |
| 3 | T-501 | H-10 | 79.65 | 300 |
| 6 | J-28 | TEE-34 | 11.16 | 300 |
| 7 | TEE-34 | H-17 | 21.77 | 150 |
| 8 | TEE-34 | H-18 | 26.77 | 150 |
| 9 | J-8 | H-14 | 56.95 | 300 |



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm | |
|---|---|---|---|---|---|
| 10 | H-14 | J-9 | 3.82 | 300 | |
| 11 | J-9 | J-183 | 5.50 | 300 | |
| 12 | J-48 | J-49(CUPService) | 11.60 | 200 | |
| 13 | J-24 | J-10 | 4.00 | 300 | |
| 14 | J-10 | J-48 | 4.00 | 300 | |
| 15 | J-48 | H-3 | 34.80 | 300 | |
| 16 | H-3 | H-11 | 78.65 | 300 | |
| 5 | H-20 | J-12 | 19.09 | 300 | |
| 17 | J-43 | H-12 | 7.75 | 300 | |
| 18 | H-12 | J-46 | 29.78 | 300 | |
| 19 | J-46 | J-11 | 5.05 | 300 | |
| 20 | J-11 | H-20 | 15.82 | 300 | |
| FIRESERVICEMETER2688-A | | 688-B | #N/A | 300 | Valve |
| FIRESERVICEMETER1691-A | | 691-B | #N/A | 300 | Valve |

Node Results:

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-22 | 0.00 | 107.08 | 40.98 | 0.00 |
| J-21 | 0.00 | 107.07 | 41.51 | 0.00 |
| J-20 | 0.00 | 107.09 | 41.76 | 0.00 |
| J-19 | 0.00 | 107.10 | 42.97 | 0.00 |
| J-8 | 0.00 | 106.06 | 29.46 | 0.00 |
| J-7 | 0.00 | 106.15 | 29.26 | 0.00 |
| J-6 | 0.00 | 106.32 | 33.08 | 0.00 |
| J-5 | 0.00 | 106.40 | 30.83 | 0.00 |
| J-4 | 0.00 | 106.67 | 35.20 | 0.00 |
| J-3 | 0.00 | 106.80 | 35.34 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-2 | 0.00 | 106.90 | 42.78 | 0.00 |
| J-1 | 0.00 | 107.05 | 43.10 | 0.00 |
| J-12 | 0.00 | 106.61 | 39.48 | 0.00 |
| J-13 | 0.00 | 106.62 | 39.68 | 0.00 |
| J-14 | 0.00 | 106.64 | 39.98 | 0.00 |
| J-15 | 0.00 | 106.80 | 37.46 | 0.00 |
| J-16 | 0.00 | 106.80 | 38.40 | 0.00 |
| J-17 | 0.00 | 106.89 | 41.30 | 0.00 |
| J-18 | 0.00 | 106.94 | 43.26 | 0.00 |
| J-11 | 0.00 | 106.57 | 39.13 | 0.00 |
| J-10 | 0.00 | 105.90 | 32.36 | 0.00 |
| J-9 | 0.00 | 105.92 | 31.35 | 0.00 |
| J-23(HospitalService) | 16.13 | 105.91 | 29.00 | 0.00 |
| J-E1 | 0.00 | 107.10 | 43.18 | 0.00 |
| J-E2 | 0.00 | 107.08 | 41.50 | 0.00 |
| J-E3 | 0.00 | 107.06 | 44.78 | 0.00 |
| J-E4 | 0.00 | 107.07 | 41.99 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-E7 | 0.00 | 107.09 | 43.51 | 0.00 |
| J-E8 | 0.00 | 107.10 | 44.01 | 0.00 |
| J-24 | 0.00 | 105.90 | 32.22 | 0.00 |
| J-25 | 0.00 | 106.71 | 39.20 | 0.00 |
| J-26(PGService) | 3.07 | 106.70 | 36.09 | 0.00 |
| J-E6 | 0.00 | 107.08 | 42.44 | 0.00 |
| J-E5 | 0.00 | 107.08 | 42.49 | 0.00 |
| J-E9 | 0.00 | 107.10 | 44.35 | 0.00 |
| J-E10 | 0.00 | 107.10 | 44.41 | 0.00 |
| J-E11 | 0.00 | 107.10 | 41.02 | 0.00 |
| J-27(CUPService) | 13.67 | 105.88 | 32.27 | 0.00 |
| J-28 | 0.00 | 106.80 | 35.86 | 0.00 |
| J-29 | 0.00 | 106.80 | 35.30 | 0.00 |
| J-30(CUPService) | 13.67 | 105.88 | 32.39 | 0.00 |
| J-31 | 0.00 | 105.94 | 33.68 | 0.00 |
| J-32 | 0.00 | 106.06 | 30.47 | 0.00 |
| J-33 | 0.00 | 106.10 | 31.32 | 0.00 |
| J-34 | 0.00 | 106.17 | 29.88 | 0.00 |
| J-35 | 0.00 | 106.20 | 26.18 | 0.00 |
| J-36 | 0.00 | 106.32 | 29.61 | 0.00 |
| J-37 | 0.00 | 106.39 | 38.24 | 0.00 |
| J-38 | 0.00 | 106.44 | 38.98 | 0.00 |
| J-39 | 0.00 | 106.50 | 39.13 | 0.00 |
| J-40 | 0.00 | 106.47 | 39.59 | 0.00 |
| J-41 | 0.00 | 106.50 | 36.59 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-42 | 0.00 | 106.50 | 36.79 | 0.00 |
| J-43 | 0.00 | 106.53 | 39.45 | 0.00 |
| J-45(HospitalService) | 16.13 | 105.91 | 29.00 | 0.00 |
| J-46 | 0.00 | 106.57 | 39.47 | 0.00 |
| J-44 | 0.00 | 106.27 | 28.22 | 0.00 |
| J-47 | 0.00 | 106.80 | 35.31 | 0.00 |
| J-183 | 0.00 | 105.92 | 31.49 | 0.00 |
| H-1 | 0.00 | 106.92 | 39.58 | 0.00 |
| H-2 | 0.00 | 106.77 | 35.86 | 0.00 |
| H-3 | 0.00 | 105.91 | 30.40 | 0.00 |
| H-4 | 0.00 | 106.29 | 29.53 | 0.00 |
| H-5 | 0.00 | 106.67 | 36.79 | 0.00 |
| H-6 | 0.00 | 106.12 | 26.09 | 0.00 |
| 366028H031 | 0.00 | 107.08 | 42.35 | 0.00 |
| 366028H029 | 0.00 | 107.07 | 41.89 | 0.00 |
| 366028H030 | 0.00 | 107.08 | 41.99 | 0.00 |
| 366028H185 | 0.00 | 107.10 | 40.72 | 0.00 |
| 366028H219 | 0.00 | 107.10 | 44.01 | 0.00 |
| H-12 | 0.00 | 106.53 | 36.29 | 0.00 |
| H-13 | 0.00 | 106.50 | 36.41 | 0.00 |
| H-14 | 0.00 | 105.93 | 28.49 | 0.00 |
| H-15 | 0.00 | 106.46 | 31.26 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality | |
|---|---|---|---|---|---|
| H-7 | 0.00 | 106.70 | 31.35 | 0.00 | |
| H-8 | 0.00 | 106.50 | 35.97 | 0.00 | |
| H-9 | 0.00 | 106.14 | 28.02 | 0.00 | |
| H-10 | 0.00 | 106.04 | 29.17 | 0.00 | |
| H-11 | 0.00 | 105.94 | 30.99 | 0.00 | |
| H-16 | 0.00 | 106.80 | 27.39 | 0.00 | |
| H-18 | 0.00 | 106.80 | 29.98 | 0.00 | |
| H-17 | 0.00 | 106.80 | 26.85 | 0.00 | |
| H-19 | 0.00 | 107.10 | 43.30 | 0.00 | |
| 688-A | 0.00 | 107.03 | 43.07 | 0.00 | |
| 688-B | 0.00 | 106.95 | 39.87 | 0.00 | |
| 691-A | 0.00 | 107.03 | 45.52 | 0.00 | |
| 691-B | 0.00 | 106.98 | 40.40 | 0.00 | |
| UOHI | 15.97 | 105.83 | 31.06 | 0.00 | |
| T-501 | 0.00 | 105.95 | 33.84 | 0.00 | |
| TEE-34 | 0.00 | 106.80 | 35.07 | 0.00 | |
| J-48 | 0.00 | 105.90 | 32.51 | 0.00 | |
| J-49(CUPService) | 13.67 | 105.88 | 32.51 | 0.00 | |
| H-20 | 0.00 | 106.59 | 38.75 | 0.00 | |
| R-1 | -18.92 | 107.10 | 0.00 | 0.00 | Reservoir |

```
R-2                  -73.39    107.10      0.00      0.00 Reservoir

Link Results:
----------------------------------------------------------------------
Link                   Flow  VelocityUnit Headloss    Status
ID                      LPS       m/s      m/km
----------------------------------------------------------------------
43-PropWM300mmHospital      52.18      0.74      2.23      Open
32-PropWM300mmRdL     -35.80      0.51      1.11      Open
21-ExWM400mmCarlingAve      73.39      0.09      0.01      Open
20-ExWM400mmCarlingAve      21.22      0.17      0.22      Open
16-ExWM400mmCarlingAve      18.92      0.15      0.18      Open
8-ExWM400mmCarlingAve      18.92      0.15      0.18      Open
45-PropWM300mmHospital      52.18      0.74      2.23      Open
19-PropWM150mmResearchB       0.00      0.00      0.00    Closed
15-PropWM150mmCarlingV-T#3       0.00      0.00      0.00    Closed
9-PropWM150mmCarlingV-T#2       0.00      0.00      0.00    Closed
7-PropWM150mmCarlingV-T#1       0.00      0.00      0.00    Closed
23-PropWM300mmRdA      40.13      0.57      1.37      Open
24-PropWM300mmRdA      40.13      0.57      1.37      Open
37-PropWM300mmRdD      53.44      0.76      2.33      Open
36-PropWM300mmRdD      53.44      0.76      2.34      Open
28-PropWM300mmRdB      38.87      0.55      1.30      Open
30-PropWM300mmRdB      35.80      0.51      1.11      Open
29-PropWM150mmPGService       3.07      0.17      0.48      Open
14-ExWM400mmCarlingAve      18.92      0.15      0.18      Open
17-ExWM400mmCarlingAve      21.22      0.17      0.22      Open
```



```
Link Results: (continued)
----------------------------------------------------------------------
Link                   Flow  VelocityUnit Headloss    Status
ID                      LPS       m/s      m/km
----------------------------------------------------------------------
18-ExWM400mmCarlingAve      21.22      0.17      0.22      Open
10-ExWM400mmCarlingAve      18.92      0.15      0.18      Open
13-ExWM400mmCarlingAve      18.92      0.15      0.18      Open
11-ExWM150mmCarlingAve       0.00      0.00      0.00      Open
12-ExWM150mmCarlingAve       0.00      0.00      0.00      Open
6-ExWM400mmCarlingAve      18.92      0.15      0.17      Open
4-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
31-PropWM300mmRdB     -35.80      0.51      1.11      Open
25-PropWM300mmRdA      40.13      0.57      1.37      Open
40-PropWM300mmHospital      53.44      0.76      2.34      Open
39-PropWM300mmHospital      53.44      0.76      2.34      Open
42-PropWM300mmHospital      53.44      0.76      2.34      Open
41-PropWM300mmHospital      53.44      0.76      2.33      Open
38-PropWM300mmHospital      53.44      0.76      2.34      Open
1-ExWM400mmCarlingAve      18.92      0.02      0.00      Open
```

```
3-ExWM400mmCarlingAve      18.92      0.15      0.19      Open
5A-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
46-PropWM200mmCUPService     -13.67      0.44      1.58      Open
27-PropWM300mmRdB      38.87      0.55      1.29      Open
26-PropWM300mmRdA       1.27      0.02      0.00      Open
47-PropWM300mmHospital      -1.27      0.02      0.00      Open
49-PropWM300mmRdA      -1.27      0.02      0.00      Open
50-PropWM300mmRdE      53.44      0.76      2.34      Open
51-PropWM300mmRdE      53.44      0.76      2.34      Open
56-PropWM300mmRdE     -19.83      0.28      0.37      Open
57-PropWM200mmCUPService     -13.67      0.44      1.58      Open
59-PropWM300mmRdE     -35.80      0.51      1.11      Open
60-PropWM300mmRdE     -35.80      0.51      1.11      Open
61-PropWM300mmRdE     -35.80      0.51      1.11      Open
62-PropWM300mmRdE     -35.80      0.51      1.11      Open
63-PropWM300mmRdE     -35.80      0.51      1.11      Open
64-PropWM300mmHospital     -35.80      0.51      1.11      Open
65-PropWM300mmHospital     -35.80      0.51      1.11      Open
66-PropWM300mmHospital     -35.80      0.51      1.11      Open
67-PropWM300mmHospital     -35.80      0.51      1.11      Open
68-PropWM300mmHospital     -35.80      0.51      1.11      Open
69-PropWM300mmHospital     -35.80      0.51      1.11      Open
70-PropWM300mmLoadingDock       0.00      0.00      0.00      Open
71-PropWM300mmLoadingDock       0.00      0.00      0.00      Open
72-PropWM300mmLoadingDock       0.00      0.00      0.00      Open
73-PropWM300mmLoadingDock       0.00      0.00      0.00      Open
74-PropWM300mmLoadingDock     -35.80      0.51      1.11      Open
80-PropWM300mmRdL     -35.80      0.51      1.11      Open
48-PropWM300mmHospital      -1.27      0.02      0.00      Open
48B-PropWM300mmHospital      -1.38      0.02      0.00      Open
83-PropWM300mm        0.11      0.00      0.00      Open
84-PropWM150mm        0.11      0.01      0.00      Open
```



Link Results: (continued)

```
---------------------------------------------------------------------
Link                  Flow  VelocityUnit Headloss    Status
ID                     LPS       m/s      m/km
---------------------------------------------------------------------
5B-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
5-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
44-PropWM300mmHospital      52.18      0.74      2.23      Open
44-PropWM300mmHospital(2)      52.18      0.74      2.23      Open
22-PropWM300mmRdA      40.13      0.57      1.37      Open
22-PropWM300mmRdA(2)      40.13      0.57      1.37      Open
34-PropWM300mmRdE(2)      21.18      0.30      0.42      Open
76-PropWM300mmHospitalService     -16.13      0.23      0.25      Open
79-PropWM300mmHospitalService     -16.13      0.23      0.25      Open
1                    -15.97      0.90     10.23      Open
```

| | | | | |
|---|---|---|---|---|
| 2 | -19.83 | 0.28 | 0.37 | Open |
| 3 | -35.80 | 0.51 | 1.11 | Open |
| 6 | -0.11 | 0.00 | 0.00 | Open |
| 7 | -0.11 | 0.01 | 0.00 | Open |
| 8 | 0.00 | 0.00 | 0.00 | Open |
| 9 | 53.44 | 0.76 | 2.34 | Open |
| 10 | 53.44 | 0.76 | 2.34 | Open |
| 11 | 37.31 | 0.53 | 1.20 | Open |
| 12 | 13.67 | 0.44 | 1.58 | Open |
| 13 | 7.51 | 0.11 | 0.06 | Open |
| 14 | -6.16 | 0.09 | 0.04 | Open |
| 15 | -19.83 | 0.28 | 0.37 | Open |
| 16 | -19.83 | 0.28 | 0.37 | Open |
| 5 | -35.80 | 0.51 | 1.11 | Open |
| 17 | -35.80 | 0.51 | 1.11 | Open |
| 18 | -35.80 | 0.51 | 1.11 | Open |
| 19 | -35.80 | 0.51 | 1.11 | Open |
| 20 | -35.80 | 0.51 | 1.11 | Open |
| FIRESERVICEMETER2 | 52.18 | 0.74 | 0.07 | Open Valve |
| FIRESERVICEMETER1 | 40.13 | 0.57 | 0.05 | Open Valve |

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

Input File: NCD-Case 3.net

Scenario: with hospital loop
Date: 2024-07-19 11:25:02 AM

Link - Node Table:

| Link ID | Start Node | End Node | Length m | Diameter mm |
|---|---|---|---|---|
| 43-PropWM300mmHospitalJ-2 | J-3 | | 44.3429614279853 | 300 |
| 32-PropWM300mmRdLJ-12 | J-13 | | 8.10 | 300 |
| 21-ExWM400mmCarlingAveR-2 | J-E1 | | 148.67 | 1000 |
| 20-ExWM400mmCarlingAveJ-E1 | J-E2 | | 72.06 | 400 |
| 16-ExWM400mmCarlingAveJ-E4 | J-E3 | | 53.8905996515422 | 400 |
| 8-ExWM400mmCarlingAveJ-E8 | J-E7 | | 30.3005394242057 | 400 |
| 45-PropWM300mmHospitalJ-E1 | J-1 | | 20.64 | 300 |
| 19-PropWM150mmResearchBJ-E2 | J-22 | | 30.3462421119232 | 150 |
| 15-PropWM150mmCarlingV-T#3J-E4 | J-21 | | 30.9676844497797 | 150 |
| 9-PropWM150mmCarlingV-T#2J-E7 | J-20 | | 31.0736886830009 | 150 |
| 7-PropWM150mmCarlingV-T#1J-E8 | J-19 | | 31.2526179381906 | 150 |
| 23-PropWM300mmRdAJ-18 | H-1 | | 8.34306529014965 | 300 |
| 24-PropWM300mmRdAH-1 | J-17 | | 26.2370276682741 | 300 |
| 37-PropWM300mmRdDJ-6 | H-4 | | 14.21 | 300 |
| 36-PropWM300mmRdDH-4 | J-7 | | 59.70 | 300 |
| 28-PropWM300mmRdBH-2 | J-25 | | 47.92 | 300 |
| 30-PropWM300mmRdBJ-25 | H-5 | | 42.00 | 300 |
| 29-PropWM150mmPGServiceJ-25 | J-26(PGService) | | 16.98 | 150 |
| 14-ExWM400mmCarlingAve366028H031 | J-E4 | | 29.2340814798819 | 400 |
| 17-ExWM400mmCarlingAve366028H029 | J-E3 | | 35.0957871684793 | 400 |
| 18-ExWM400mmCarlingAveJ-E2 | 366028H029 | | 54.4871678813318 | 400 |
| 10-ExWM400mmCarlingAveJ-E7 | J-E6 | | 86.5525765463542 | 400 |
| 13-ExWM400mmCarlingAveJ-E6 | 366028H031 | | 7.73250133830889 | 400 |
| 11-ExWM150mmCarlingAveJ-E6 | J-E5 | | 7.45726728454382 | 150 |
| 12-ExWM150mmCarlingAveJ-E5 | 366028H030 | | 90.9465713866359 | 150 |
| 6-ExWM400mmCarlingAveJ-E9 | J-E8 | | 0.382945097269914 | 400 |
| 4-ExWM150mmPrestonStJ-E9 | 366028H219 | | 40.1973470697933 | 150 |
| 31-PropWM300mmRdBJ-14 | H-5 | | 22.94 | 300 |
| 25-PropWM300mmRdAJ-17 | J-16 | | 62.29 | 300 |
| 40-PropWM300mmHospitalJ-4 | H-15 | | 91.57 | 300 |
| 39-PropWM300mmHospitalH-15 | J-5 | | 24.29 | 300 |

```
42-PropWM300mmHospitalJ-3            H-7                 43.89       300
41-PropWM300mmHospitalH-7            J-4                 10.80       300
38-PropWM300mmHospitalJ-5            J-6            35.8431820756787       300
1-ExWM400mmCarlingAveR-1            J-E10               19.39      1000
3-ExWM400mmCarlingAveJ-E10          J-E9           0.399488044413268       400
```

```
Page 2                                    Scenario: with hospital loop
Link - Node Table: (continued)
----------------------------------------------------------------------
Link           Start          End                 Length  Diameter
ID             Node           Node                     m        mm
----------------------------------------------------------------------
5A-ExWM150mmPrestonStJ-E11          366028H185     45.2635914858321       150
46-PropWM200mmCUPServiceJ-27(CUPService)J-24                11.58       200
27-PropWM300mmRdBJ-16           H-2                 21.58       300
26-PropWM300mmRdAJ-16           J-15                21.35       300
47-PropWM300mmHospitalJ-3            J-29           12.8116327584704       300
49-PropWM300mmRdAJ-28           J-15                34.67       300
50-PropWM300mmRdEJ-7            H-6                 13.31       300
51-PropWM300mmRdEH-6            J-8                 22.67       300
56-PropWM300mmRdEH-11           J-31                 5.74       300
57-PropWM200mmCUPServiceJ-30(CUPService)J-10                11.59       200
59-PropWM300mmRdEH-10           J-32                19.01       300
60-PropWM300mmRdEJ-32           J-33           35.9527228433413       300
61-PropWM300mmRdEJ-33           H-9            38.6955804752682       300
62-PropWM300mmRdEH-9            J-34           26.326879710781       300
63-PropWM300mmRdEJ-34           J-35           22.6847258729083       300
64-PropWM300mmHospitalJ-35           J-44           66.2303194539337       300
65-PropWM300mmHospitalJ-44           J-36           45.3820485822456       300
66-PropWM300mmHospitalJ-36           J-37           61.1082602227364       300
67-PropWM300mmHospitalJ-37           J-38           43.5544391693597       300
68-PropWM300mmHospitalJ-38           J-40                34.59       300
69-PropWM300mmHospitalJ-40           J-39                22.02       300
70-PropWM300mmLoadingDockJ-42           H-13                 4.94       300
71-PropWM300mmLoadingDockH-13           J-41                54.59       300
72-PropWM300mmLoadingDockJ-41           H-8            10.281839107194       300
73-PropWM300mmLoadingDockH-8            J-39           18.8763427083242       300
74-PropWM300mmLoadingDockJ-39           J-43           23.4020520143924       300
80-PropWM300mmRdLJ-13           J-14           17.9428667770884       300
48-PropWM300mmHospitalJ-29           J-47           37.9955088729321       300
48B-PropWM300mmHospitalJ-47           J-28                35.74       300
83-PropWM300mm J-47           H-16                31.85       300
84-PropWM150mm H-16           H-17                47.38       150
5B-ExWM150mmPrestonSt366028H185     H-19           118.755824075502       150
5-ExWM150mmPrestonStH-19           366028H219     51.0338192356705       150
44-PropWM300mmHospitalJ-1            688-A          11.7604930134715       300
44-PropWM300mmHospital(2)688-B          J-2            23.8506572610621       300
22-PropWM300mmRdAJ-E3           691-A          21.8758265595292       300
22-PropWM300mmRdA(2)691-B          J-18           31.0182402514265       300
```

34-PropWM300mmRdE(2)J-183 J-24 34.93 300
76-PropWM300mmHospitalServiceJ-45(HospitalService)J-183 28.02
300
79-PropWM300mmHospitalServiceJ-23(HospitalService)J-9 28.03
300

| | | | | |
|---|---|---|---|---|
| 1 | UOHI | T-501 | 11.80 | 150 |
| 2 | J-31 | T-501 | 10.52 | 300 |
| 3 | T-501 | H-10 | 79.65 | 300 |
| 6 | J-28 | TEE-34 | 11.16 | 300 |
| 7 | TEE-34 | H-17 | 21.77 | 150 |
| 8 | TEE-34 | H-18 | 26.77 | 150 |
| 9 | J-8 | H-14 | 56.95 | 300 |



Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length m | Diameter mm | |
|---|---|---|---|---|---|
| 10 | H-14 | J-9 | 3.82 | 300 | |
| 11 | J-9 | J-183 | 5.50 | 300 | |
| 12 | J-48 | J-49(CUPService) | 11.60 | 200 | |
| 13 | J-24 | J-10 | 4.00 | 300 | |
| 14 | J-10 | J-48 | 4.00 | 300 | |
| 15 | J-48 | H-3 | 34.80 | 300 | |
| 16 | H-3 | H-11 | 78.65 | 300 | |
| 5 | H-20 | J-12 | 19.09 | 300 | |
| 17 | J-43 | H-12 | 7.75 | 300 | |
| 18 | H-12 | J-46 | 29.78 | 300 | |
| 19 | J-46 | J-11 | 5.05 | 300 | |
| 20 | J-11 | H-20 | 15.82 | 300 | |
| FIRESERVICEMETER2688-A | | 688-B | #N/A | 300 | Valve |
| FIRESERVICEMETER1691-A | | 691-B | #N/A | 300 | Valve |

Node Results:

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-22 | 0.00 | 114.60 | 48.48 | 0.00 |
| J-21 | 0.00 | 114.60 | 49.02 | 0.00 |
| J-20 | 0.00 | 114.60 | 49.25 | 0.00 |
| J-19 | 0.00 | 114.60 | 50.46 | 0.00 |
| J-8 | 0.00 | 114.43 | 37.81 | 0.00 |
| J-7 | 0.00 | 114.44 | 37.54 | 0.00 |
| J-6 | 0.00 | 114.47 | 41.22 | 0.00 |
| J-5 | 0.00 | 114.48 | 38.89 | 0.00 |
| J-4 | 0.00 | 114.53 | 43.04 | 0.00 |
| J-3 | 0.00 | 114.55 | 43.07 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-2 | 0.00 | 114.56 | 50.43 | 0.00 |
| J-1 | 0.00 | 114.59 | 50.62 | 0.00 |
| J-12 | 0.00 | 114.52 | 47.37 | 0.00 |
| J-13 | 0.00 | 114.52 | 47.57 | 0.00 |
| J-14 | 0.00 | 114.52 | 47.85 | 0.00 |
| J-15 | 0.00 | 114.55 | 45.19 | 0.00 |
| J-16 | 0.00 | 114.55 | 46.13 | 0.00 |
| J-17 | 0.00 | 114.56 | 48.96 | 0.00 |
| J-18 | 0.00 | 114.57 | 50.88 | 0.00 |
| J-11 | 0.00 | 114.51 | 47.05 | 0.00 |
| J-10 | 0.00 | 114.40 | 40.85 | 0.00 |
| J-9 | 0.00 | 114.41 | 39.82 | 0.00 |
| J-23(HospitalService) | 5.98 | 114.41 | 37.47 | 0.00 |
| J-E1 | 0.00 | 114.60 | 50.66 | 0.00 |
| J-E2 | 0.00 | 114.60 | 49.00 | 0.00 |
| J-E3 | 0.00 | 114.59 | 52.30 | 0.00 |
| J-E4 | 0.00 | 114.60 | 49.50 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality |
|---|---|---|---|---|
| J-E7 | 0.00 | 114.60 | 51.00 | 0.00 |
| J-E8 | 0.00 | 114.60 | 51.50 | 0.00 |
| J-24 | 0.00 | 114.40 | 40.71 | 0.00 |
| J-25 | 0.00 | 114.53 | 47.00 | 0.00 |
| J-26(PGService) | 1.14 | 114.53 | 43.90 | 0.00 |
| J-E6 | 0.00 | 114.60 | 49.95 | 0.00 |
| J-E5 | 0.00 | 114.60 | 50.00 | 0.00 |
| J-E9 | 0.00 | 114.60 | 51.84 | 0.00 |
| J-E10 | 0.00 | 114.60 | 51.90 | 0.00 |
| J-E11 | 0.00 | 114.60 | 48.50 | 0.00 |
| J-27(CUPService) | 5.06 | 114.40 | 40.77 | 0.00 |
| J-28 | 0.00 | 114.55 | 43.59 | 0.00 |
| J-29 | 0.00 | 114.55 | 43.03 | 0.00 |
| J-30(CUPService) | 5.06 | 114.40 | 40.89 | 0.00 |
| J-31 | 0.00 | 114.41 | 42.13 | 0.00 |
| J-32 | 0.00 | 114.43 | 38.82 | 0.00 |
| J-33 | 0.00 | 114.44 | 39.64 | 0.00 |
| J-34 | 0.00 | 114.45 | 38.15 | 0.00 |
| J-35 | 0.00 | 114.45 | 34.42 | 0.00 |
| J-36 | 0.00 | 114.47 | 37.74 | 0.00 |
| J-37 | 0.00 | 114.48 | 46.32 | 0.00 |
| J-38 | 0.00 | 114.49 | 47.02 | 0.00 |
| J-39 | 0.00 | 114.50 | 47.12 | 0.00 |
| J-40 | 0.00 | 114.50 | 47.59 | 0.00 |
| J-41 | 0.00 | 114.50 | 44.57 | 0.00 |

| | | | | |
|---|---|---|---|---|
| J-42 | 0.00 | 114.50 | 44.77 | 0.00 |
| J-43 | 0.00 | 114.50 | 47.42 | 0.00 |
| J-45(HospitalService) | 5.98 | 114.41 | 37.48 | 0.00 |
| J-46 | 0.00 | 114.51 | 47.40 | 0.00 |
| J-44 | 0.00 | 114.46 | 36.40 | 0.00 |
| J-47 | 0.00 | 114.55 | 43.04 | 0.00 |
| J-183 | 0.00 | 114.41 | 39.97 | 0.00 |
| H-1 | 0.00 | 114.57 | 47.20 | 0.00 |
| H-2 | 0.00 | 114.54 | 43.62 | 0.00 |
| H-3 | 0.00 | 114.41 | 38.88 | 0.00 |
| H-4 | 0.00 | 114.47 | 37.70 | 0.00 |
| H-5 | 0.00 | 114.53 | 44.64 | 0.00 |
| H-6 | 0.00 | 114.44 | 34.39 | 0.00 |
| 366028H031 | 0.00 | 114.60 | 49.86 | 0.00 |
| 366028H029 | 0.00 | 114.60 | 49.40 | 0.00 |
| 366028H030 | 0.00 | 114.60 | 49.50 | 0.00 |
| 366028H185 | 0.00 | 114.60 | 48.20 | 0.00 |
| 366028H219 | 0.00 | 114.60 | 51.50 | 0.00 |
| H-12 | 0.00 | 114.51 | 44.25 | 0.00 |
| H-13 | 0.00 | 114.50 | 44.39 | 0.00 |
| H-14 | 0.00 | 114.41 | 36.95 | 0.00 |
| H-15 | 0.00 | 114.49 | 39.27 | 0.00 |



Node Results: (continued)

| Node ID | Demand LPS | Head m | Pressure m | Quality | |
|---|---|---|---|---|---|
| H-7 | 0.00 | 114.53 | 39.17 | 0.00 | |
| H-8 | 0.00 | 114.50 | 43.95 | 0.00 | |
| H-9 | 0.00 | 114.44 | 36.30 | 0.00 | |
| H-10 | 0.00 | 114.43 | 37.54 | 0.00 | |
| H-11 | 0.00 | 114.41 | 39.44 | 0.00 | |
| H-16 | 0.00 | 114.55 | 35.12 | 0.00 | |
| H-18 | 0.00 | 114.55 | 37.71 | 0.00 | |
| H-17 | 0.00 | 114.55 | 34.58 | 0.00 | |
| H-19 | 0.00 | 114.60 | 50.79 | 0.00 | |
| 688-A | 0.00 | 114.59 | 50.62 | 0.00 | |
| 688-B | 0.00 | 114.57 | 47.48 | 0.00 | |
| 691-A | 0.00 | 114.59 | 53.06 | 0.00 | |
| 691-B | 0.00 | 114.58 | 47.98 | 0.00 | |
| UOHI | 5.91 | 114.39 | 39.60 | 0.00 | |
| T-501 | 0.00 | 114.41 | 42.28 | 0.00 | |
| TEE-34 | 0.00 | 114.55 | 42.80 | 0.00 | |
| J-48 | 0.00 | 114.40 | 40.99 | 0.00 | |
| J-49(CUPService) | 5.06 | 114.40 | 41.01 | 0.00 | |
| H-20 | 0.00 | 114.51 | 46.66 | 0.00 | |
| R-1 | -7.09 | 114.60 | 0.00 | 0.00 | Reservoir |

```
R-2                  -27.10    114.60      0.00      0.00 Reservoir

Link Results:
----------------------------------------------------------------------
Link                   Flow  VelocityUnit Headloss    Status
ID                      LPS       m/s      m/km
----------------------------------------------------------------------
43-PropWM300mmHospital      19.13      0.27      0.35      Open
32-PropWM300mmRdL     -13.26      0.19      0.18      Open
21-ExWM400mmCarlingAve      27.10      0.03      0.00      Open
20-ExWM400mmCarlingAve       7.96      0.06      0.04      Open
16-ExWM400mmCarlingAve       7.09      0.06      0.03      Open
8-ExWM400mmCarlingAve       7.09      0.06      0.03      Open
45-PropWM300mmHospital      19.13      0.27      0.35      Open
19-PropWM150mmResearchB       0.00      0.00      0.00    Closed
15-PropWM150mmCarlingV-T#3       0.00      0.00      0.00    Closed
9-PropWM150mmCarlingV-T#2       0.00      0.00      0.00    Closed
7-PropWM150mmCarlingV-T#1       0.00      0.00      0.00    Closed
23-PropWM300mmRdA      15.06      0.21      0.22      Open
24-PropWM300mmRdA      15.06      0.21      0.22      Open
37-PropWM300mmRdD      19.79      0.28      0.37      Open
36-PropWM300mmRdD      19.79      0.28      0.37      Open
28-PropWM300mmRdB      14.40      0.20      0.21      Open
30-PropWM300mmRdB      13.26      0.19      0.18      Open
29-PropWM150mmPGService       1.14      0.06      0.08      Open
14-ExWM400mmCarlingAve       7.09      0.06      0.03      Open
17-ExWM400mmCarlingAve       7.96      0.06      0.04      Open
```



```
Link Results: (continued)
----------------------------------------------------------------------
Link                   Flow  VelocityUnit Headloss    Status
ID                      LPS       m/s      m/km
----------------------------------------------------------------------
18-ExWM400mmCarlingAve       7.96      0.06      0.04      Open
10-ExWM400mmCarlingAve       7.09      0.06      0.03      Open
13-ExWM400mmCarlingAve       7.09      0.06      0.03      Open
11-ExWM150mmCarlingAve       0.00      0.00      0.00      Open
12-ExWM150mmCarlingAve       0.00      0.00      0.00      Open
6-ExWM400mmCarlingAve       7.09      0.06      0.02      Open
4-ExWM150mmPrestonSt       0.00      0.00      0.00      Open
31-PropWM300mmRdB     -13.26      0.19      0.18      Open
25-PropWM300mmRdA      15.06      0.21      0.22      Open
40-PropWM300mmHospital      19.79      0.28      0.37      Open
39-PropWM300mmHospital      19.79      0.28      0.37      Open
42-PropWM300mmHospital      19.79      0.28      0.37      Open
41-PropWM300mmHospital      19.79      0.28      0.37      Open
38-PropWM300mmHospital      19.79      0.28      0.37      Open
1-ExWM400mmCarlingAve       7.09      0.01      0.00      Open
```

| | | | | |
|---|---|---|---|---|
| 3-ExWM400mmCarlingAve | 7.09 | 0.06 | 0.05 | Open |
| 5A-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 46-PropWM200mmCUPService | -5.06 | 0.16 | 0.25 | Open |
| 27-PropWM300mmRdB | 14.40 | 0.20 | 0.21 | Open |
| 26-PropWM300mmRdA | 0.66 | 0.01 | 0.00 | Open |
| 47-PropWM300mmHospital | -0.66 | 0.01 | 0.00 | Open |
| 49-PropWM300mmRdA | -0.66 | 0.01 | 0.00 | Open |
| 50-PropWM300mmRdE | 19.79 | 0.28 | 0.37 | Open |
| 51-PropWM300mmRdE | 19.79 | 0.28 | 0.37 | Open |
| 56-PropWM300mmRdE | -7.35 | 0.10 | 0.06 | Open |
| 57-PropWM200mmCUPService | -5.06 | 0.16 | 0.25 | Open |
| 59-PropWM300mmRdE | -13.26 | 0.19 | 0.18 | Open |
| 60-PropWM300mmRdE | -13.26 | 0.19 | 0.18 | Open |
| 61-PropWM300mmRdE | -13.26 | 0.19 | 0.18 | Open |
| 62-PropWM300mmRdE | -13.26 | 0.19 | 0.18 | Open |
| 63-PropWM300mmRdE | -13.26 | 0.19 | 0.18 | Open |
| 64-PropWM300mmHospital | -13.26 | 0.19 | 0.18 | Open |
| 65-PropWM300mmHospital | -13.26 | 0.19 | 0.18 | Open |
| 66-PropWM300mmHospital | -13.26 | 0.19 | 0.18 | Open |
| 67-PropWM300mmHospital | -13.26 | 0.19 | 0.18 | Open |
| 68-PropWM300mmHospital | -13.26 | 0.19 | 0.18 | Open |
| 69-PropWM300mmHospital | -13.26 | 0.19 | 0.18 | Open |
| 70-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 71-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 72-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 73-PropWM300mmLoadingDock | 0.00 | 0.00 | 0.00 | Open |
| 74-PropWM300mmLoadingDock | -13.26 | 0.19 | 0.18 | Open |
| 80-PropWM300mmRdL | -13.26 | 0.19 | 0.18 | Open |
| 48-PropWM300mmHospital | -0.66 | 0.01 | 0.00 | Open |
| 48B-PropWM300mmHospital | -0.70 | 0.01 | 0.00 | Open |
| 83-PropWM300mm | 0.05 | 0.00 | 0.00 | Open |
| 84-PropWM150mm | 0.05 | 0.00 | 0.00 | Open |



Link Results: (continued)

| Link ID | Flow LPS | VelocityUnit m/s | Headloss m/km | Status |
|---|---|---|---|---|
| 5B-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 5-ExWM150mmPrestonSt | 0.00 | 0.00 | 0.00 | Open |
| 44-PropWM300mmHospital | 19.13 | 0.27 | 0.35 | Open |
| 44-PropWM300mmHospital(2) | 19.13 | 0.27 | 0.35 | Open |
| 22-PropWM300mmRdA | 15.06 | 0.21 | 0.22 | Open |
| 22-PropWM300mmRdA(2) | 15.06 | 0.21 | 0.22 | Open |
| 34-PropWM300mmRdE(2) | 7.83 | 0.11 | 0.07 | Open |
| 76-PropWM300mmHospitalService | -5.98 | 0.08 | 0.04 | Open |
| 79-PropWM300mmHospitalService | -5.98 | 0.08 | 0.04 | Open |
| 1 | -5.91 | 0.33 | 1.62 | Open |

| | | | | |
|---|---|---|---|---|
| 2 | -7.35 | 0.10 | 0.06 | Open |
| 3 | -13.26 | 0.19 | 0.18 | Open |
| 6 | -0.05 | 0.00 | 0.00 | Open |
| 7 | -0.05 | 0.00 | 0.00 | Open |
| 8 | 0.00 | 0.00 | 0.00 | Open |
| 9 | 19.79 | 0.28 | 0.37 | Open |
| 10 | 19.79 | 0.28 | 0.37 | Open |
| 11 | 13.81 | 0.20 | 0.19 | Open |
| 12 | 5.06 | 0.16 | 0.25 | Open |
| 13 | 2.77 | 0.04 | 0.01 | Open |
| 14 | -2.29 | 0.03 | 0.01 | Open |
| 15 | -7.35 | 0.10 | 0.06 | Open |
| 16 | -7.35 | 0.10 | 0.06 | Open |
| 5 | -13.26 | 0.19 | 0.18 | Open |
| 17 | -13.26 | 0.19 | 0.18 | Open |
| 18 | -13.26 | 0.19 | 0.18 | Open |
| 19 | -13.26 | 0.19 | 0.18 | Open |
| 20 | -13.26 | 0.19 | 0.18 | Open |
| FIRESERVICEMETER2 | 19.13 | 0.27 | 0.02 | Open Valve |
| FIRESERVICEMETER1 | 15.06 | 0.21 | 0.01 | Open Valve |

# APPENDIX D: EPANET SUMMARY

# WATER DISTRIBUTION - DISTRIBUTION DEMANDS

**PROJECT:** THE OTTAWA HOSPITAL NEW CIVIC DEVELOPMENT
**PROJECT NUMBER:** CA0021243.8764
**DATE:** 2025-12-19

**SUBMISISON:** SPC Resubmission
**BY:** LIAM CURLEY
**CHECKED:** COLIN GRAHAM
**APPROVED:**

**Hydraulic Inputs**

| | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | Parking Garage (Separate Contract) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Minimum HGL | m | 107.1 | 107.1 | N/A | N/A | N/A | N/A | N/A | From City Boundary Conditions |
| Maximum HGL | m | 114.6 | 114.6 | N/A | N/A | N/A | N/A | N/A | From City Boundary Conditions |
| MaxDay+FF | m | 107.8 | 107.6 | N/A | N/A | N/A | N/A | N/A | From City Boundary Conditions |
| Civil Average Daily | LPS | 5.98 | 5.98 | 5.06 | 5.06 | 5.06 | 5.91 | 1.14 | From Civil Calculations or Relevant Report |
| Civil Max Daily | LPS | 8.96 | 8.96 | 7.59 | 7.59 | 7.59 | 8.87 | 1.7 | From Civil Calculations or Relevant Report |
| Civil Max Hourly | LPS | 16.13 | 16.13 | 13.67 | 13.67 | 13.67 | 15.97 | 3.07 | From Civil Calculations or Relevant Report |
| Civil Fire Flow | LPS | 250 | | 167 | | | N/A* | 200 | From Civil Calculations or Relevant Report |

## HYDRAULIC RESULTS FROM MODEL

**CASE 1 (Max Day + Fire Flow)**

| **Fire @ CUP** | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | SYSTEM LOW |
|---|---|---|---|---|---|---|---|---|
| *Input Values* | Building | 8.96 | 8.96 | 7.59 | 7.59 | 7.59 | 8.87 | 1.70 |
| | Reservoir | 107.80 | 107.60 | N/A | N/A | N/A | N/A | N/A |
| *EPANET Results (m)* | Building | 25.17 | 25.13 | 28.12 | 28.21 | 28.31 | 26.78 | 22.97 |
| ***Converted Results (PSI)*** | ***Building*** | ***35.79*** | ***35.76*** | ***40.01*** | ***40.14*** | ***40.28*** | ***38.10*** | ***32.68*** |
| **Fire @ Front Entryway** | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | SYSTEM LOW |
| *Input Values* | Building | 8.96 | 8.96 | 7.59 | 7.59 | 7.59 | 8.87 | 1.70 |
| | Reservoir | 107.80 | 107.60 | N/A | N/A | N/A | N/A | N/A |
| *EPANET Results (m)* | Building | 27.86 | 27.87 | 31.16 | 31.28 | 31.40 | 30.00 | 22.39 |
| ***Converted Results (PSI)*** | ***Building*** | ***39.64*** | ***39.66*** | ***44.34*** | ***44.51*** | ***44.68*** | ***42.69*** | ***31.86*** |
| **Fire @ Pavillion** | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | SYSTEM LOW |
| *Input Values* | Building | 8.96 | 8.96 | 7.59 | 7.59 | 7.59 | 8.87 | 1.70 |
| | Reservoir | 107.80 | 107.60 | N/A | N/A | N/A | N/A | N/A |
| *EPANET Results (m)* | Building | 33.55 | 33.55 | 31.35 | 31.47 | 31.59 | 31.27 | 20.40 |
| ***Converted Results (PSI)*** | ***Building*** | ***47.74*** | ***47.74*** | ***44.61*** | ***44.78*** | ***44.95*** | ***44.49*** | ***29.03*** |
| **Fire @ Podium** | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | SYSTEM LOW |
| *Input Values* | Building | 8.96 | 8.96 | 7.59 | 7.59 | 7.59 | 8.87 | 1.70 |
| | Reservoir | 107.80 | 107.60 | N/A | N/A | N/A | N/A | N/A |
| *EPANET Results (m)* | Building | 27.54 | 27.53 | 25.32 | 25.43 | 25.55 | 25.75 | 19.01 |
| ***Converted Results (PSI)*** | ***Building*** | ***39.19*** | ***39.17*** | ***36.03*** | ***36.18*** | ***36.35*** | ***36.64*** | ***27.05*** |
| **Fire @ Tower A** | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | SYSTEM LOW |
| *Input Values* | Building | 8.96 | 8.96 | 7.59 | 7.59 | 7.59 | 8.87 | 1.70 |
| | Reservoir | 107.80 | 107.60 | N/A | N/A | N/A | N/A | N/A |
| *EPANET Results (m)* | Building | 29.43 | 29.44 | 27.29 | 27.42 | 27.55 | 27.66 | 20.40 |
| ***Converted Results (PSI)*** | ***Building*** | ***41.88*** | ***41.89*** | ***38.83*** | ***39.02*** | ***39.20*** | ***39.36*** | ***29.03*** |
| **Fire @ Tower B** | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | SYSTEM LOW |
| *Input Values* | Building | 8.96 | 8.96 | 7.59 | 7.59 | 7.59 | 8.87 | 1.70 |
| | Reservoir | 107.80 | 107.60 | N/A | N/A | N/A | N/A | N/A |
| *EPANET Results (m)* | Building | 31.54 | 31.51 | 29.26 | 29.37 | 29.49 | 29.01 | 19.97 |
| ***Converted Results (PSI)*** | ***Building*** | ***44.88*** | ***44.83*** | ***41.63*** | ***41.79*** | ***41.96*** | ***41.28*** | ***28.41*** |
| **Fire @ UOHI** | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | SYSTEM LOW |
| *Input Values* | Building | 8.96 | 8.96 | 7.59 | 7.59 | 7.59 | 8.87 | 1.70 |
| | Reservoir | 107.80 | 107.60 | N/A | N/A | N/A | N/A | N/A |
| *EPANET Results (m)* | Building | 27.66 | 27.58 | 25.14 | 25.22 | 25.30 | 24.63 | 17.10 |
| ***Converted Results (PSI)*** | ***Building*** | ***39.36*** | ***39.24*** | ***35.77*** | ***35.89*** | ***36.00*** | ***35.05*** | ***24.33*** |

**Required Pressures (per City Guidelines):**
**System = 20 PSI min.**

**Note that multiple fire scenarios have been evaluated:**
**1. Fire at CUP**
**2. Fire at Front Entryway**
**3. Fire at Pavilion**
**4. Fire at Podium**
**5. Fire at Tower A**
**6. Fire at Tower B**
**7. Fire at UOHI**

**Full EPANET summaries are available for the other fires.**

**Also note that "SYSTEM LOW" denotes the lowest pressure in the entire system.**

**Main Hospital Service Connection 1: J-23**
**Main Hopsital Service Connection 2: J-45**

**Central Utility Plant Connection 1: J-27**
**Central Utility Plant Connection 2: J-30**
**Central Utility Plant Connection 3: J-49**

***University of Ottawa Heart Institute Fire Flows included in the Main Hospital Building Calculations**

**CASE 2 (Peak Hour)**

| **CASE 2** | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | SYSTEM LOW |
|---|---|---|---|---|---|---|---|---|
| *Input Values* | Hydrant | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Building | 16.13 | 16.13 | 13.67 | 13.67 | 13.67 | 15.97 | 3.07 |
| | Reservoir | 107.10 | 107.10 | N/A | N/A | N/A | N/A | N/A |
| *EPANET Results (m)* | Building | 29.00 | 29.00 | 32.27 | 32.39 | 32.51 | 31.06 | 26.18 |
| ***Converted Results (PSI)*** | ***Building*** | **41.26** | **41.26** | **45.92** | **46.09** | **46.26** | **44.19** | **37.25** |

**Required Pressures (per City Guidelines):**
**Building = 40 to 80 PSI**

**CASE 3 (Basic Day)**

| **CASE 3** | | Main Hospital 1 | Main Hospital 2 | CUP 1 | CUP 2 | CUP 3 | UOHI | SYSTEM LOW |
|---|---|---|---|---|---|---|---|---|
| *Input Values* | Hydrant | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Building | 5.98 | 5.98 | 5.06 | 5.06 | 5.06 | 5.91 | 1.14 |
| | Reservoir | 114.60 | 114.60 | N/A | N/A | N/A | N/A | N/A |
| *EPANET Results (m)* | Max Pressure | 37.47 | 37.48 | 40.77 | 40.89 | 41.01 | 39.60 | 34.39 |
| ***Converted Results (PSI)*** | ***Max Pressure*** | **53.32** | **53.33** | **58.01** | **58.18** | **58.35** | **56.35** | **48.93** |

**Required Pressures (per City Guidelines):**
**80 PSI max. in Network**

*Pr essure Reducing Valves required at all Building Connections.*
*See Mechanical for details.*

# APPENDIX E: SANITARY DESIGN FLOWS

# SANITARY FLOW CALCULATIONS

**PROJECT:** NEW CIVIC DEVELOPMENT - THE OTTAWA HOSPITAL
**PROJECT NUMBER:**
**DATE:** 2026-01-09
**SUBMISISON:** SPC Resubmission
**BY:** LIAM CURLEY
**CHECKED:** COLIN GRAHAM

**Site Information**

Address: New Civic Development - The Ottawa Hospital

**Average Wastewater Flows**

| | | | |
|---|---|---|---|
| Residential | = | 280 | L/c/d |
| Commercial | = | 28,000 | L/gross ha/d |
| Institutional | = | 28,000 | L/gross ha/d |
| Light Industrial | = | 35,000 | L/gross ha/d |
| Heavy Industrial | = | 55,000 | L/gross ha/d |

**Peaking Factors:**

Residential = Harmon Equation

$$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000}^{\frac{1}{2}}\right)}\right) * K$$

where P = population
K = correction factor = 0.8

| | | | |
|---|---|---|---|
| Commercial | = | 1.5 | (if Commercial contribution >20%, otherwise use 1.0) |
| Institutional | = | 1.5 | (if Institutional contribution >20%, otherwise use 1.0) |
| Industrial | = | Per figure in Appendix 4-B | |

**Peak Extraneous Flows:**

| | | | |
|---|---|---|---|
| Infiltration Allowance | = | 0.33 | L/s/effective gross ha (for all areas) |
| **Less than 10 ha:** | | | |
| Foundation Drain Allowance | = | 5.0 | L/s/gross ha (if necessary for ex. partially separated and combined areas only) |
| **10 ha - 100 ha:** | | | |
| Foundation Drain Allowance | = | 3.0 | L/s/gross ha (if necessary for ex. partially separated and combined areas only) |
| **Greater than 100 ha:** | | | |
| Foundation Drain Allowance | = | 2.0 | L/s/gross ha (if necessary for ex. partially separated and combined areas only) |

| SERVICE CONNECTION | | **UOHI** | | |
|---|---|---|---|---|
| Demand Type = | | Institutional | | |
| Average Day Demand = | | 28,000 | L/gross ha/day | |
| **Site Area =** | | **9.29** | **ha** | |
| **Average Daily Flow** = | | 28,000 | x 9.29 | |
| = | | 260,120 | L/day | |
| **=** | | **3.01** | **L/s** | |
| Peaking Factor Type = | | Institutional | | |
| Peaking Factor = | | 1.5 | | |
| Population = | | N/A | | |
| **Peak Daily Flow** = | | 1.5 | x Average day | |
| = | | 1.5 | x 260,120.00 | |
| = | | 390,180.00 | L/day | |
| **=** | | **4.52** | **L/s** | |
| Infiltration Allowance = | | 0.33 | | |
| **Peak Extraneous Flow** = | | 0.33 | x lot area | |
| = | | 0.33 | x 1.06 | |
| **=** | | **0.35** | **L/s** | |
| **Total Peak Design Flow** = | | Peak Daily Flow | + Extraneous Flow | |
| = | | 4.52 | + 0.35 | |
| **=** | | **4.87** | **L/s** | |

# APPENDIX F: SANITARY SEWER DESIGN SHEET

# SANITARY SEWER DESIGN SHEET

**PROJECT:** NEW CIVIC DEVELOPMENT - THE OTTAWA HOSPITAL
**NUMBER:**
**DATE:** 2026-01-09
**SUBMISSION:** SPC Resubmission
**BY:** LIAM CURLEY
**CHECKED:** COLIN GRAHAM

| Location | | | Inverts | | Incoming Flows | | | | | | | | | | | | | | | | | | Sewer Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Street Name or Description | From | To | Start | End | Effective Gross Area (ha) | Design Gross Floor Area (ha) | Ultimate Gross Floor Area (ha) | Sewer Type | Design Build-out Beds | Ultimate Build-out Beds | Flow (L/s) - Design Beds | Flow (L/s) - Ultimate Beds | Design Build-out GFA (L/s) | Ultimate Build-out GFA (L/s) | Design Max Flow (L/s) | Ultimate Max Flow (L/s) | Peak Factor | Design Peak Flow (L/s) | Ultimate Peak Flow (L/s) | Infiltration Allowance (L/s) | Design Accum. Total Flow (L/s) | Ultimate Accum. Total Flow (L/s) | Material | Diameter Nom. | Diameter Actual | Slope | Length | Cap. | Vel. | Time of Flow | Design Capacity (Q/Qfull) | Ultimate Capacity (Q/Qfull) | |
| | | | | | | | | | | | | | | | | | | | | | | | | mm | | % | m | L/s | m/s | min | | | |
| **Future UOHI** | **BUILDING** | **AW MHSA 58** | **74.13** | **73.66** | **1.06** | **9.29** | **9.29** | **SERVICE** | **N/A** | **N/A** | **N/A** | **N/A** | **3.01** | **3.01** | **3.01** | **3.01** | **1.50** | **4.52** | **4.52** | **0.35** | **4.87** | **4.87** | **PVC** | **150** | **152** | **2.00** | **23.3** | **22** | **1.23** | **0.32** | **22.12%** | **22.12%** | |
| | *AW MHSA 58* | *AW MHSA 59* | *74.47* | *72.98* | *0.07* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.02* | *4.89* | *4.89* | *PVC* | *300* | *305* | *2.00* | *74.5* | *143* | *1.96* | *0.63* | *3.42%* | *3.42%* | |
| | *AW MHSA 59* | *AW MHSA 57* | *72.95* | *72.82* | *0.01* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.00* | *4.89* | *4.89* | *PVC* | *300* | *305* | *2.00* | *6.5* | *143* | *1.95* | *0.06* | *3.42%* | *3.42%* | |
| | *AW MHSA 57* | *AW MHSA 55* | *72.76* | *72.55* | *0.07* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.02* | *4.91* | *4.91* | *PVC* | *300* | *305* | *0.32* | *85.5* | *57* | *0.78* | *1.40* | *8.62%* | *8.62%* | |
| **CUP-2** | **BUILDING** | **AW MHSA 55** | **72.94** | **72.76** | **0.58** | **0.58** | **0.58** | **SERVICE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **7.25** | **7.25** | **1.00** | **7.25** | **7.25** | **0.19** | **7.44** | **7.44** | **PVC** | **200** | **203** | **1.99** | **8.9** | **48** | **1.49** | **0.10** | **15.50%** | **15.50%** | (1) |
| | *AW MHSA 55* | *AW MHSA 54* | *70.36* | *70.14* | *0.07* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.02* | *12.38* | *12.38* | *PVC* | *300* | *305* | *0.32* | *87.7* | *57* | *0.78* | *1.45* | *21.72%* | *21.72%* | |
| **CUP-1** | **BUILDING** | **AW MHSA 54** | **72.84** | **72.66** | **0.70** | **0.70** | **0.70** | **SERVICE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **7.25** | **7.25** | **1.00** | **7.25** | **7.25** | **0.23** | **7.48** | **7.48** | **PVC** | **200** | **203** | **2.01** | **8.8** | **48** | **1.50** | **0.10** | **15.59%** | **15.59%** | (1) |
| | *AW MHSA 54* | *AW MHSA 52* | *70.11* | *69.94* | *0.05* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.02* | *19.88* | *19.88* | *PVC* | *300* | *305* | *0.32* | *92.5* | *57* | *0.78* | *1.12* | *34.87%* | *34.87%* | |
| | *AW MHSA 52* | *AW MHSA 51* | *69.909* | *69.86* | *0.02* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *19.88* | *19.88* | *PVC* | *300* | *305* | *0.32* | *15.5* | *57* | *0.78* | *0.33* | *34.88%* | *34.88%* | |
| | *AW MHSA 51* | *AW MHSA 50* | *69.83* | *69.74* | *0.03* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *19.89* | *19.89* | *PVC* | *300* | *305* | *0.32* | *28.6* | *57* | *0.78* | *0.61* | *34.90%* | *34.90%* | |
| | *AW MHSA 50* | *AW MHSA 32* | *69.71* | *69.47* | *0.03* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *19.90* | *19.90* | *PVC* | *300* | *305* | *0.74* | *32.4* | *87* | *1.19* | *0.45* | *22.88%* | *22.88%* | |
| | *AW MHSA 36* | *AW MHSA 35* | *77.77* | *77.73* | *0.01* | *0.00* | *0.00* | *EXTERNAL* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *1.20* | *1.20* | *0.00* | *1.20* | *1.20* | *PVC* | *250* | *254* | *0.35* | *11.5* | *37* | *0.72* | *0.27* | *3.23%* | *3.23%* | (2) |
| | *AW MHSA 35* | *AW MHSA 34* | *77.67* | *77.54* | *0.04* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *1.22* | *1.22* | *PVC* | *250* | *254* | *0.31* | *41.6* | *35* | *0.68* | *1.02* | *3.48%* | *3.48%* | |
| | *AW MHSA 34* | *AW MHSA 33* | *77.48* | *77.35* | *0.04* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *1.23* | *1.23* | *PVC* | *250* | *254* | *0.32* | *40.1* | *35* | *0.70* | *0.95* | *3.52%* | *3.52%* | |
| | *AW MHSA 33* | *AW MHSA 32* | *77.29* | *77.16* | *0.04* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *1.24* | *1.24* | *PVC* | *300* | *305* | *0.32* | *41.3* | *57* | *0.78* | *0.88* | *2.18%* | *2.18%* | |
| | *AW MHSA 32* | *AW MHSA 31* | *69.41* | *69.14* | *0.08* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.03* | *21.17* | *21.17* | *PVC* | *300* | *305* | *0.32* | *83.6* | *57* | *0.79* | *1.76* | *37.15%* | *37.15%* | |
| | *AW MHSA 31* | ***MHSA 43*** | *69.11* | *69.10* | *0.00* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.00* | *21.17* | *21.17* | *PVC* | *300* | *305* | *0.32* | *3.3* | *57* | *0.78* | *0.07* | *37.15%* | *37.15%* | |
| **Tower A-1 - TA-SAN-2** | **BUILDING** | **MHSA 30** | **69.36** | **69.27** | **0.34** | **0.66** | **2.82** | **SERVICE** | **42** | **253** | **0.68** | **4.59** | **0.21** | **0.66** | **0.68** | **4.59** | **1.50** | **1.02** | **6.88** | **0.11** | **1.13** | **6.99** | **PVC** | **300** | **305** | **1.00** | **8.7** | **101** | **1.38** | **0.11** | **1.12%** | **6.92%** | |
| | **MHSA 30** | **MHSA 43** | **69.24** | **69.12** | **0.03** | **N/A** | **N/A** | **MAINLINE** | **0** | **0** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.01** | **1.14** | **7.00** | **PVC** | **300** | **305** | **0.50** | **25.6** | **71** | **0.98** | **0.44** | **1.61%** | **9.58%** | |
| | ***MHSA 43*** | *AW MHSA 30* | *69.10* | *69.06* | *0.01* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.00* | *22.32* | *28.18* | *PVC* | *300* | *305* | *0.35* | *11.3* | *60* | *0.82* | *0.23* | *37.20%* | *46.96%* | |
| | *AW MHSA 30* | *AW MHSA 29* | *69.06* | *68.99* | *0.02* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *22.33* | *28.19* | *PVC* | *300* | *305* | *0.29* | *24.1* | *54* | *0.74* | *0.54* | *41.35%* | *52.19%* | |
| | *AW MHSA 29* | *AW MHSA 28* | *68.93* | *68.92* | *0.00* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.00* | *22.33* | *28.19* | *PVC* | *300* | *305* | *0.22* | *4.5* | *46* | *0.65* | *0.12* | *46.52%* | *58.72%* | |
| | *AW MHSA 28* | **MHSA 31** | *68.89* | *68.76* | *0.05* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.02* | *22.35* | *28.20* | *PVC* | *300* | *305* | *0.32* | *46.8* | *57* | *0.78* | *1.04* | *39.20%* | *49.48%* | |
| **Tower A-2 - TA-SAN-1** | **BUILDING** | **MHSA 31** | **69.36** | **69.04** | **0.29** | **0.59** | **1.82** | **SERVICE** | **38** | **255** | **0.62** | **4.13** | **0.19** | **0.59** | **0.62** | **4.13** | **1.50** | **0.92** | **6.20** | **0.10** | **1.02** | **6.29** | **PVC** | **300** | **305** | **1.00** | **32.3** | **101** | **1.38** | **0.39** | **1.01%** | **6.23%** | |
| | **MHSA 31** | *AW MHSA 27* | *68.78* | *68.67* | *0.03* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *23.37* | *34.51* | *PVC* | *300* | *305* | *0.33* | *27.2* | *58* | *0.80* | *0.57* | *40.30%* | *59.49%* | |
| | *AW MHSA 40* | *AW MHSA 27* | *70.38* | *69.89* | *0.03* | *0.00* | *0.00* | *EXTERNAL* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.30* | *0.30* | *0.01* | *0.31* | *0.31* | *PVC* | *250* | *254* | *1.50* | *32.7* | *76* | *1.50* | *0.36* | *0.41%* | *0.41%* | (3) |
| | *AW MHSA 27* | *AW MHSA 26* | *68.61* | *68.50* | *0.03* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *23.70* | *34.83* | *PVC* | *300* | *305* | *0.33* | *33.5* | *58* | *0.79* | *0.71* | *40.85%* | *60.05%* | |
| | *AW MHSA 26* | *AW MHSA 25* | *68.44* | *68.31* | *0.04* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *23.71* | *34.84* | *PVC* | *375* | *381* | *0.33* | *39.1* | *105* | *0.93* | *0.70* | *22.58%* | *33.18%* | |
| | *AW MHSA 25* | *AW MHSA 24* | *68.28* | *68.17* | *0.03* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *23.72* | *34.85* | *PVC* | *375* | *381* | *0.32* | *34.7* | *103* | *0.91* | *0.64* | *23.03%* | *33.84%* | |
| | *AW MHSA 24* | *AW MHSA 23A* | *68.14* | *68.03* | *0.03* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *23.73* | *34.86* | *PVC* | *375* | *381* | *0.32* | *34.1* | *104* | *0.91* | *0.63* | *22.62%* | *33.52%* | |
| | *AW MHSA 23A* | ***MHSA 34*** | *68.00* | *67.88* | *0.04* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *23.74* | *34.87* | *PVC* | *375* | *381* | *0.32* | *36.1* | *103* | *0.91* | *0.66* | *23.05%* | *33.86%* | |
| **MAIN ENTRY - PG-SAN-1** | **BUILDING** | **MHSA 32** | **72.87** | **72.24** | **0.56** | **0.56** | **0.56** | **SERVICE** | **N/A** | **N/A** | **N/A** | **N/A** | **0.18** | **0.18** | **0.18** | **0.18** | **1.50** | **0.27** | **0.27** | **0.18** | **0.46** | **0.46** | **PVC** | **200** | **203** | **5.24** | **12.1** | **78** | **2.41** | **0.08** | **0.59%** | **0.59%** | |
| | **MHSA 32** | **MHSA 33** | **72.24** | **71.79** | **0.03** | **N/A** | **N/A** | **MAINLINE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.01** | **0.47** | **0.47** | **PVC** | **200** | **203** | **0.37** | **34.9** | **21** | **0.64** | **0.91** | **2.23%** | **2.23%** | |
| | **MHSA 33** | **MHSA 34** | **71.79** | **71.57** | **0.02** | **N/A** | **N/A** | **MAINLINE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.01** | **0.48** | **0.48** | **PVC** | **200** | **203** | **1.03** | **21.0** | **35** | **1.07** | **0.33** | **1.36%** | **1.36%** | |
| | ***MHSA 34*** | *AW MHSA 16* | *67.88* | *67.83* | *0.01* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.00* | *24.22* | *35.36* | *PVC* | *375* | *381* | *0.32* | *14.9* | *103* | *0.91* | *0.27* | *23.52%* | *34.33%* | |
| | *AW MHSA 16* | *AW MHSA 22* | *67.83* | *67.81* | *0.01* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.00* | *24.23* | *35.36* | *PVC* | *375* | *381* | *0.32* | *9.0* | *104* | *0.91* | *0.17* | *23.29%* | *34.00%* | |
| | *AW MHSA 22* | *AW MHSA 21* | *67.78* | *67.65* | *0.04* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *24.24* | *35.37* | *PVC* | *375* | *381* | *0.32* | *42.2* | *103* | *0.91* | *0.77* | *23.53%* | *34.34%* | |
| | *AW MHSA 21* | *AW MHSA 20* | *67.58* | *67.45* | *0.04* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *24.25* | *35.39* | *PVC* | *375* | *381* | *0.32* | *41.1* | *104* | *0.91* | *0.75* | *23.32%* | *34.02%* | |
| **TOWER B-2 - TB-SAN-4** | **BUILDING** | **MHSA 35** | **68.00** | **67.99** | **0.20** | **2.04** | **2.04** | **SERVICE** | **211** | **211** | **3.42** | **3.42** | **0.66** | **0.66** | **3.42** | **3.42** | **1.50** | **5.13** | **5.13** | **0.07** | **5.19** | **5.19** | **PVC** | **250** | **254** | **0.33** | **3.9** | **36** | **0.71** | **0.09** | **14.43%** | **14.43%** | |
| | **MHSA 35** | **AW MHSA 20** | **67.91** | **67.71** | **0.01** | **N/A** | **N/A** | **MAINLINE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.00** | **5.20** | **5.20** | **PVC** | **250** | **254** | **2.53** | **7.9** | **99** | **1.95** | **0.07** | **5.25%** | **5.25%** | |
| | *AW MHSA 20* | *AW MHSA 11* | *66.60* | *66.29* | *0.03* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *29.46* | *40.59* | *PVC* | *375* | *381* | *1.00* | *31.3* | *183* | *1.60* | *0.33* | *16.10%* | *22.18%* | |
| **TOWER B-1 - TB-SAN-1** | **BUILDING** | **MHSA 42** | **68.05** | **67.97** | **0.36** | **3.06** | **3.06** | **SERVICE** | **317** | **317** | **5.14** | **5.14** | **0.99** | **0.99** | **5.14** | **5.14** | **1.50** | **7.70** | **7.70** | **0.12** | **7.82** | **7.82** | **PVC** | **300** | **305** | **2.00** | **4.1** | **143** | **1.96** | **0.04** | **5.47%** | **5.47%** | |
| | **MHSA 42** | **MHSA 37** | **67.44** | **67.31** | **0.03** | **N/A** | **N/A** | **MAINLINE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.01** | **7.83** | **7.83** | **PVC** | **300** | **305** | **0.50** | **26.4** | **71** | **0.98** | **0.45** | **11.03%** | **11.03%** | |
| | **MHSA 37** | **MHSA 38** | **67.28** | **67.12** | **0.03** | **N/A** | **N/A** | **MAINLINE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.01** | **7.84** | **7.84** | **PVC** | **300** | **305** | **0.50** | **31.0** | **71** | **0.98** | **0.53** | **11.05%** | **11.05%** | |
| **PODIUM 1 - TB-SAN-2** | **BUILDING** | **MHSA 38** | **68.00** | **67.68** | **0.85** | **2.27** | **2.27** | **SERVICE** | **38** | **38** | **0.62** | **0.62** | **0.73** | **0.73** | **0.73** | **0.73** | **1.50** | **1.10** | **1.10** | **0.28** | **1.38** | **1.38** | **PVC** | **300** | **305** | **1.08** | **29.6** | **105** | **1.44** | **0.34** | **1.32%** | **1.32%** | |
| | **MHSA 38** | **MHSA 39** | **67.12** | **66.98** | **0.03** | **N/A** | **N/A** | **MAINLINE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.01** | **9.23** | **9.23** | **PVC** | **375** | **381** | **0.50** | **27.8** | **129** | **1.13** | **0.41** | **7.16%** | **7.16%** | |
| **PODIUM 2 - TB-SAN-3** | **BUILDING** | **MHSA 39** | **68.00** | **67.72** | **0.77** | **2.50** | **2.50** | **SERVICE** | **43** | **43** | **0.70** | **0.70** | **0.81** | **0.81** | **0.81** | **0.81** | **1.50** | **1.22** | **1.22** | **0.25** | **1.47** | **1.47** | **PVC** | **300** | **305** | **1.05** | **26.7** | **103** | **1.42** | **0.31** | **1.43%** | **1.43%** | |
| | **MHSA 39** | **MHSA 40** | **66.98** | **66.81** | **0.03** | **N/A** | **N/A** | **MAINLINE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.01** | **10.71** | **10.71** | **PVC** | **375** | **381** | **0.65** | **26.8** | **147** | **1.29** | **0.35** | **7.29%** | **7.29%** | |
| | **MHSA 40** | **MHSA 41** | **66.81** | **66.60** | **0.03** | **N/A** | **N/A** | **MAINLINE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.01** | **10.72** | **10.72** | **PVC** | **375** | **381** | **0.65** | **32.6** | **147** | **1.29** | **0.42** | **7.30%** | **7.30%** | |
| | **MHSA 41** | **AW MHSA 11** | **66.57** | **66.23** | **0.05** | **N/A** | **N/A** | **MAINLINE** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **0.00** | **0.00** | **0.02** | **10.74** | **10.74** | **PVC** | **375** | **381** | **0.65** | **51.8** | **147** | **1.29** | **0.67** | **7.31%** | **7.31%** | |
| | *AW MHSA 11* | *AW MHSA 10* | *66.23* | *66.16* | *0.02* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.01* | *40.21* | *51.34* | *PVC* | *375* | *381* | *0.32* | *21.9* | *103* | *0.91* | *0.40* | *39.04%* | *49.85%* | |
| | *AW MHSA 10* | *PG MHSA 5* | *66.16* | *65.98* | *0.01* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.00* | *40.21* | *51.35* | *PVC* | *375* | *381* | *1.00* | *13.6* | *183* | *1.61* | *0.14* | *21.98%* | *28.06%* | |
| | *PG MHSA 5* | *PG MHSA 2* | *65.90* | *65.76* | *0.01* | *0.00* | *0.00* | *MAINLINE* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *0.00* | *0.00* | *0.00* | *40.22* | *51.35* | *PVC* | *375* | *381* | *1.00* | *14.0* | *183* | *1.61* | *0.14* | *21.98%* | *28.06%* | |
| | | | | | | (4) | (4) | | (4) | (4) | (4) | (4) | (4) | (4) | (4) | (4) | | (4) | (4) | | (4) | (4) | | | | | | | | | | | | |

Design Notes

**GENERAL**

Max spacing of maintenance holes = 120m
Roughness Coefficient (n) = 0.013
See City of Ottawa Sewer Guidelines for min slopes
See Proposed Sanitary Sewer Flows from Report for Peak Flow Calculations
Mechanical inlet flow not yet available at time of print.
(1) = CUP Service flows from Site Servicing and Stormwater Management Report, Parsons, October 2024 (PDG PG 358, 359)
(2) = External Peak 1.20L/s inlet flow from Central Experimental Farm Master Servicing Plan (2008)
(3) = External Peak 0.30L/s inlet flow from Central Experimental Farm Master Servicing Plan (2008)

**AVERAGE DAILY DEMANDS**

| | | ( Design Build Out Bed Count) | | ( Ultimate Build Out Bed Count) |
|---|---|---|---|---|
| Total Design Beds = | 689 | | 1147 | |

Mechanical Flows as provided by HHA/Crossey based on Ontario Building Code Part 7.
(4) Design Build-Out is the Day 1 Build-Out while the Ultimate Build-Out is the Day 2 final Design Build-Out

Average Daily Demands from Appendix 4-A of City of Ottawa Sewer Design Guidelines (September 2025)
INSTITUTIONS
Hospitals - Including Laundry = 1400 L/bed/d
Hospitals - Excluding Laundry = 550 L/bed/d

**INFILTRATION**

Infiltration Allowance - Dry 0.05 L/s/ha
Infiltration Allowance - Wet 0.28 L/s/ha
Cumulative Infiltration Allowance 0.330 L/s/ha
NOTE: Assumed 5m either side of pipe

**MECH FLOWS (L/S)**

| | | |
|---|---|---|
| **TOWER A-1** | 35.39 | **Fixtures** |
| **(TA-SAN-2)** | 0.00 | **Sump** |
| **TOWER A-2** | 31.92 | **Fixtures** |
| **(TA-SAN-1)** | 26.81 | **Sump** |
| **MAIN ENTRY** | 11.61 | **Fixtures** |
| **(PG-SAN-1)** | 0.00 | **Sump** |
| **TOWER B-1** | 26.78 | **Fixtures** |
| **(TB-SAN-1)** | 15.77 | **Sump** |
| **TOWER B-2** | 19.87 | **Fixtures** |
| **(TB-SAN-4)** | 0.00 | **Sump** |
| **PODIUM-1** | 29.78 | **Fixtures** |
| **(TB-SAN-2)** | 0.00 | **Sump** |
| **PODIUM 2** | 32.93 | **Fixtures** |
| **(TB-SAN-3)** | 0.00 | **Sump** |

*Mechanical flows used to break down percentage of flows going to each service

**BUILDING GROSS FLOOR AREA (ha)**

| | DESIGN BUILD-OUT | ULTIMATE BUILD-OUT | |
|---|---|---|---|
| **TOWER A-1** | 0.593 | 1.824 | **ha** |
| **(TA-SAN-2)** | 38 | 255 | **Beds** |
| **TOWER A-2** | 0.657 | 2.524 | **ha** |
| **(TA-SAN-1)** | 42 | 283 | **Beds** |
| **MAIN ENTRY** | 0.580 | 0.580 | **ha** |
| **(PG-SAN-1)** | 0 | 0 | **Beds** |
| **TOWER B-1** | 3.06 | 3.06 | **ha** |
| **(TB-SAN-1)** | 317 | 317 | **Beds** |
| **TOWER B-2** | 2.04 | 2.04 | **ha** |
| **(TB-SAN-4)** | 211 | 211 | **Beds** |
| **PODIUM-1** | 2.268 | 2.266 | **ha** |
| **(TB-SAN-2)** | 38 | 38 | **Beds** |
| **PODIUM 2** | 2.504 | 2.504 | **ha** |
| **(TB-SAN-3)** | 43 | 43 | **Beds** |

*From info received from Parsons on 2025-12-04

| | GFA | |
|---|---|---|
| **UOHI** | 9.29 | **ha** |

*During the T17 UGM R8 - TOH indicated 1 million square feet as the GFA

# APPENDIX G: STORM SEWER DESIGN SHEET

# STORM SEWER DESIGN SHEET

**PROJECT:** NEW CIVIC DEVELOPMENT - THE OTTAWA HOSPITAL
**NUMBER:** CA0027758.0-51
**DATE:** 2025-12-19
**SUBMISISON:** SPC Resubmission
**BY:** LIAM CURLEY
**CHECKED:** COLIN GRAHAM

## Standard Design Calculation Sheet (Rational Method)

| | IDF equation I = a/(Td+c)^b | | |
|---|---|---|---|
| 5-Year | a= 998.071 | b= 0.814 | c= 6.053 |
| 10-Year | a= 1174.184 | b= 0.816 | c= 6.014 |
| 25-Year | a= 1402.884 | b= 0.819 | c= 6.018 |
| 50-Year | a= 1569.580 | b= 0.820 | c= 6.014 |
| 100-Year | a= 1735.688 | b= 0.820 | c= 6.014 |

### Minor Storm

| Location: Street Name or Description | Location: From | Location: To | Drainage Areas: Runoff Coefficients 0.20 ha | Drainage Areas: Runoff Coefficients 0.70 ha | Drainage Areas: Runoff Coefficients 0.90 ha | Inlet Flow L/s | Accum. Inlet L/S | Rational Method Runoff: Storm Event | Individual AC | Accum. AC | Time of Duration Td min | Rainfall Intensity i mm/h | Q L/s | Sewer Data: Type of Pipe | Diameter Nom. mm | Diameter Actual | Inverts From | Inverts To | Slope % | Length m | Cap. L/s | Vel. m/s | Time of Flow min | Ratio Q/Qfull |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tower A South S3 | Mechanical Connection 8 | SWM TANK 203 | 0.00 | 0.00 | 0.34 | 0.00 | 0.00 | 5-Year | 0.31 | 0.31 | 10.00 | 104.2 | 88.63 | PVC | 375 | 381 | 73.97 | 73.71 | 1.60 | 16.2 | 231 | 2.03 | 0.13 | 38.37% |
| West Side (Tower A North) S4 | Mechanical Connection 7 | SWM TANK 203 | 0.00 | 0.00 | 0.29 | 0.00 | 0.00 | 5-Year | 0.26 | 0.26 | 10.00 | 104.2 | 75.60 | PVC | 375 | 381 | 73.97 | 73.80 | 1.00 | 17.0 | 183 | 1.60 | 0.18 | 41.31% |
| | SWM TANK 203 | AW MHST 146 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.57 | 10.18 | 103.3 | 62.00 | PVC | 300 | 305 | 71.42 | 71.40 | 0.72 | 4.2 | 86 | 1.17 | 0.06 | 72.09% |
| Middle Hospital S7, 54A, 54B | Mechanical Connection 14 | MHST 203 | 0.26 | 0.00 | 0.60 | 0.00 | 0.00 | 5-Year | 0.59 | 0.59 | 10.00 | 104.2 | 171.48 | PVC | 525 | 533 | 73.24 | 73.19 | 1.00 | 5.0 | 447 | 2.01 | 0.04 | 82.18% |
| | MHST 203 | MHST 205 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.59 | 10.04 | 104.0 | 171.13 | CONC | 675 | 686 | 73.11 | 73.09 | 0.25 | 8.4 | 438 | 1.19 | 0.12 | 39.07% |
| Middle Hospital S8 | Mechanical Connection 15 | MHST 204 | 0.15 | 0.00 | 0.13 | 0.00 | 0.00 | 5-Year | 0.15 | 0.15 | 10.00 | 104.2 | 42.58 | PVC | 450 | 457 | 73.24 | 73.19 | 1.00 | 5.0 | 297 | 1.81 | 0.05 | 14.34% |
| | MHST 204 | MHST 205 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.15 | 10.05 | 103.9 | 42.47 | CONC | 525 | 533 | 73.11 | 73.09 | 0.16 | 12.9 | 180 | 0.81 | 0.27 | 23.60% |
| | MHST 205 | MHST 206 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.74 | 10.32 | 102.5 | 210.64 | CONC | 675 | 686 | 72.94 | 72.91 | 0.11 | 29.0 | 292 | 0.79 | 0.61 | 72.14% |
| Tower B (Front of Hospital) S9 | Mechanical Connection 16 | CBMH 208 | 0.16 | 0.00 | 0.10 | 0.00 | 0.00 | 5-Year | 0.12 | 0.12 | 10.00 | 104.2 | 35.34 | PVC | 375 | 381 | 73.80 | 73.44 | 4.00 | 8.9 | 366 | 3.21 | 0.05 | 9.66% |
| | CBMH 208 | CBMH 209 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.12 | 10.05 | 103.9 | 35.25 | PVC | 375 | 381 | 73.41 | 73.35 | 0.31 | 19.5 | 102 | 0.90 | 0.36 | 34.56% |
| | CBMH 209 | MHST 206 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.12 | 10.41 | 102.1 | 34.62 | PVC | 375 | 381 | 73.32 | 73.21 | 0.40 | 28.9 | 116 | 1.02 | 0.47 | 29.84% |
| | MHST 206 | SWM TANK 202 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.86 | 10.88 | 99.8 | 238.79 | CONC | 675 | 686 | 72.91 | 72.88 | 0.36 | 9.0 | 523 | 1.42 | 0.11 | 45.66% |
| | SWM TANK 202 | AW MHST 144 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.86 | 10.99 | 99.2 | 194.00 | PVC | 450 | 457 | 70.85 | 70.80 | 0.83 | 5.2 | 271 | 1.65 | 0.05 | 71.59% |
| CUP North S1 | Mechanical Connection 1 | AW MHST 141 | 0.00 | 0.00 | 0.70 | 0.00 | 0.00 | 5-Year | 0.63 | 0.63 | 10.00 | 104.2 | 182.48 | PVC | 375 | 381 | 73.50 | 73.09 | 7.50 | 5.5 | 501 | 4.40 | 0.02 | 36.42% |
| CUP South S2 | Mechanical Connection 2 | AW MHST 158 | 0.00 | 0.00 | 0.58 | 0.00 | 0.00 | 5-Year | 0.52 | 0.52 | 10.00 | 104.2 | 151.20 | PVC | 375 | 381 | 73.50 | 73.22 | 5.01 | 5.5 | 409 | 3.59 | 0.03 | 36.97% |
| Hospital South West S5 | Mechanical Connection 12 | MHST 218 | 0.22 | 0.00 | 0.06 | 0.00 | 0.00 | 5-Year | 0.10 | 0.10 | 10.00 | 104.2 | 28.39 | PVC | 450 | 457 | 74.11 | 73.98 | 1.00 | 13.0 | 297 | 1.81 | 0.12 | 9.56% |
| | MHST 218 | SWM TANK 204 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.10 | 10.12 | 103.6 | 28.21 | PVC | 450 | 457 | 73.95 | 73.91 | 0.22 | 18.2 | 139 | 0.85 | 0.36 | 20.30% |
| Ambulance Garage S12 | Mechanical Connection 9 | SWM TANK 204 | 0.05 | 0.00 | 0.04 | 0.00 | 0.00 | 5-Year | 0.05 | 0.05 | 10.00 | 104.2 | 13.32 | PVC | 300 | 305 | 73.88 | 73.85 | 1.00 | 3.8 | 101 | 1.38 | 0.05 | 13.19% |
| South (Hospital South East, Road E) S6 | Mechanical Connection 10 | SWM TANK 204 | 0.23 | 0.00 | 0.07 | 0.00 | 0.00 | 5-Year | 0.11 | 0.11 | 10.00 | 104.2 | 31.57 | PVC | 450 | 457 | 73.91 | 73.77 | 1.00 | 14.1 | 297 | 1.81 | 0.13 | 10.63% |
| | SWM TANK 204 | AW MHST 141 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.25 | 10.00 | 104.2 | 62.00 | PVC | 375 | 381 | 73.03 | 72.98 | 0.44 | 13.5 | 121 | 1.06 | 0.21 | 51.24% |
| 59A | Trench Drain 1 | MHST 221 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 5-Year | 0.05 | 0.05 | 10.00 | 104.2 | 13.03 | PVC | 200 | 203 | 67.42 | 66.62 | 1.00 | 79.8 | 34 | 1.05 | 1.27 | 38.34% |
| 59C | Trench Drain 2 | MHST 221 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 5-Year | 0.08 | 0.08 | 10.00 | 104.2 | 23.46 | PVC | 300 | 305 | 67.87 | 67.60 | 1.00 | 27.5 | 101 | 1.38 | 0.33 | 23.23% |
| | MHST 221 | Pumping Station | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.13 | 11.27 | 97.9 | 34.30 | PVC | 300 | 305 | 66.63 | 66.42 | 0.77 | 26.8 | 88 | 1.21 | 0.37 | 38.98% |
| | Pumping Station | MHST 212 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.13 | 11.64 | 96.3 | 33.72 | PVC | 300 | 305 | 68.41 | 68.38 | 1.11 | 3.2 | 107 | 1.46 | 0.04 | 31.51% |
| Loading Dock (Tower B South) S11, S11A, S11B | Mechanical Connection 22 | MHST 213 | 0.00 | 0.00 | 0.39 | 0.00 | 0.00 | 5-Year | 0.35 | 0.35 | 10.00 | 104.2 | 101.67 | PVC | 450 | 457 | 68.74 | 68.61 | 3.98 | 3.1 | 592 | 3.61 | 0.01 | 17.17% |
| | MHST 213 | MHST 214 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.35 | 10.01 | 104.1 | 101.62 | CONC | 525 | 533 | 68.54 | 68.41 | 0.24 | 51.8 | 220 | 0.99 | 0.87 | 46.19% |
| | MHST 214 | SWM TANK 201 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.35 | 10.88 | 99.8 | 97.35 | CONC | 750 | 762 | 68.19 | 68.15 | 0.11 | 37.5 | 379 | 0.83 | 0.75 | 25.69% |
| | SWM TANK 201 | MHST 212 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.62 | 11.63 | 96.3 | 161.00 | CONC | 825 | 838 | 68.54 | 68.46 | 0.15 | 53.8 | 588 | 1.07 | 0.84 | 27.38% |
| | MHST 212 | AW MHST 130 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.75 | 12.47 | 92.7 | 192.58 | CONC | 825 | 838 | 68.54 | 68.46 | 0.15 | 54.8 | 582 | 1.06 | 0.86 | 33.09% |
| S10 - Tower B East | Mechanical Connection 24 | MHST 211 | 0.00 | 0.00 | 0.30 | 0.00 | 0.00 | 5-Year | 0.27 | 0.27 | 10.00 | 104.2 | 78.21 | PVC | 375 | 381 | 68.51 | 68.46 | 0.99 | 5.5 | 182 | 1.59 | 0.06 | 42.97% |
| | MHST 211 | SWM TANK 201 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.27 | 10.06 | 103.9 | 77.97 | CONC | 525 | 533 | 68.31 | 68.24 | 0.16 | 44.0 | 179 | 0.80 | 0.92 | 43.56% |
| | CB111 | AW MHST 150 | 0.04 | 0.00 | 0.03 | 0.00 | 0.00 | 5-Year | 0.04 | 0.04 | 10.00 | 104.2 | 11.30 | PVC | 200 | 203 | 72.38 | 71.90 | 1.00 | 47.6 | 34 | 1.05 | 0.76 | 33.23% |
| | CB110 | AW MHST 151 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 5-Year | 0.03 | 0.03 | 10.00 | 104.2 | 7.82 | PVC | 200 | 203 | 72.21 | 71.92 | 0.99 | 29.6 | 34 | 1.05 | 0.47 | 23.00% |
| | CB112 | Pumping Station 3 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 5-Year | 0.01 | 0.01 | 10.00 | 104.2 | 2.09 | PVC | 200 | 203 | 68.66 | 68.50 | 1.00 | 15.8 | 34 | 1.06 | 0.25 | 6.13% |
| | Pumping Station 3 | AW MHST 147 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5-Year | 0.00 | 0.01 | 10.25 | 102.9 | 2.06 | PVC | 200 | 203 | 71.64 | 71.54 | 1.00 | 9.7 | 34 | 1.06 | 0.15 | 6.06% |
| UOHI S13 | CAP 001 | MHST 220 | 0.00 | 0.00 | 1.06 | 0.00 | 0.00 | 5-Year | 0.95 | 0.95 | 10.00 | 104.2 | 276.33 | PVC | 450 | 457 | 73.94 | 72.69 | 5.04 | 24.8 | 666 | 4.07 | 0.10 | 41.49% |

### Major Storm

| Rational Method Runoff: Storm Event | Individual AC | Accum. AC | Time of Duration Td min | Rainfall Intensity I =20% mm/h | Q L/s | Sewer Data: Type of Pipe | Diameter Nom. mm | Diameter Actual | Inverts From | Inverts To | Slope % | Length m | Cap. L/s | Vel. m/s | Time of Flow min | Ratio Q/Qfull |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100-Year | 0.38 | 0.38 | 10.00 | 214.3 | 227.84 | PVC | 375 | 381 | 73.97 | 73.71 | 1.6 | 16.2 | 231 | 2.03 | 0.13 | 98.63% |
| 100-Year | 0.33 | 0.33 | 10.00 | 178.6 | 161.95 | PVC | 375 | 381 | 73.97 | 73.80 | 1.00 | 17.0 | 183 | 1.60 | 0.18 | 88.50% |
| 100-Year | 0.00 | 0.71 | 10.18 | 176.9 | 86.00 | PVC | 300 | 305 | 71.42 | 71.40 | 0.72 | 4.2 | 86 | 1.17 | 0.06 | 100.00% |
| 100-Year | 0.74 | 0.74 | 10.00 | 178.6 | 367.33 | PVC | 525 | 533 | 73.24 | 73.19 | 1.00 | 5.0 | 447 | 2.01 | 0.04 | 82.18% |
| 100-Year | 0.00 | 0.74 | 10.04 | 178.2 | 366.58 | CONC | 675 | 686 | 73.11 | 73.09 | 0.25 | 8.4 | 438 | 1.19 | 0.12 | 83.69% |
| 100-Year | 0.18 | 0.18 | 10.00 | 178.6 | 91.21 | PVC | 450 | 457 | 73.24 | 73.19 | 1.00 | 5.0 | 297 | 1.81 | 0.05 | 30.71% |
| 100-Year | 0.00 | 0.18 | 10.05 | 178.1 | 90.98 | CONC | 525 | 533 | 73.11 | 73.09 | 0.16 | 12.9 | 180 | 0.81 | 0.27 | 50.54% |
| | 0.00 | 0.92 | 10.32 | | | CONC | 675 | 686 | 72.94 | 72.91 | | 29.0 | | | | |
| 100-Year | 0.15 | 0.15 | 10.00 | 178.6 | 75.70 | PVC | 375 | 381 | 73.80 | 73.44 | 4.00 | 8.9 | 366 | 3.21 | 0.05 | 20.68% |
| | 0.00 | 0.15 | 10.05 | | 0.00 | PVC | 375 | 381 | 73.41 | 73.35 | | 19.5 | | | | |
| 100-Year | 0.00 | 0.15 | 10.05 | 178.1 | 75.51 | PVC | 375 | 381 | 73.32 | 73.21 | 0.40 | 28.9 | 116 | 1.02 | 0.47 | 65.09% |
| 100-Year | 0.00 | 1.08 | 10.52 | 173.9 | 520.43 | CONC | 675 | 686 | 72.91 | 72.88 | 0.36 | 9.0 | 523 | 1.42 | 0.11 | 99.51% |
| 100-Year | 0.00 | 1.08 | 10.63 | 173.0 | 271.00 | PVC | 450 | 457 | 70.85 | 70.80 | 0.83 | 5.2 | 271 | 1.65 | 0.05 | 100.00% |
| 100-Year | 0.79 | 0.79 | 10.00 | 178.6 | 390.91 | PVC | 375 | 381 | 73.50 | 73.09 | 7.50 | 5.5 | 501 | 4.40 | 0.02 | 78.03% |
| 100-Year | 0.65 | 0.65 | 10.00 | 178.6 | 323.90 | PVC | 375 | 381 | 73.50 | 73.22 | 5.01 | 5.5 | 409 | 3.59 | 0.03 | 79.19% |
| 100-Year | 0.12 | 0.12 | 10.00 | 178.6 | 60.81 | PVC | 450 | 457 | 74.11 | 73.98 | 1.00 | 13.0 | 297 | 1.81 | 0.12 | 20.47% |
| 100-Year | 0.00 | 0.12 | 10.12 | 177.5 | 60.44 | PVC | 450 | 457 | 73.95 | 73.91 | 0.22 | 18.2 | 139 | 0.85 | 0.36 | 43.48% |
| 100-Year | 0.06 | 0.06 | 10.00 | 178.6 | 28.54 | PVC | 300 | 305 | 73.88 | 73.85 | 1.00 | 3.8 | 101 | 1.38 | 0.05 | 28.26% |
| 100-Year | 0.14 | 0.14 | 10.00 | 178.6 | 67.63 | PVC | 450 | 457 | 73.91 | 73.77 | 1.00 | 14.1 | 297 | 1.81 | 0.13 | 22.77% |
| 100-Year | 0.00 | 0.32 | 10.48 | 174.3 | 86.00 | PVC | 375 | 381 | 73.03 | 72.98 | 0.44 | 13.5 | 121 | 1.06 | 0.21 | 71.07% |
| 100-Year | 0.06 | 0.06 | 10.00 | 178.6 | 27.92 | PVC | 200 | 203 | 67.42 | 66.62 | 1.00 | 79.8 | 34 | 1.05 | 1.27 | 82.12% |
| | | | | | 0.00 | | | | | | | | | | | |
| 100-Year | 0.10 | 0.10 | 10.00 | 178.6 | 50.26 | PVC | 300 | 305 | 67.87 | 67.60 | 1.00 | 27.5 | 101 | 1.38 | 0.33 | 49.76% |
| 100-Year | 0.00 | 0.16 | 11.27 | 167.7 | 73.44 | PVC | 300 | 305 | 66.63 | 66.42 | 0.77 | 26.8 | 88 | 1.21 | 0.37 | 83.45% |
| 100-Year | 0.00 | 0.16 | 11.64 | 164.8 | 72.17 | PVC | 300 | 305 | 68.41 | 68.38 | 1.11 | 3.2 | 107 | 1.46 | 0.04 | 67.45% |
| 100-Year | 0.44 | 0.44 | 10.00 | 178.6 | 217.79 | PVC | 450 | 457 | 68.74 | 68.61 | 3.98 | 3.1 | 592 | 3.61 | 0.01 | 36.79% |
| 100-Year | 0.00 | 0.44 | 10.01 | 178.5 | 217.68 | CONC | 525 | 533 | 68.54 | 68.41 | 0.24 | 51.8 | 220 | 0.99 | 0.87 | 98.95% |
| 100-Year | 0.00 | 0.44 | 10.88 | 170.9 | 208.45 | CONC | 750 | 762 | 68.19 | 68.15 | 0.11 | 37.5 | 379 | 0.83 | 0.75 | 55.00% |
| 100-Year | 0.00 | 0.78 | 11.63 | 164.9 | 266.00 | CONC | 825 | 838 | 68.54 | 68.46 | 0.15 | 53.8 | 588 | 1.07 | 0.84 | 45.24% |
| 100-Year | 0.00 | 0.93 | 12.47 | 158.7 | 412.07 | CONC | 825 | 838 | 68.54 | 68.46 | 0.15 | 54.8 | 582 | 1.06 | 0.86 | 70.80% |
| 100-Year | 0.34 | 0.34 | 10.00 | 178.6 | 167.53 | PVC | 375 | 381 | 68.51 | 68.46 | 0.99 | 5.5 | 182 | 1.59 | 0.06 | 92.05% |
| 100-Year | 0.00 | 0.34 | 10.06 | 178.0 | 167.02 | CONC | 525 | 533 | 68.31 | 68.24 | 0.16 | 44.0 | 179 | 0.80 | 0.92 | 93.31% |
| 100-Year | 0.05 | 0.05 | 10.00 | 178.6 | 24.20 | PVC | 200 | 203 | 72.38 | 71.90 | 1.00 | 47.6 | 34 | 1.05 | 0.76 | 71.17% |
| 100-Year | 0.03 | 0.03 | 10.00 | 178.6 | 16.75 | PVC | 200 | 203 | 72.21 | 71.92 | 0.99 | 29.6 | 34 | 1.05 | 0.47 | 49.27% |
| 100-Year | 0.01 | 0.01 | 10.00 | 178.6 | 4.47 | PVC | 200 | 203 | 68.66 | 68.50 | 1.00 | 15.8 | 34 | 1.06 | 0.25 | 13.14% |
| 100-Year | 0.00 | 0.01 | 10.25 | 176.3 | 4.41 | PVC | 200 | 203 | 71.64 | 71.54 | 1.00 | 9.7 | 34 | 1.06 | 0.15 | 12.97% |
| 100-Year | 1.19 | 1.19 | 10.00 | 178.6 | 591.95 | PVC | 450 | 457 | 73.94 | 72.69 | 5.04 | 24.8 | 666 | 4.07 | 0.10 | 88.88% |

Note 1: Outlet flow from Stormwater Management Tanks to be restrained by orifice plate. Refer to Stormwater Management Report for plate sizing.
Note 2: Outlet flow rate into the 250mm pipe will be restricted by a 160mm orifice plate.
Note 3: Inlet flow from Mechanical Engineer will be added in a subsequent design table to confirm Ontario Building Code method of flow determination for the design pipe sizes
This information will be available at 65DD submission
Note 4: Pumping station flow rates for trench drain and depressed areas will be confirmed at next design submission. Flow rate will be aligned with pipe capacity.

Additional Notes: Min velocity = 0.80 m/s, Velocity > 3.0 m/s requires protection measures, Max velocity = 6.0 m
For Runoff Coefficient (C), grassed area = 0.2, ballast = 0.013
Also for C, add 10% for 25-year storm event, 20% for 50-year storm event and 25% for 100-year storm event (update this in appropriate drainage ce
A minimum time of concentration of 10min shall be usec
Municipal Roadway = 5-year storm event
Municipal Freeway = 10-year storm event
Guideway = 10-year storm event
Roughness Coefficient (n) = 0.013
See City of Ottawa Sewer Guidelines for min slopes

# APPENDIX H: SWALE FLOW CALCULATIONS

# SWALE SIZING DESIGN SHEET - 100-YEAR +20%

**PROJECT:** NEW CIVIC DEVELOPMENT - THE OTTAWA HOSPITAL
**NUMBER:**
**DATE:** 2025-09-12
**SUBMISISON:** SPC Resubmission
**BY:** DEVANG MARATHA
**CHECKED:** COLIN GRAHAM
**APPROVED:**

## Standard Design Calculation Sheet (Rational Method)

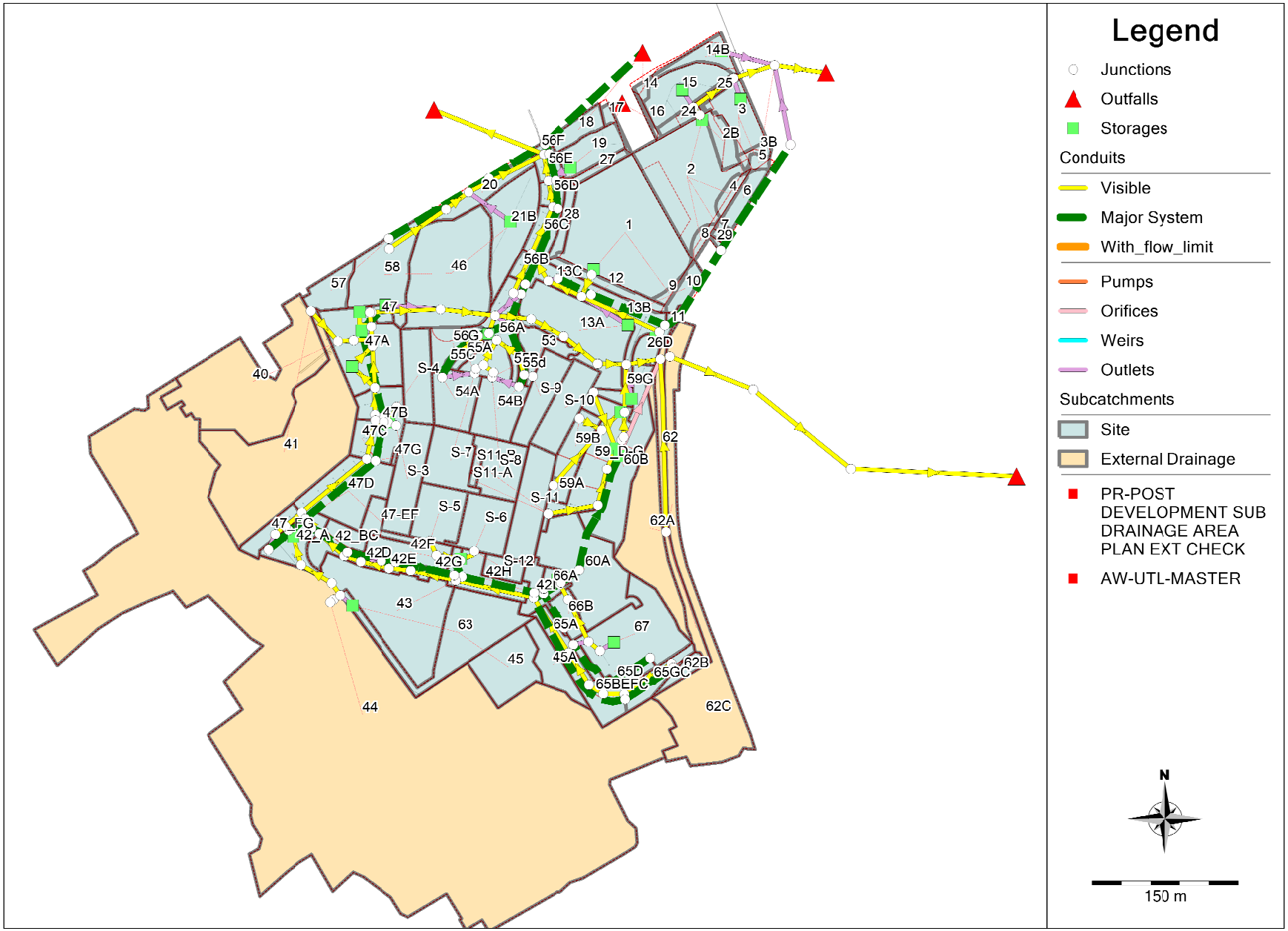
| | IDF equation I = a/(Td+c)^b | | |
|---|---|---|---|
| 5-Year | a= 998.071 | b= 0.814 | c= 6.053 |
| 10-Year | a= 1174.184 | b= 0.816 | c= 6.014 |
| 25-Year | a= 1402.884 | b= 0.819 | c= 6.018 |
| 50-Year | a= 1569.580 | b= 0.820 | c= 6.014 |
| 100-Year | a= 1735.688 | b= 0.820 | c= 6.014 |

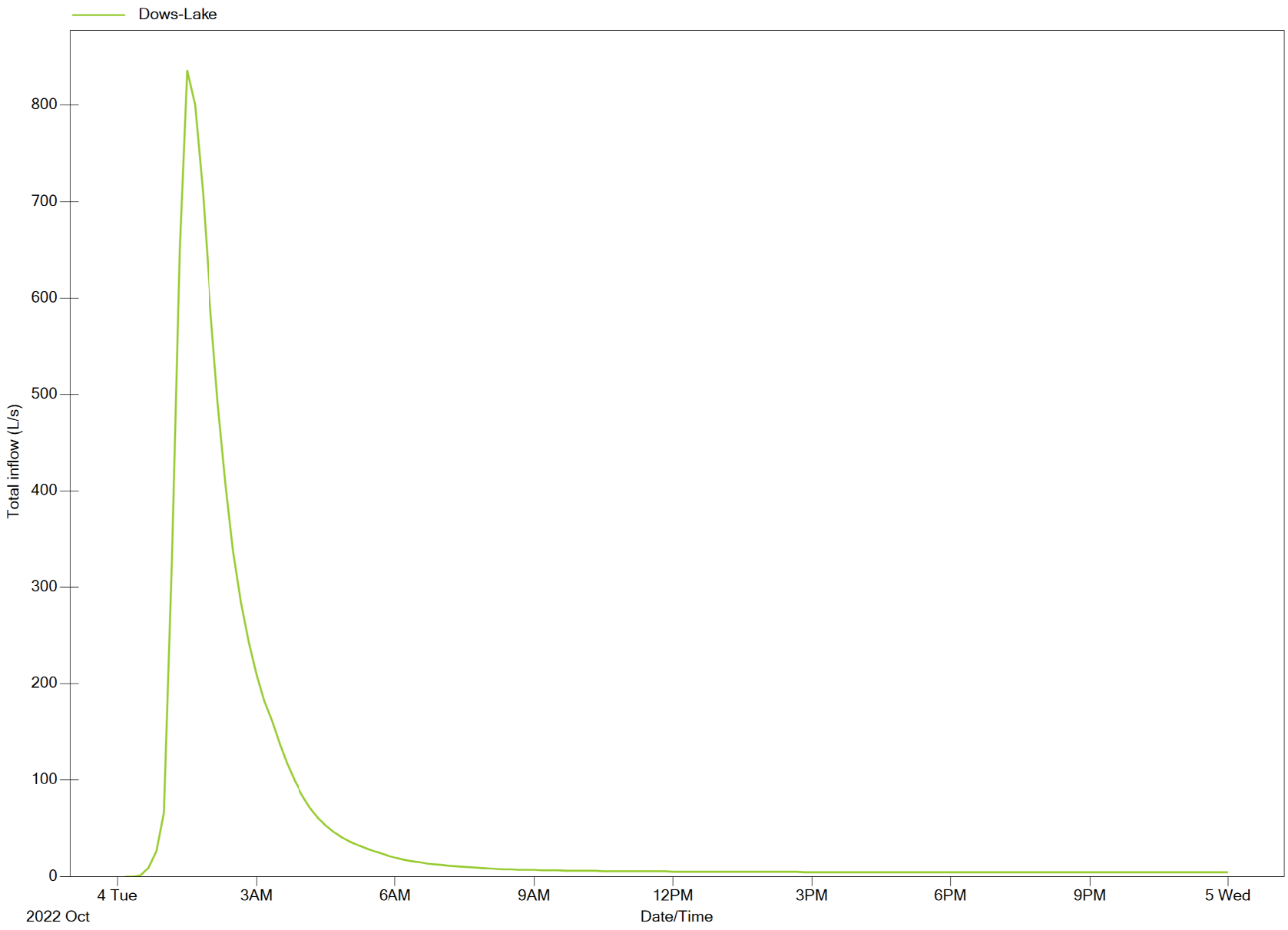
| Location | | | Drainage Areas | | | Rational Method Runoff | | | | | | Swale Data | | | | | | | | | | | | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Street Name or Description | From | To | Runoff Coefficients 0.20 ha | 0.70 ha | 0.90 ha | Storm Event | Individual AC | Accum. AC | Time of Duration Td min | Rainfall Intensity i mm/h | Q L/s | Side Slope x:1 | Bottom Width m | Depth m | Slope % | Length m | Cap. L/s | Vel. m/s | Time of Flow min | Upstream Invert | Downstream Invert | Min Depth of Ditch Bottom | |
| S_01 | 1+000 | 1+88.03 | 0.34 | | 0.18 | 100-Year | 0.23 | 0.23 | 10.00 | 178.6 | 136 | 3.0 | 0.5 | 0.5 | 2.0 | 88.0 | 1827 | 1.83 | 0.80 | 72.70 | 70.94 | 0.80 | |
| | 1+88.03 | 1+202.65 | 0.72 | | 0.03 | 100-Year | 0.17 | 0.40 | 10.80 | 171.6 | 230 | 3.0 | 0.5 | 0.6 | 1.5 | 114.6 | 2611 | 1.89 | 1.01 | 70.94 | 69.22 | 0.90 | |
| | 1+202.65 | 1+261.50 (DICB8) | | | | 100-Year | 0.00 | 0.40 | 11.81 | 163.5 | 219 | 3.0 | 0.5 | 1.0 | 0.3 | 58.9 | 4934 | 1.41 | 0.70 | 69.22 | 69.04 | 1.30 | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| S_02 | 2+000 | 2+204.07 | 0.45 | | 0.02 | 100-Year | 0.11 | 0.11 | 10.00 | 178.6 | 67 | 3.0 | 0.5 | 0.2 | 3.6 | 204.1 | 109 | 0.76 | 4.45 | 82.36 | 74.98 | 0.45 | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| S_03 | 3+000 | 3+103.43 (DICB 6) | 0.13 | | | 100-Year | 0.03 | 0.03 | 10.00 | 178.6 | 16 | 3.0 | 0.5 | 0.4 | 1.8 | 103.4 | 945 | 1.39 | 1.24 | 77.94 | 76.09 | 0.70 | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| S_04 | 4+000 | 4+43.26 (DICB 9) | 0.04 | | 0.07 | 100-Year | 0.07 | 0.07 | 10.00 | 178.6 | 45 | 3.0 | 0.5 | 0.4 | 2.4 | 43.3 | 764 | 1.41 | 0.51 | 75.31 | 74.28 | 0.65 | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| S_05 | 5+000 | 5+26.20 | 0.26 | | | 100-Year | 0.05 | 0.05 | 10.00 | 178.6 | 31 | 3.0 | 0.5 | 0.5 | 2.0 | 26.2 | 1820 | 1.82 | 0.24 | 69.38 | 68.86 | 0.80 | |
| | 5+26.20 | 5+56.71 (DICB 2) | | | | 100-Year | 0.00 | 0.05 | 10.24 | 176.4 | 31 | 3.0 | 0.5 | 1.0 | 0.3 | 30.5 | 4847 | 1.38 | 0.37 | 68.86 | 68.77 | 1.30 | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| S_06 | 6+000 | 6+121.08 | 0.12 | | | 100-Year | 0.02 | 0.02 | 10.00 | 178.6 | 14 | 3.0 | 0.5 | 0.5 | 2.0 | 121.1 | 1827 | 1.83 | 1.10 | 82.26 | 79.84 | 0.80 | |
| | 6+121.08 | 6+170.79 | | | | 100-Year | 0.00 | 0.02 | 11.10 | 169.1 | 13 | 3.0 | 0.5 | 0.5 | 3.2 | 49.7 | 2311 | 2.31 | 0.36 | 79.84 | 78.25 | 0.80 | |
| | 6+170.79 | 6+281.76 (DICB 7) | | | | 100-Year | 0.00 | 0.02 | 11.46 | 166.2 | 13 | 3.0 | 0.5 | 0.5 | 2.6 | 111.0 | 2103 | 2.10 | 0.88 | 78.25 | 75.31 | 0.80 | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| S_07 | 7+000 | 7+131.74 | 0.06 | | | 100-Year | 0.01 | 0.01 | 10.00 | 178.6 | 7 | 3.0 | 0.3 | 0.5 | 0.3 | 131.7 | 611 | 0.70 | 3.14 | 81.97 | 81.68 | 0.80 | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| S_08 | 8+000 | 8+112.12 (DICB 4) | 0.07 | | | 100-Year | 0.01 | 0.01 | 10.00 | 178.6 | 9 | 3.0 | 0.3 | 0.8 | 0.3 | 112.1 | 2367 | 1.12 | 1.67 | 81.97 | 81.63 | 1.10 | |
| | 8+112.12 (DICB 4) | 8+127.80 | | | | 100-Year | 0.00 | 0.01 | 10.00 | 178.6 | 9 | 3.0 | 0.3 | 0.8 | 5.0 | 15.7 | 9648 | 4.55 | 0.06 | 82.42 | 81.63 | 1.10 | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| S_09 | 9+000 | 9+71.42 | 0.14 | | | 100-Year | 0.03 | 0.03 | 10.00 | 178.6 | 17 | 3.0 | 0.3 | 0.8 | 4.3 | 71.4 | 8868 | 4.18 | 0.28 | 82.42 | 79.38 | 1.10 | |
| | 9+71.42 | 9+99.40 | | | | 100-Year | 0.00 | 0.03 | 10.00 | 178.6 | 17 | 3.0 | 0.3 | 0.8 | 2.1 | 28.0 | 6237 | 2.94 | 0.16 | 79.97 | 79.38 | 1.10 | |

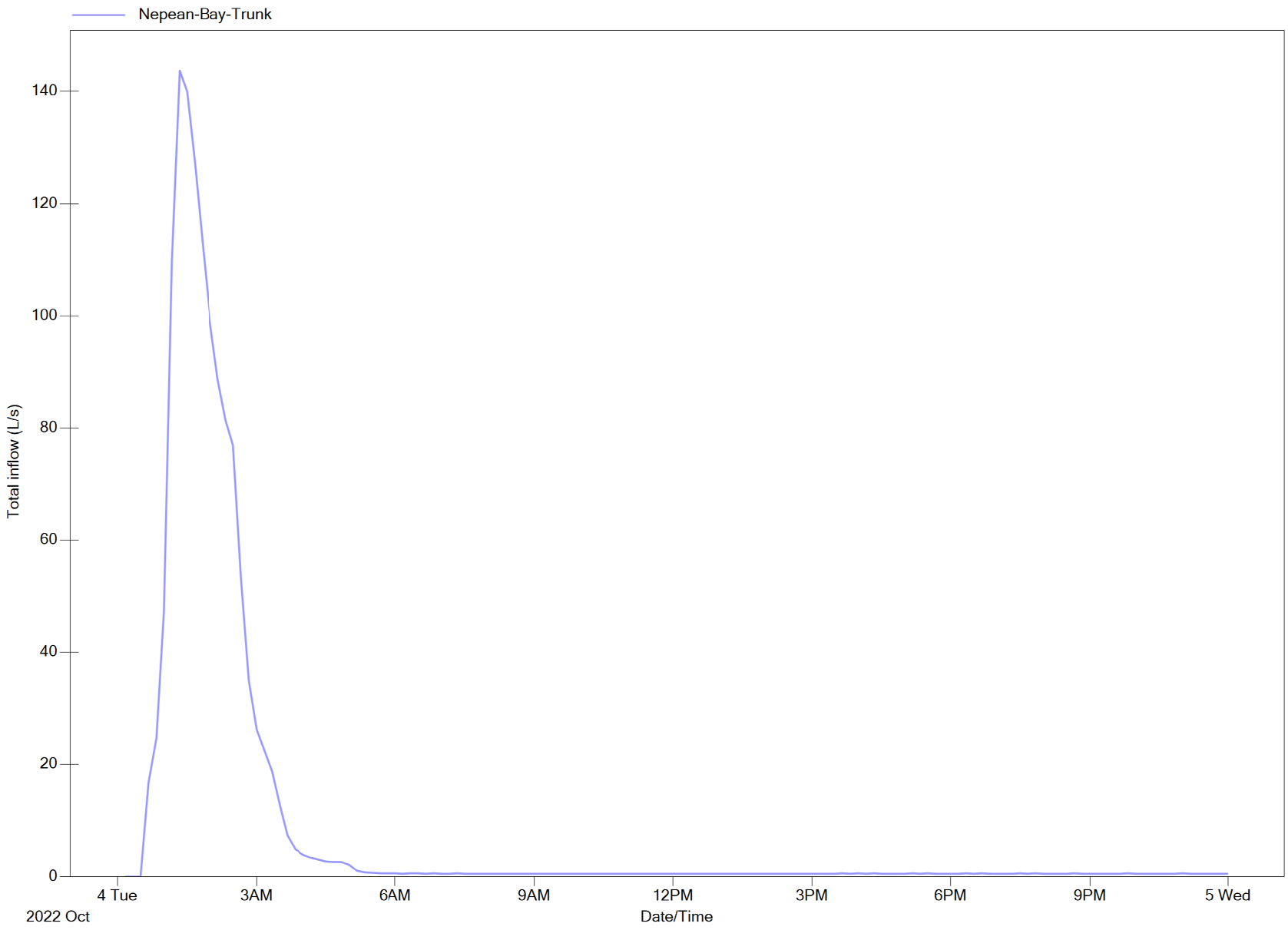
Notes:
The slope of open channels will depend on various factors including roadway longitudinal grade and natural topography;
The minimum allowable ditch/swale slope is 0.5% (1% is desirable);
For Runoff Coefficient (C), grassed area = 0.2, ballast = 0.7, paved area = 0.9
Also for C, add 10% for 25-year storm event, 20% for 50-year storm event and 25% for 100-year storm event (update this in appropriate drainage cell)
A minimum time of concentration of 10min shall be used
Where designed to accommodate the 100-year storm +20%, the free board (0.3m) as measured from the top of the bank, and the maximum possible water elevation in the ditch;
Surface water elevation must be set below the road structure for the 5-year storm + freeboard (0.3m).
Channel protection in the form of sodding, gabion, armour stone, riprap, asphalt, and concrete lining may be required depending on design flow and velocities; and
Roughness Coefficient (n) = 0.035
Permissible velocities for channels lined with grass are included in Appendix 6-C of the Ottawa Sewer Design Guidelines.

# APPENDIX I: PCSWMM MODEL OUTPUT

# PCSWMM OUTPUT
# 3-HOUR CHICAGO -2-YEAR STORM


Legend
Junctions
Outfalls
Storages
Conduits
Visible
Major System
With_flow_limit
Pumps
Orifices
Weirs
Outlets
Subcatchments
Site
External Drainage
PR-POST DEVELOPMENT SUB DRAINAGE AREA PLAN EXT CHECK
AW-UTL-MASTER
N
150 m


Dows-Lake
Total inflow (L/s)
800
700
600
500
400
300
200
100
0
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time


Nepean-Bay-Trunk
Total inflow (L/s)
140
120
100
80
60
40
20
0
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time

# SUBCATCHMENTS 1/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 1 | | 2yr_3hr_Chicago | SA-1 | 1.2161 | 3.0 | 100.0 | 250.0 | 1.02 |
| 10 | | 2yr_3hr_Chicago | 13B | 0.0822 | 3.0 | 8.1 | 1.6 | 0.08 |
| 11 | | 2yr_3hr_Chicago | MHST-105-S | 0.0302 | 3.0 | 89.3 | 5.9 | 0.90 |
| 12 | | 2yr_3hr_Chicago | BI-SA1-S | 0.1276 | 5.0 | 56.5 | 15.8 | 0.57 |
| 13A | | 2yr_3hr_Chicago | S-26B | 0.6503 | 9.6 | 12.5 | 17.6 | 0.13 |
| 13B | | 2yr_3hr_Chicago | BI-SA1-S | 0.2248 | 5.0 | 87.8 | 41.7 | 0.89 |
| 13C | | 2yr_3hr_Chicago | MHST-104-S | 0.1227 | 5.0 | 78.7 | 20.6 | 0.79 |
| 14 | | 2yr_3hr_Chicago | Carling_OLF | 0.0580 | 3.0 | 60.3 | 7.5 | 0.61 |
| 14B | | 2yr_3hr_Chicago | S-14B | 0.1272 | 3.0 | 0.0 | 0.4 | 0.01 |
| 15 | | 2yr_3hr_Chicago | S-15 | 0.3643 | 3.0 | 3.6 | 3.1 | 0.04 |
| 16 | | 2yr_3hr_Chicago | LRT-Corridor | 0.0229 | 3.0 | 0.0 | 0.2 | 0.01 |
| 17 | | 2yr_3hr_Chicago | LRT-Corridor | 0.0361 | 3.0 | 0.0 | 0.2 | 0.01 |
| 18 | | 2yr_3hr_Chicago | Carling_OLF | 0.1189 | 3.0 | 3.4 | 1.0 | 0.04 |
| 19 | | 2yr_3hr_Chicago | S-19 | 0.2056 | 3.0 | 7.1 | 3.3 | 0.07 |
| 2 | | 2yr_3hr_Chicago | SA-2 | 0.7114 | 3.0 | 100.0 | 152.3 | 1.01 |
| 20 | | 2yr_3hr_Chicago | Carling_OLFN1 | 0.2434 | 8.0 | 0.0 | 0.6 | 0.01 |
| 21B | | 2yr_3hr_Chicago | S-21B | 0.4325 | 10.0 | 9.2 | 19.4 | 0.18 |
| 24 | | 2yr_3hr_Chicago | MHST-107 | 0.0348 | 3.0 | 55.8 | 4.2 | 0.56 |
| 25 | | 2yr_3hr_Chicago | OGS1 | 0.0465 | 3.0 | 80.6 | 8.0 | 0.81 |
| 26D | | 2yr_3hr_Chicago | S-26D | 0.0774 | 25.0 | 0.0 | 0.3 | 0.01 |
| 27 | | 2yr_3hr_Chicago | MHST-101-S | 0.0531 | 3.0 | 84.5 | 9.8 | 0.85 |
| 28 | | 2yr_3hr_Chicago | MHST-102-S | 0.0844 | 5.0 | 62.6 | 11.5 | 0.63 |
| 29 | | 2yr_3hr_Chicago | 7 | 0.0113 | 3.0 | 0.0 | 0.0 | 0.00 |
| 2B | | 2yr_3hr_Chicago | SA-2 | 0.0908 | 3.0 | 100.0 | 19.4 | 1.00 |
| 3 | | 2yr_3hr_Chicago | S-3Store | 0.2154 | 3.0 | 31.8 | 16.6 | 0.36 |
| 3B | | 2yr_3hr_Chicago | 3 | 0.0393 | 3.0 | 100.0 | 8.4 | 1.00 |
| 4 | | 2yr_3hr_Chicago | 2 | 0.0196 | 3.0 | 100.0 | 4.2 | 1.00 |
| 40 | External | 2yr_3hr_Chicago | MHST-156 | 1.1965 | 6.8 | 46.2 | 117.8 | 0.47 |
| 41 | External | 2yr_3hr_Chicago | MHST-132 | 1.5292 | 3.0 | 14.6 | 47.9 | 0.15 |
| 42_A | | 2yr_3hr_Chicago | MHST-135-S | 0.2148 | 5.0 | 12.8 | 6.0 | 0.13 |
| 42_BC | | 2yr_3hr_Chicago | MHST-149-S | 0.1753 | 5.0 | 60.5 | 22.8 | 0.61 |
| 42D | | 2yr_3hr_Chicago | MHST-150-S1 | 0.0509 | 2.0 | 99.0 | 10.7 | 1.00 |
| 42E | | 2yr_3hr_Chicago | MHST-151-S | 0.0245 | 2.0 | 99.0 | 5.2 | 0.99 |
| 42F | | 2yr_3hr_Chicago | CB91 | 0.1997 | 2.0 | 83.0 | 34.1 | 0.84 |
| 42G | | 2yr_3hr_Chicago | MHST-141-S | 0.0958 | 2.0 | 91.0 | 18.8 | 0.92 |
| 42H | | 2yr_3hr_Chicago | MHST-158-S | 0.1983 | 2.0 | 87.4 | 37.2 | 0.88 |
| 42I | | 2yr_3hr_Chicago | DICB9 | 0.1177 | 6.0 | 79.0 | 20.1 | 0.80 |
| 43 | | 2yr_3hr_Chicago | MHST-141 | 0.8632 | 2.0 | 100.0 | 179.7 | 1.01 |
| 44 | External | 2yr_3hr_Chicago | MHST-62534 | 12.7451 | 1.0 | 32.0 | 855.6 | 0.32 |
| 45 | | 2yr_3hr_Chicago | 63 | 0.2888 | 4.0 | 58.8 | 36.3 | 0.59 |
| 45A | | 2yr_3hr_Chicago | MHST-153-S | 0.2052 | 4.0 | 12.6 | 5.8 | 0.13 |
| 46 | | 2yr_3hr_Chicago | 21B | 0.9308 | 10.0 | 15.6 | 32.4 | 0.16 |

# SUBCATCHMENTS 2/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 47 | | 2yr_3hr_Chicago | CB65 | 0.0374 | 3.0 | 90.6 | 7.3 | 0.91 |
| 47_FG | | 2yr_3hr_Chicago | D-MHST-161-S | 0.1159 | 3.0 | 72.2 | 18.0 | 0.73 |
| 47A | | 2yr_3hr_Chicago | MHST-157-S | 0.5412 | 3.0 | 65.0 | 73.4 | 0.66 |
| 47B | | 2yr_3hr_Chicago | BI-SA49-S | 0.2880 | 3.0 | 69.3 | 42.5 | 0.70 |
| 47C | | 2yr_3hr_Chicago | MHST-147-S | 0.0737 | 3.0 | 100.0 | 15.7 | 1.00 |
| 47D | | 2yr_3hr_Chicago | MHST-148-S | 0.4496 | 3.0 | 32.0 | 31.5 | 0.32 |
| 47-EF | | 2yr_3hr_Chicago | 47D | 0.0559 | 3.0 | 59.0 | 7.2 | 0.60 |
| 47G | | 2yr_3hr_Chicago | MHST-147-S | 0.0080 | 3.0 | 100.0 | 1.7 | 1.00 |
| 5 | | 2yr_3hr_Chicago | preston | 0.0120 | 3.0 | 100.0 | 2.6 | 1.00 |
| 53 | | 2yr_3hr_Chicago | MH-SA56-3 | 0.1516 | 2.0 | 61.5 | 20.0 | 0.62 |
| 54A | | 2yr_3hr_Chicago | CB_54A | 0.2598 | 2.0 | 73.0 | 40.4 | 0.74 |
| 54B | | 2yr_3hr_Chicago | CB_54B | 0.2799 | 2.0 | 77.1 | 46.0 | 0.78 |
| 55A | | 2yr_3hr_Chicago | MH-SA56-1 | 0.0348 | 2.0 | 100.0 | 7.4 | 1.00 |
| 55B | | 2yr_3hr_Chicago | MH-SA56-2 | 0.0244 | 2.0 | 100.0 | 5.2 | 1.00 |
| 55C | | 2yr_3hr_Chicago | CB225-S | 0.0149 | 0.5 | 100.0 | 3.2 | 1.01 |
| 55d | | 2yr_3hr_Chicago | CB209 | 0.0276 | 6.0 | 63.6 | 3.8 | 0.64 |
| 56A | | 2yr_3hr_Chicago | MHST-120-S | 0.3601 | 5.0 | 31.2 | 24.0 | 0.31 |
| 56B | | 2yr_3hr_Chicago | MHST-106-S | 0.0565 | 5.0 | 86.0 | 10.5 | 0.87 |
| 56C | | 2yr_3hr_Chicago | MSHT-103-S | 0.1354 | 5.0 | 82.0 | 23.8 | 0.83 |
| 56D | | 2yr_3hr_Chicago | MHST-102-S | 0.0761 | 5.0 | 84.7 | 13.8 | 0.85 |
| 56E | | 2yr_3hr_Chicago | MHST-101-S | 0.0805 | 5.0 | 77.3 | 13.4 | 0.78 |
| 56F | | 2yr_3hr_Chicago | Carling_OLFN3 | 0.0180 | 5.0 | 77.4 | 3.1 | 0.78 |
| 56G | | 2yr_3hr_Chicago | CB225-S | 0.1673 | 5.0 | 50.1 | 18.0 | 0.50 |
| 57 | | 2yr_3hr_Chicago | Carling_OLF1 | 0.1534 | 15.0 | 6.9 | 3.0 | 0.08 |
| 58 | | 2yr_3hr_Chicago | 46 | 0.4475 | 16.0 | 10.2 | 10.0 | 0.10 |
| 59_D-G | | 2yr_3hr_Chicago | Chamber201 | 0.4461 | 2.0 | 90.7 | 84.9 | 0.92 |
| 59A | | 2yr_3hr_Chicago | TD_A | 0.0501 | 2.0 | 90.7 | 9.8 | 0.91 |
| 59B | | 2yr_3hr_Chicago | TD_B | 0.1795 | 2.0 | 90.7 | 34.9 | 0.91 |
| 59G | | 2yr_3hr_Chicago | CB130 | 0.0764 | 2.0 | 53.4 | 8.9 | 0.54 |
| 6 | | 2yr_3hr_Chicago | 3 | 0.1396 | 3.0 | 2.1 | 0.8 | 0.02 |
| 60A | | 2yr_3hr_Chicago | ST-60-S-B | 0.6561 | 25.0 | 22.7 | 32.2 | 0.23 |
| 60B | | 2yr_3hr_Chicago | DICB8 | 0.4884 | 25.0 | 30.4 | 32.2 | 0.31 |
| 62 | External | 2yr_3hr_Chicago | POW_D1 | 0.2744 | 5.0 | 61.7 | 32.0 | 0.63 |
| 62A | External | 2yr_3hr_Chicago | POW_D1 | 0.6276 | 6.0 | 25.0 | 33.6 | 0.25 |
| 62B | | 2yr_3hr_Chicago | MHST-136-S | 0.0620 | 3.0 | 0.0 | 0.0 | 0.00 |
| 62C | External | 2yr_3hr_Chicago | POW_D1 | 1.1137 | 5.0 | 61.8 | 109.3 | 0.63 |
| 63 | | 2yr_3hr_Chicago | S-63 | 0.6280 | 2.0 | 67.5 | 99.7 | 0.71 |
| 65A | | 2yr_3hr_Chicago | MHST-153-S | 0.0894 | 3.6 | 63.3 | 12.1 | 0.64 |
| 65BEFC | | 2yr_3hr_Chicago | MHST-137-S | 0.2015 | 3.6 | 37.9 | 16.3 | 0.38 |
| 65D | | 2yr_3hr_Chicago | SW_65D | 0.1128 | 3.0 | 5.0 | 1.2 | 0.05 |
| 65GC | | 2yr_3hr_Chicago | MHST-136-S | 0.1771 | 3.6 | 65.5 | 24.7 | 0.66 |
| 66A | | 2yr_3hr_Chicago | CHAMBER-102 | 0.0642 | 6.0 | 53.8 | 7.5 | 0.54 |
| 66B | | 2yr_3hr_Chicago | CBMHST105 | 0.1106 | 6.0 | 73.8 | 17.5 | 0.74 |
| 67 | | 2yr_3hr_Chicago | CB95 | 0.6208 | 3.0 | 59.8 | 79.2 | 0.60 |
| 7 | | 2yr_3hr_Chicago | 2 | 0.0165 | 3.0 | 100.0 | 3.5 | 1.00 |
| 8 | | 2yr_3hr_Chicago | 2 | 0.0188 | 3.0 | 100.0 | 4.0 | 1.00 |
| 9 | | 2yr_3hr_Chicago | 1 | 0.0192 | 3.0 | 100.0 | 4.1 | 1.00 |
| S-10 | | 2yr_3hr_Chicago | MHST-211 | 0.2975 | 2.0 | 100.0 | 60.1 | 1.02 |
| S-11 | | 2yr_3hr_Chicago | MHST-213 | 0.4008 | 2.0 | 100.0 | 77.7 | 1.02 |
| S11-A | | 2yr_3hr_Chicago | MHST-213 | 0.0107 | 2.0 | 100.0 | 2.3 | 1.00 |
| S11-B | | 2yr_3hr_Chicago | MHST-213 | 0.0153 | 2.0 | 69.2 | 2.3 | 0.70 |
| S-12 | | 2yr_3hr_Chicago | MH-SA51-1 | 0.0933 | 2.0 | 74.5 | 14.9 | 0.75 |
| S-3 | | 2yr_3hr_Chicago | MH-SA50 | 0.3456 | 2.0 | 99.9 | 68.5 | 1.02 |
| S-4 | | 2yr_3hr_Chicago | MH-SA49 | 0.2910 | 2.0 | 99.8 | 58.8 | 1.01 |
| S-5 | | 2yr_3hr_Chicago | MH-SA51-2 | 0.2767 | 2.0 | 64.2 | 37.9 | 0.65 |
| S-6 | | 2yr_3hr_Chicago | MH-SA51-1 | 0.2932 | 2.0 | 65.3 | 40.9 | 0.66 |
| S-7 | | 2yr_3hr_Chicago | MH-SA56-1 | 0.2899 | 2.0 | 77.2 | 47.5 | 0.78 |
| S-8 | | 2yr_3hr_Chicago | MH-SA56-2 | 0.2768 | 2.0 | 75.4 | 44.5 | 0.76 |
| S-9 | | 2yr_3hr_Chicago | MH-SA56-3 | 0.2599 | 2.0 | 71.4 | 39.1 | 0.72 |

## CONDUITS 1/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | CBMHST105 | CBMHST103 | | 17.6 | 72.40 | 72.13 | CIRCULAR | 0.38 | | 0.01534 | 94.8 |
| 11 | CB_54A | CB225-S | Major_System | 29.9 | 79.69 | 77.71 | RECT_OPEN | 0.15 | | 0.06634 | 0.0 |
| 12 | CB_54B | CB209 | major_system | 33.4 | 79.67 | 77.64 | RECT_OPEN | 0.15 | | 0.06086 | 42.8 |
| 15 | SW_42I | DICB9 | major_system | 41.1 | 75.31 | 74.28 | TRAPEZOIDAL | 1.00 | | 0.02509 | 0.0 |
| 16 | MH207 | Chamber-204 | | 25.3 | 73.98 | 73.88 | CIRCULAR | 0.38 | | 0.00395 | 37.4 |
| 17 | D-Chamber-204 | MHST-141 | | 21.1 | 73.03 | 72.98 | CIRCULAR | 0.30 | | 0.00237 | 29.0 |
| 19 | DICB9 | CBMHST-103-S | major_system | 21.8 | 74.28 | 74.26 | TRAPEZOIDAL | 0.50 | | 0.00092 | 8.6 |
| 2 | MHST-105-S | Wales-OLF-N03 | Major_System | 17.0 | 68.69 | 68.20 | IRREGULAR | 0.00 | Road-B | 0.02884 | 0.9 |
| 21 | MHST-157-S | CB65 | Major_System | 36.2 | 74.22 | 73.54 | IRREGULAR | 0.00 | Road-D | 0.01881 | 0.0 |
| 23 | CBMHST-103-S | ST-60-S-B | major_system | 22.5 | 74.26 | 74.11 | TRAPEZOIDAL | 0.50 | | 0.00667 | 8.2 |
| 25 | CB91 | CB94 | major_system | 29.3 | 75.14 | 75.03 | RECT_OPEN | 0.30 | | 0.00375 | 28.1 |
| 27 | TD_A | MHST-221 | | 75.5 | 67.42 | 66.62 | CIRCULAR | 0.20 | | 0.01060 | 9.6 |
| 28 | MHST-221 | PS | | 26.8 | 66.63 | 66.42 | CIRCULAR | 0.30 | | 0.00765 | 43.6 |
| 3 | Preston | Preston_Street | | 10.0 | 61.03 | 60.90 | CIRCULAR | 0.30 | | 0.01300 | 39.4 |
| 30 | TD_B | MHST-221 | | 25.5 | 67.88 | 67.60 | CIRCULAR | 0.30 | | 0.01084 | 34.6 |
| 32 | CB225-S | CB26 | Major_System | 28.5 | 77.71 | 75.96 | RECT_OPEN | 0.15 | | 0.06143 | 20.6 |
| 34 | CB26 | MHST-120-S | Major_System | 33.4 | 75.96 | 74.46 | RECT_OPEN | 0.15 | | 0.04502 | 20.3 |
| 4 | OGS-3 | MHST62528 | | 10.0 | 67.62 | 67.60 | CIRCULAR | 1.20 | | 0.00200 | 858.4 |
| 41 | CB209 | MHST-120-S | Major_System | 34.7 | 77.64 | 74.46 | RECT_OPEN | 0.15 | | 0.09199 | 45.1 |
| 5 | MHST62528 | MHST62545 | | 91.8 | 67.56 | 66.71 | CIRCULAR | 1.20 | | 0.00929 | 853.6 |
| 6 | MHST62545 | MHST62547 | | 129.6 | 66.69 | 64.45 | CIRCULAR | 1.20 | | 0.01726 | 849.4 |
| 7 | MHST62547 | Dows-Lake | | 171.0 | 64.17 | 63.75 | CIRCULAR | 1.20 | | 0.00249 | 844.5 |
| 8 | POW_D1 | OGS-3 | | 180.0 | 78.70 | 69.70 | TRAPEZOIDAL | 0.55 | | 0.05006 | 159.7 |
| 8_1 | CHAMBER-103 | D-MHST-155 | | 3.1 | 74.08 | 74.06 | CIRCULAR | 0.90 | | 0.00645 | 485.8 |
| 8_1-S | CHAMBER-103 | MHST-155 | Major_System | 14.7 | 79.00 | 78.70 | RECT_OPEN | 0.30 | | 0.02037 | 0.0 |
| 9 | CBMHST103 | CHAMBER-102 | | 2.6 | 72.10 | 72.07 | CIRCULAR | 0.38 | | 0.01154 | 116.5 |
| CA-OLF_2 | Carling_OLF1 | Carling_OLFN1 | Major_System | 120.4 | 66.50 | 65.41 | IRREGULAR | 0.00 | CarlingAve | 0.00907 | 2.6 |
| CA-OLF_3 | Carling_OLFN3 | Carling_OLF | Major_System | 66.5 | 64.80 | 64.60 | IRREGULAR | 0.00 | CarlingAve | 0.00301 | 10.9 |
| CA-OLF_4 | Carling_OLFN1 | Carling_OLFN3 | Major_System | 67.1 | 65.41 | 64.80 | IRREGULAR | 0.00 | CarlingAve | 0.00906 | 2.5 |
| CA-STM | IN119607 | D-MHST-100 | | 86.0 | 63.10 | 62.80 | CIRCULAR | 0.30 | | 0.00349 | 5.0 |
| ST-100_2 | D-MHST-100 | Nepean-Bay-Trunk | | 6.0 | 63.06 | 63.04 | CIRCULAR | 0.90 | | 0.00333 | 144.6 |
| ST-100-S | MHST-100-S | Carling_OLFN3 | Major_System | 11.0 | 65.42 | 64.80 | IRREGULAR | 0.00 | Road-A | 0.05645 | 9.5 |
| ST-101I | MHST-101 | MHST-100 | | 27.4 | 63.12 | 63.09 | CIRCULAR | 0.90 | | 0.00109 | 142.1 |
| ST-101I-S | MHST-101-S | MHST-100-S | Major_System | 27.4 | 66.07 | 65.42 | IRREGULAR | 0.00 | Road-A | 0.02371 | 9.7 |
| ST-102 | CBMHST-101 | CBMHST105 | | 47.9 | 73.63 | 72.43 | CIRCULAR | 0.38 | | 0.02505 | 78.1 |

## CONDUITS 2/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-102I | MHST-102 | MHST-101 | | 27.2 | 63.15 | 63.12 | CIRCULAR | 1.50 | | 0.00110 | 137.6 |
| ST-102I-S | MHST-102-S | MHST-101-S | Major_System | 27.2 | 66.28 | 66.07 | IRREGULAR | 0.00 | Road-A | 0.00773 | 5.0 |
| ST-103I | MSHT-103 | MHST-102 | | 52.9 | 63.20 | 63.15 | CIRCULAR | 1.50 | | 0.00100 | 145.9 |
| ST-103I-S | MSHT-103-S | MHST-102-S | Major_System | 52.9 | 66.13 | 66.28 | IRREGULAR | 0.00 | Road-A | -0.00283 | 3.0 |
| ST-104 | CBMHST-104 | CBMHST-101 | | 15.1 | 74.14 | 73.84 | CIRCULAR | 0.38 | | 0.01983 | 77.4 |
| ST-104_1 | BI-SA1 | MHST-104 | | 38.3 | 63.67 | 63.63 | CIRCULAR | 1.20 | | 0.00102 | 132.1 |
| ST-104_2 | MHST-105 | BI-SA1 | | 87.8 | 63.79 | 63.70 | CIRCULAR | 1.20 | | 0.00100 | 27.5 |
| ST-104I | MHST-104 | MSHT-103 | | 32.8 | 63.53 | 63.50 | CIRCULAR | 1.20 | | 0.00101 | 141.6 |
| ST-105I_1-S | BI-SA1-S | MHST-105-S | Major_System | 87.8 | 70.15 | 68.64 | IRREGULAR | 0.00 | Road-B | 0.01719 | 28.3 |
| ST-105I_2-S | MHST-104-S | BI-SA1-S | Major_System | 37.7 | 70.80 | 70.15 | IRREGULAR | 0.00 | Road-B | 0.01723 | 8.9 |
| ST-106I | MHST-106 | MSHT-103 | | 44.7 | 63.23 | 63.20 | CIRCULAR | 1.50 | | 0.00067 | 11.3 |
| ST-106I-S | MHST-106-S | MSHT-103-S | Major_System | 29.6 | 71.87 | 66.13 | IRREGULAR | 0.00 | Road-A | 0.19783 | 25.3 |
| ST-107 | D-MHST-170 | MHST-158 | | 13.3 | 71.93 | 71.80 | CIRCULAR | 0.30 | | 0.00977 | 15.8 |
| ST-120-S_1 | MHST-120-S | CB68 | Major_System | 33.8 | 74.46 | 72.63 | IRREGULAR | 0.00 | Road-A | 0.05427 | 73.4 |
| ST-120-S_2 | CB68 | MHST-106-S | Major_System | 11.0 | 72.63 | 71.87 | IRREGULAR | 0.00 | Road-A | 0.06909 | 24.0 |
| ST-130 | MHST-130 | OGS-3 | | 35.6 | 67.69 | 67.62 | CIRCULAR | 1.00 | | 0.00197 | 796.0 |
| ST-131_1 | MHST-212 | 13 | | 25.4 | 67.95 | 67.93 | CIRCULAR | 0.83 | | 0.00094 | 101.4 |
| ST-131_2 | 13 | MHST-130 | | 49.1 | 67.93 | 67.88 | CIRCULAR | 0.83 | | 0.00096 | 142.0 |
| ST-132 | MHST-132 | MHST-156 | | 41.9 | 73.25 | 72.62 | CIRCULAR | 0.45 | | 0.01505 | 47.3 |
| ST-133 | Chamber201S | MHST-212 | | 2.9 | 67.95 | 67.95 | CIRCULAR | 0.83 | | -0.00034 | 90.9 |
| ST-134 | MHST-134 | MHST-138 | | 17.5 | 76.62 | 76.18 | CIRCULAR | 0.38 | | 0.02515 | 34.3 |
| ST-135 | MHST-135 | MHST-148 | | 28.3 | 70.62 | 70.60 | CIRCULAR | 1.35 | | 0.00071 | 366.6 |
| ST-136 | MHST-136 | MHST-137 | | 57.8 | 78.65 | 77.30 | CIRCULAR | 0.30 | | 0.02338 | 20.1 |
| ST-136-S | MHST-136-S | MHST-137-S | Major_System | 59.7 | 81.70 | 79.79 | IRREGULAR | 0.00 | Road-E_S | 0.03201 | 4.1 |
| ST-137 | MHST-137 | MHST-134 | | 22.4 | 77.24 | 76.68 | CIRCULAR | 0.38 | | 0.02501 | 34.3 |
| ST-137-S | MHST-137-S | MHST-153-S | Major_System | 85.8 | 79.79 | 76.52 | IRREGULAR | 0.00 | Road-E_S | 0.03813 | 5.7 |
| ST-138 | MHST-138 | MHST-153 | | 38.9 | 75.17 | 74.20 | CIRCULAR | 0.38 | | 0.02494 | 34.2 |
| ST-141 | MHST-141 | MHST-160 | | 47.1 | 71.42 | 71.30 | CIRCULAR | 0.90 | | 0.00255 | 337.9 |
| ST-141-S | MHST-151-S | MHST-141-S | Major_System | 61.2 | 77.12 | 75.21 | IRREGULAR | 0.00 | Road-E_S | 0.03122 | 6.1 |
| ST-142 | D-MHST-142 | MHST-130 | | 29.3 | 67.74 | 67.69 | CIRCULAR | 1.20 | | 0.00171 | 696.8 |
| ST-143 | MHST-143 | MHST-159 | | 38.2 | 69.45 | 69.41 | CIRCULAR | 1.35 | | 0.00105 | 693.4 |
| ST-144A | MHST-144 | CONNECT | | 56.7 | 69.68 | 69.56 | CIRCULAR | 1.35 | | 0.00212 | 627.5 |
| ST-144B | CONNECT | MHST-143 | | 37.1 | 69.56 | 69.48 | CIRCULAR | 1.35 | | 0.00216 | 695.7 |
| ST-145_1 | D-MHST-145 | MHST-144 | | 71.4 | 69.90 | 69.83 | CIRCULAR | 1.20 | | 0.00098 | 627.5 |
| ST-146_1-S | MHST-146-S | BI-SA49-S | Major_System | 5.7 | 75.38 | 75.35 | IRREGULAR | 0.00 | Road-D | 0.00509 | 2.8 |

## CONDUITS 3/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_2 | D-MHST-146_1 | MHST-200 | | 27.7 | 70.17 | 70.13 | CIRCULAR | 1.50 | | 0.00144 | 890.0 |
| ST-146_2-S | BI-SA49-S | MHST-157-S | Major_System | 91.1 | 75.35 | 74.63 | IRREGULAR | 0.00 | Road-D | 0.00791 | 9.1 |
| ST-147 | MHST-147 | MHST-146 | | 40.9 | 70.25 | 70.20 | CIRCULAR | 1.50 | | 0.00122 | 815.7 |
| ST-147-S | MHST-147-S | MHST-146-S | Major_System | 40.8 | 76.00 | 75.38 | IRREGULAR | 0.00 | Road-D | 0.01521 | 7.1 |
| ST-148 | MHST-148 | MHST-147 | | 86.4 | 70.45 | 70.28 | CIRCULAR | 1.50 | | 0.00197 | 799.5 |
| ST-148-S | MHST-148-S | MHST-147-S | Major_System | 93.3 | 80.37 | 76.00 | IRREGULAR | 0.00 | Road-D | 0.04688 | 17.1 |
| ST-149 | MHST-149 | MHST-135 | | 33.9 | 70.69 | 70.65 | CIRCULAR | 1.35 | | 0.00118 | 368.6 |
| ST-149-S | MHST-135-S | MHST-149-S | Major_System | 44.3 | 79.68 | 77.93 | IRREGULAR | 0.00 | Road-E_C | 0.03950 | 3.2 |
| ST-150 | MHST-150 | MHST-149 | | 18.1 | 70.76 | 70.72 | CIRCULAR | 1.35 | | 0.00220 | 351.2 |
| ST-150-S | MHST-149-S | MHST-150-S1 | Major_System | 36.4 | 77.93 | 77.24 | IRREGULAR | 0.00 | Road-E_C | 0.01895 | 5.0 |
| ST-151 | MHST-151 | MHST-150 | | 30.3 | 71.23 | 71.21 | CIRCULAR | 0.90 | | 0.00066 | 338.0 |
| ST-151-S | MHST-150-S1 | MHST-151-S | Major_System | 14.8 | 77.24 | 77.12 | IRREGULAR | 0.00 | Road-E_S | 0.00808 | 1.3 |
| ST-153_2 | MHST-153 | MHST-158 | | 67.4 | 72.86 | 72.19 | CIRCULAR | 0.38 | | 0.00995 | 53.6 |
| ST-153-S | MHST-153-S | DICB9 | Major_System | 77.3 | 76.52 | 74.80 | IRREGULAR | 0.00 | Road-E_S | 0.02224 | 3.0 |
| ST-154 | MHST-154 | CHAMBER-103 | | 16.0 | 75.80 | 75.72 | CIRCULAR | 0.90 | | 0.00500 | 932.0 |
| ST-154A | MHST-154A | MHST-154B | | 15.5 | 76.18 | 76.10 | CIRCULAR | 0.90 | | 0.00516 | 931.0 |
| ST-154B | MHST-154B | MHST-154 | | 35.9 | 76.04 | 75.86 | CIRCULAR | 0.90 | | 0.00501 | 930.3 |
| ST-155_3 | MHST-155 | MHST-148 | | 22.3 | 74.03 | 73.82 | CIRCULAR | 0.90 | | 0.00942 | 490.6 |
| ST-156 | MHST-156 | MHST_156B | | 16.0 | 70.13 | 70.12 | CIRCULAR | 1.50 | | 0.00062 | 162.9 |
| ST-156B | MHST_156B | MHST-157 | | 18.8 | 70.09 | 70.08 | CIRCULAR | 1.50 | | 0.00053 | 159.5 |
| ST-157_1 | MHST-157 | D-MHST-157B | | 13.5 | 70.02 | 70.00 | CIRCULAR | 1.50 | | 0.00148 | 942.7 |
| ST-157_2 | D-MHST-157B | MHST-145 | | 14.7 | 69.97 | 69.96 | CIRCULAR | 1.50 | | 0.00068 | 394.2 |
| ST-157_3 | D-MHST-157B | CHAMBER-104B | | 9.4 | 69.97 | 69.91 | CIRCULAR | 0.90 | | 0.00638 | 549.1 |
| ST-158 | MHST-158 | MHST-141 | | 82.5 | 71.74 | 71.57 | CIRCULAR | 0.75 | | 0.00206 | 121.9 |
| ST-158-S_1 | MHST-141-S | CB94 | Major_System | 8.2 | 75.21 | 75.03 | IRREGULAR | 0.00 | Road-E_S | 0.02183 | 3.5 |
| ST-158-S_2 | CB94 | MHST-158-S | Major_System | 76.3 | 75.03 | 74.57 | IRREGULAR | 0.00 | Road-E_S | 0.00603 | 27.5 |
| ST-159 | MHST-159 | MHST-142 | | 44.6 | 69.41 | 69.32 | CIRCULAR | 1.35 | | 0.00202 | 691.7 |
| ST-160 | MHST-160 | MHST-151 | | 22.3 | 71.27 | 71.23 | CIRCULAR | 0.90 | | 0.00179 | 337.0 |
| ST-161_2-S | D-MHST-161-S | MHST-148-S | Major_System | 52.7 | 81.44 | 80.37 | IRREGULAR | 0.00 | Road-D | 0.02031 | 6.5 |
| ST-162 | CBMHST-162 | MHST-154A | | 5.4 | 76.27 | 76.24 | CIRCULAR | 0.90 | | 0.00561 | 855.8 |
| ST-200_1 | MHST-200 | MHST-201 | | 42.9 | 70.11 | 70.05 | CIRCULAR | 1.50 | | 0.00140 | 457.3 |
| ST-200_2 | MHST-200 | CHAMBER-104-A | | 8.4 | 70.17 | 70.13 | CIRCULAR | 0.90 | | 0.00476 | 429.5 |
| ST-201 | MHST-201 | MHST-157 | | 6.5 | 70.07 | 70.05 | CIRCULAR | 1.50 | | 0.00308 | 832.6 |
| ST-202 | Chamber202-S | CONNECT | | 5.2 | 70.84 | 70.80 | CIRCULAR | 0.45 | | 0.00769 | 61.7 |
| ST-203 | MHST-203 | MHST-205 | | 8.6 | 73.11 | 73.09 | CIRCULAR | 0.68 | | 0.00232 | 95.4 |

## CONDUITS 4/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-204 | MHST-204 | MHST-205 | | 12.7 | 73.11 | 73.09 | CIRCULAR | 0.53 | | 0.00158 | 52.3 |
| ST-205 | MHST-205 | MHST-206 | | 28.9 | 72.94 | 72.91 | CIRCULAR | 0.68 | | 0.00104 | 147.0 |
| ST-206 | MHST-206 | Chamber202 | | 10.3 | 72.91 | 72.88 | CIRCULAR | 0.68 | | 0.00341 | 205.8 |
| ST-208 | MHST-208 | MHST-209 | | 19.4 | 73.41 | 73.35 | CIRCULAR | 0.38 | | 0.00309 | 58.9 |
| ST-209 | MHST-209 | MHST-206 | | 28.6 | 73.32 | 73.21 | CIRCULAR | 0.38 | | 0.00385 | 59.2 |
| ST-211 | MHST-211 | Chamber201 | | 43.1 | 68.31 | 68.24 | CIRCULAR | 0.53 | | 0.00162 | 58.8 |
| ST-214 | MHST-214 | MHST-215 | | 38.3 | 68.23 | 68.27 | CIRCULAR | 0.75 | | -0.00104 | 80.2 |
| ST-215 | MHST-215 | Chamber201 | | 1.7 | 68.27 | 68.27 | CIRCULAR | 0.75 | | 0.00000 | 80.0 |
| ST-225 | CB225 | Chamber202 | | 29.0 | 73.46 | 73.17 | CIRCULAR | 0.20 | | 0.00997 | 0.0 |
| ST-42I | MHST-158-S | DICB9 | major_system | 9.7 | 74.58 | 74.28 | IRREGULAR | 0.00 | Road-E_S | 0.03109 | 8.5 |
| ST-60-S_1 | ST-60-S-B | DICB8 | Major_System | 125.5 | 74.11 | 69.82 | TRAPEZOIDAL | 1.00 | | 0.03419 | 37.6 |
| ST-62534 | MHST-62534 | CBMHST-162 | | 7.2 | 76.90 | 76.27 | CIRCULAR | 0.90 | | 0.08833 | 855.6 |
| ST-62538 | MHST-161 | MHST-155 | | 13.4 | 78.96 | 78.70 | CIRCULAR | 0.53 | | 0.01941 | 11.1 |
| St-C104 | CHAMBER-104-A | MHST-201 | | 13.1 | 70.13 | 70.07 | CIRCULAR | 0.90 | | 0.00458 | 384.1 |
| ST-C203 | D-Chamber-203 | MHST-146 | | 15.9 | 71.42 | 71.38 | CIRCULAR | 0.30 | | 0.00251 | 50.5 |
| ST-CB6-S | SW_65D | DICB6 | major_system | 104.0 | 77.94 | 76.09 | TRAPEZOIDAL | 0.50 | | 0.01779 | 0.9 |
| ST-G107 | MHST-107 | OGS1 | | 52.5 | 62.03 | 61.24 | CIRCULAR | 0.30 | | 0.01505 | 13.8 |
| ST-OGS1_2 | OGS1 | Preston | | 10.0 | 61.21 | 61.06 | CIRCULAR | 0.30 | | 0.01500 | 36.9 |
| ST-P3 | DICB3 | IN119608 | | 71.1 | 64.23 | 63.80 | CIRCULAR | 0.20 | | 0.00605 | 0.0 |
| ST-P46 | IN119608 | IN119607 | | 30.0 | 63.50 | 63.20 | CIRCULAR | 0.20 | | 0.01000 | 0.0 |
| ST-SA1 | MH-SA1 | BI-SA1 | | 24.7 | 69.45 | 69.08 | CIRCULAR | 0.30 | | 0.01501 | 60.3 |
| ST-SA49 | MH-SA49 | Chamber-203 | | 17.9 | 74.02 | 73.80 | CIRCULAR | 0.38 | | 0.01228 | 58.7 |
| ST-SA50 | MH-SA50 | Chamber-203 | | 13.2 | 74.07 | 73.67 | CIRCULAR | 0.375 | | 0.03032 | 68.43 |
| ST-SA51-1 | MH-SA51-1 | Chamber-204 | | 14.69 | 73.91 | 73.76 | CIRCULAR | 0.45 | | 0.01021 | 55.69 |
| ST-SA51-2 | MH-SA51-2 | MH207 | | 16.236 | 74.11 | 73.98 | CIRCULAR | 0.375 | | 0.00801 | 37.87 |
| ST-SA52_1 | MHST-213 | MHST-214 | | 51.841 | 68.54 | 68.45 | CIRCULAR | 0.525 | | 0.00174 | 80.26 |
| ST-SA56-1 | MH-SA56-1 | MHST-203 | | 5.031 | 73.24 | 73.19 | CIRCULAR | 0.525 | | 0.00994 | 95.37 |
| ST-SA56-2 | MH-SA56-2 | MHST-204 | | 4.866 | 73.24 | 73.19 | CIRCULAR | 0.45 | | 0.01028 | 52.44 |
| ST-SA56-3 | MH-SA56-3 | MHST-208 | | 8.906 | 73.8 | 73.44 | CIRCULAR | 0.375 | | 0.04046 | 58.98 |
| ST-UGS6B | CHAMBER-102 | MHST-170 | | 16.625 | 72.03 | 71.96 | CIRCULAR | 0.375 | | 0.00421 | 15.87 |
| ST-UGS-Z1 | CHAMBER-104B | MHST-145 | | 8.4 | 69.91 | 69.90 | CIRCULAR | 0.90 | | 0.00119 | 350.2 |
| ST-xx | MH-SAxx | MHST-107 | | 10.7 | 62.45 | 62.15 | CIRCULAR | 0.20 | | 0.02805 | 7.0 |
| WD-OLF_3 | Wales-OLF-N03 | Wales-OLF-N04 | Major_System | 81.2 | 68.20 | 66.75 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01786 | 0.5 |
| WD-OLF_4 | Wales-OLF-N04 | Wales-OLF-N05 | Major_System | 95.0 | 66.75 | 65.50 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01316 | 0.1 |
| | | | | | | | | | | | |

# Junctions 1/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| 13 | | NO | 67.93 | 70.22 | 2.29 | 0.38 | 68.31 | 10/04/2022 01:32 AM |
| BI-SA1 | | NO | 63.50 | 70.48 | 6.98 | 0.41 | 63.91 | 10/04/2022 01:14 AM |
| BI-SA1-S | Major_System | NO | 70.15 | 70.30 | 0.15 | 0.04 | 70.19 | 10/04/2022 01:10 AM |
| BI-SA49-S | Major_System | NO | 75.35 | 75.51 | 0.16 | 0.03 | 75.38 | 10/04/2022 01:10 AM |
| Carling_OLF1 | | NO | 66.50 | 66.70 | 0.20 | 0.02 | 66.52 | 10/04/2022 01:11 AM |
| Carling_OLFN1 | | NO | 65.41 | 65.61 | 0.20 | 0.02 | 65.43 | 10/04/2022 01:15 AM |
| Carling_OLFN3 | | NO | 64.80 | 65.00 | 0.20 | 0.05 | 64.85 | 10/04/2022 01:14 AM |
| CB_54A | | NO | 79.65 | 79.95 | 0.30 | 0.03 | 79.68 | 10/04/2022 01:10 AM |
| CB_54B | | NO | 79.67 | 79.97 | 0.30 | 0.01 | 79.68 | 10/04/2022 01:10 AM |
| CB209 | | NO | 77.64 | 77.79 | 0.15 | 0.01 | 77.65 | 10/04/2022 01:10 AM |
| CB225 | | NO | 73.46 | 77.72 | 4.26 | 0.00 | 73.45 | 10/04/2022 00:00 AM |
| CB225-S | | NO | 77.71 | 77.86 | 0.15 | 0.01 | 77.72 | 10/04/2022 01:10 AM |
| CB26 | | NO | 75.96 | 76.11 | 0.15 | 0.01 | 75.97 | 10/04/2022 01:10 AM |
| CB68 | | NO | 72.63 | 72.79 | 0.16 | 0.03 | 72.66 | 10/04/2022 01:11 AM |
| CB91 | | NO | 75.14 | 75.44 | 0.30 | 0.01 | 75.15 | 10/04/2022 01:10 AM |
| CB94 | | NO | 75.03 | 75.20 | 0.17 | 0.06 | 75.09 | 10/04/2022 01:12 AM |
| CBMHST-101 | | NO | 73.63 | 76.41 | 2.78 | 0.14 | 73.77 | 10/04/2022 01:10 AM |
| CBMHST103 | | NO | 72.10 | 74.28 | 2.18 | 0.45 | 72.55 | 10/04/2022 01:40 AM |
| CBMHST-103-S | | NO | 74.26 | 74.56 | 0.30 | 0.02 | 74.28 | 10/04/2022 01:11 AM |
| CBMHST-104 | | NO | 74.14 | 76.59 | 2.45 | 0.14 | 74.28 | 10/04/2022 01:10 AM |
| CBMHST105 | | NO | 72.40 | 74.73 | 2.33 | 0.17 | 72.57 | 10/04/2022 01:10 AM |
| CBMHST-162 | | NO | 76.10 | 82.72 | 6.62 | 0.69 | 76.79 | 10/04/2022 01:10 AM |
| Chamber201S | | NO | 67.95 | 68.95 | 1.00 | 0.35 | 68.30 | 10/04/2022 01:32 AM |
| Chamber202-S | | NO | 70.84 | 73.59 | 2.75 | 0.15 | 70.99 | 10/04/2022 01:23 AM |
| CONNECT | | NO | 69.56 | 74.02 | 4.46 | 0.59 | 70.15 | 10/04/2022 01:34 AM |
| D-Chamber-203 | | NO | 71.42 | 75.05 | 3.63 | 0.21 | 71.63 | 10/04/2022 01:20 AM |
| D-Chamber-204 | | NO | 73.03 | 74.63 | 1.60 | 0.16 | 73.19 | 10/04/2022 01:21 AM |
| DICB3 | | NO | 64.00 | 66.43 | 2.43 | 0.00 | 64.00 | 10/04/2022 00:00 AM |
| DICB6 | | NO | 74.70 | 76.59 | 1.89 | 0.00 | 74.70 | 10/04/2022 01:13 AM |
| DICB9 | | NO | 74.28 | 74.48 | 0.20 | 0.04 | 74.32 | 10/04/2022 01:10 AM |
| D-MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 0.68 | 63.28 | 10/04/2022 01:21 AM |
| D-MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 0.50 | 68.30 | 10/04/2022 01:33 AM |
| D-MHST-145 | | NO | 69.90 | 74.34 | 4.44 | 0.52 | 70.42 | 10/04/2022 01:31 AM |
| D-MHST-146_1 | | NO | 70.17 | 75.39 | 5.22 | 0.51 | 70.68 | 10/04/2022 01:16 AM |
| D-MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 0.69 | 74.72 | 10/04/2022 01:18 AM |
| D-MHST-157B | | NO | 69.97 | 74.44 | 4.47 | 0.66 | 70.63 | 10/04/2022 01:30 AM |
| D-MHST-161-S | Major_System | NO | 81.44 | 81.60 | 0.16 | 0.02 | 81.46 | 10/04/2022 01:10 AM |
| D-MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 0.08 | 72.01 | 10/04/2022 01:39 AM |
| IN119607 | | NO | 63.00 | 65.62 | 2.62 | 0.28 | 63.28 | 10/04/2022 01:21 AM |
| IN119608 | | NO | 63.50 | 66.14 | 2.64 | 0.00 | 63.50 | 10/04/2022 00:00 AM |
| MH207 | | NO | 73.95 | 75.43 | 1.48 | 0.18 | 74.13 | 10/04/2022 01:10 AM |
| MH-SA1 | | NO | 69.45 | 70.55 | 1.10 | 0.15 | 69.60 | 10/04/2022 01:03 AM |
| MH-SA49 | | NO | 73.97 | 75.45 | 1.48 | 0.19 | 74.16 | 10/04/2022 01:10 AM |
| MH-SA50 | | NO | 74.07 | 75.83 | 1.76 | 0.12 | 74.19 | 10/04/2022 01:10 AM |

## Junctions 2/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MH-SA51-1 | | NO | 74.08 | 76.53 | 2.45 | 0.11 | 74.19 | 10/04/2022 01:10 AM |
| MH-SA51-2 | | NO | 74.84 | 76.50 | 1.66 | 0.08 | 74.92 | 10/04/2022 01:10 AM |
| MH-SA56-1 | | NO | 73.24 | 74.54 | 1.30 | 0.17 | 73.41 | 10/04/2022 01:10 AM |
| MH-SA56-2 | | NO | 73.24 | 74.54 | 1.30 | 0.13 | 73.37 | 10/04/2022 01:10 AM |
| MH-SA56-3 | | NO | 73.80 | 75.80 | 2.00 | 0.10 | 73.90 | 10/04/2022 01:10 AM |
| MH-SAxx | | NO | 62.00 | 64.50 | 2.50 | 0.50 | 62.50 | 10/04/2022 00:31 AM |
| MHST_156B | | NO | 70.09 | 74.24 | 4.15 | 0.55 | 70.64 | 10/04/2022 01:30 AM |
| MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 1.21 | 63.81 | 10/04/2022 01:21 AM |
| MHST-100-S | Major_System | NO | 65.42 | 65.72 | 0.30 | 0.02 | 65.44 | 10/04/2022 01:11 AM |
| MHST-101 | | NO | 63.00 | 66.07 | 3.07 | 0.81 | 63.81 | 10/04/2022 01:21 AM |
| MHST-101-S | Major_System | NO | 66.07 | 66.23 | 0.16 | 0.02 | 66.09 | 10/04/2022 01:10 AM |
| MHST-102 | | NO | 63.00 | 66.28 | 3.28 | 0.81 | 63.81 | 10/04/2022 01:22 AM |
| MHST-102-S | Major_System | NO | 66.28 | 66.44 | 0.16 | 0.02 | 66.30 | 10/04/2022 01:10 AM |
| MHST-104 | | NO | 63.30 | 70.80 | 7.50 | 0.52 | 63.82 | 10/04/2022 01:21 AM |
| MHST-104-S | Major_System | NO | 70.80 | 70.95 | 0.15 | 0.03 | 70.83 | 10/04/2022 01:10 AM |
| MHST-105 | | NO | 63.60 | 69.13 | 5.53 | 0.33 | 63.93 | 10/04/2022 01:13 AM |
| MHST-105-S | Major_System | NO | 68.64 | 68.79 | 0.15 | 0.06 | 68.70 | 10/04/2022 01:13 AM |
| MHST-106 | | NO | 63.00 | 71.87 | 8.87 | 0.81 | 63.81 | 10/04/2022 01:22 AM |
| MHST-106-S | Major_System | NO | 71.87 | 72.03 | 0.16 | 0.02 | 71.89 | 10/04/2022 01:11 AM |
| MHST-107 | | NO | 62.00 | 64.32 | 2.32 | 0.10 | 62.10 | 10/04/2022 01:10 AM |
| MHST-120-S | Major_System | NO | 74.46 | 74.62 | 0.16 | 0.04 | 74.50 | 10/04/2022 01:11 AM |
| MHST-130 | | NO | 67.69 | 70.21 | 2.52 | 0.57 | 68.26 | 10/04/2022 01:32 AM |
| MHST-132 | | NO | 73.25 | 75.96 | 2.71 | 0.11 | 73.36 | 10/04/2022 01:10 AM |
| MHST-134 | | NO | 76.62 | 79.19 | 2.57 | 0.09 | 76.71 | 10/04/2022 01:10 AM |
| MHST-135 | | NO | 70.62 | 79.31 | 8.69 | 0.40 | 71.02 | 10/04/2022 01:14 AM |
| MHST-135-S | Major_System | NO | 79.68 | 79.83 | 0.15 | 0.01 | 79.69 | 10/04/2022 01:10 AM |
| MHST-136 | | NO | 78.65 | 81.94 | 3.29 | 0.07 | 78.72 | 10/04/2022 01:10 AM |
| MHST-136-S | | NO | 81.70 | 82.00 | 0.30 | 0.02 | 81.72 | 10/04/2022 01:10 AM |
| MHST-137 | | NO | 77.24 | 80.00 | 2.76 | 0.09 | 77.33 | 10/04/2022 01:10 AM |
| MHST-137-S | | NO | 79.79 | 80.09 | 0.30 | 0.02 | 79.81 | 10/04/2022 01:10 AM |
| MHST-138 | | NO | 75.17 | 78.56 | 3.39 | 0.09 | 75.26 | 10/04/2022 01:11 AM |
| MHST-141 | | NO | 71.42 | 75.17 | 3.75 | 0.38 | 71.80 | 10/04/2022 01:10 AM |
| MHST-141-S | Major_System | NO | 75.21 | 75.36 | 0.15 | 0.02 | 75.23 | 10/04/2022 01:10 AM |
| MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 2.30 | 70.10 | 10/04/2022 01:34 AM |
| MHST-143 | | NO | 69.45 | 74.02 | 4.57 | 0.68 | 70.13 | 10/04/2022 01:34 AM |
| MHST-144 | | NO | 69.68 | 75.30 | 5.62 | 0.51 | 70.19 | 10/04/2022 01:33 AM |
| MHST-145 | | NO | 69.90 | 73.97 | 4.07 | 0.73 | 70.63 | 10/04/2022 01:31 AM |
| MHST-146 | | NO | 70.17 | 75.39 | 5.22 | 0.69 | 70.86 | 10/04/2022 01:16 AM |

## Junctions 3/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-146-S | Major_System | NO | 75.38 | 75.58 | 0.20 | 0.02 | 75.40 | 10/04/2022 01:11 AM |
| MHST-147 | | NO | 70.25 | 75.92 | 5.67 | 0.64 | 70.89 | 10/04/2022 01:16 AM |
| MHST-147-S | Major_System | NO | 76.00 | 76.20 | 0.20 | 0.02 | 76.02 | 10/04/2022 01:10 AM |
| MHST-148 | | NO | 70.45 | 80.13 | 9.68 | 0.54 | 70.99 | 10/04/2022 01:15 AM |
| MHST-148-S | Major_System | NO | 80.37 | 80.53 | 0.16 | 0.02 | 80.39 | 10/04/2022 01:10 AM |
| MHST-149 | | NO | 70.69 | 78.30 | 7.61 | 0.38 | 71.07 | 10/04/2022 01:11 AM |
| MHST-149-S | Major_System | NO | 77.93 | 78.08 | 0.15 | 0.02 | 77.95 | 10/04/2022 01:10 AM |
| MHST-150 | | NO | 70.76 | 77.32 | 6.56 | 0.35 | 71.11 | 10/04/2022 01:11 AM |
| MHST-150-S1 | Major_System | NO | 77.24 | 77.39 | 0.15 | 0.01 | 77.25 | 10/04/2022 01:10 AM |
| MHST-151 | | NO | 71.23 | 77.10 | 5.87 | 0.40 | 71.63 | 10/04/2022 01:11 AM |
| MHST-151-S | Major_System | NO | 77.12 | 77.27 | 0.15 | 0.02 | 77.14 | 10/04/2022 01:10 AM |
| MHST-153 | | NO | 72.86 | 77.00 | 4.14 | 0.14 | 73.00 | 10/04/2022 01:11 AM |
| MHST-153-S | TGCB102 | NO | 76.52 | 76.82 | 0.30 | 0.02 | 76.54 | 10/04/2022 01:10 AM |
| MHST-154 | | NO | 75.60 | 81.92 | 6.32 | 0.77 | 76.37 | 10/04/2022 01:10 AM |
| MHST-154A | | NO | 76.00 | 82.52 | 6.52 | 0.75 | 76.75 | 10/04/2022 01:10 AM |
| MHST-154B | | NO | 75.90 | 81.89 | 5.99 | 0.71 | 76.61 | 10/04/2022 01:10 AM |
| MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 0.33 | 74.36 | 10/04/2022 01:18 AM |
| MHST-156 | | NO | 70.13 | 74.49 | 4.36 | 0.51 | 70.64 | 10/04/2022 01:30 AM |
| MHST-157 | | NO | 70.02 | 74.65 | 4.63 | 0.61 | 70.63 | 10/04/2022 01:30 AM |
| MHST-158 | | YES | 71.74 | 74.80 | 3.06 | 0.25 | 71.99 | 10/04/2022 01:11 AM |
| MHST-158-S | Major_System | NO | 74.58 | 74.88 | 0.30 | 0.02 | 74.60 | 10/04/2022 01:10 AM |
| MHST-159 | | NO | 69.38 | 74.96 | 5.58 | 0.73 | 70.11 | 10/04/2022 01:34 AM |
| MHST-160 | | NO | 71.27 | 76.79 | 5.52 | 0.41 | 71.68 | 10/04/2022 01:10 AM |
| MHST-161 | | NO | 78.96 | 81.88 | 2.92 | 0.05 | 79.01 | 10/04/2022 01:10 AM |
| MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 0.62 | 72.55 | 10/04/2022 01:39 AM |
| MHST-200 | | NO | 70.10 | 74.81 | 4.71 | 0.54 | 70.64 | 10/04/2022 01:30 AM |
| MHST-201 | | NO | 69.96 | 74.74 | 4.78 | 0.68 | 70.64 | 10/04/2022 01:30 AM |
| MHST-203 | | NO | 73.11 | 78.83 | 5.72 | 0.20 | 73.31 | 10/04/2022 01:10 AM |
| MHST-204 | | NO | 73.11 | 78.79 | 5.68 | 0.18 | 73.29 | 10/04/2022 01:10 AM |
| MHST-205 | | NO | 72.94 | 78.20 | 5.26 | 0.32 | 73.26 | 10/04/2022 01:10 AM |
| MHST-206 | | NO | 72.91 | 75.77 | 2.86 | 0.29 | 73.20 | 10/04/2022 01:10 AM |
| MHST-208 | | NO | 73.41 | 77.80 | 4.39 | 0.20 | 73.61 | 10/04/2022 01:10 AM |
| MHST-209 | | NO | 73.35 | 75.76 | 2.41 | 0.18 | 73.53 | 10/04/2022 01:10 AM |
| MHST-211 | | NO | 68.31 | 70.38 | 2.07 | 0.20 | 68.51 | 10/04/2022 01:10 AM |
| MHST-212 | | NO | 67.95 | 70.22 | 2.27 | 0.35 | 68.30 | 10/04/2022 01:32 AM |
| MHST-213 | | NO | 68.54 | 70.24 | 1.70 | 0.24 | 68.78 | 10/04/2022 01:10 AM |

## Junctions 4/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-214 | | NO | 68.23 | 70.31 | 2.08 | 0.29 | 68.52 | 10/04/2022 01:10 AM |
| MHST-215 | | NO | 68.27 | 70.25 | 1.98 | 0.17 | 68.44 | 10/04/2022 01:11 AM |
| MHST-221 | | NO | 66.62 | 69.70 | 3.08 | 0.16 | 66.78 | 10/04/2022 01:10 AM |
| MHST62528 | | NO | 67.34 | 70.08 | 2.74 | 0.61 | 67.95 | 10/04/2022 01:33 AM |
| MHST-62534 | | NO | 76.90 | 82.80 | 5.90 | 0.24 | 77.14 | 10/04/2022 01:10 AM |
| MHST62545 | | NO | 66.53 | 69.90 | 3.37 | 0.49 | 67.02 | 10/04/2022 01:33 AM |
| MHST62547 | | NO | 64.00 | 71.80 | 7.80 | 0.72 | 64.72 | 10/04/2022 01:34 AM |
| MSHT-103 | | NO | 63.00 | 66.13 | 3.13 | 0.81 | 63.81 | 10/04/2022 01:22 AM |
| MSHT-103-S | Major_System | NO | 66.13 | 66.29 | 0.16 | 0.03 | 66.16 | 10/04/2022 01:11 AM |
| OGS1 | | NO | 61.00 | 63.82 | 2.82 | 0.32 | 61.32 | 10/04/2022 01:10 AM |
| OGS-3 | | NO | 67.62 | 70.34 | 2.72 | 0.51 | 68.13 | 10/04/2022 01:33 AM |
| POW_D1 | | NO | 78.70 | 79.30 | 0.60 | 0.09 | 78.79 | 10/04/2022 01:11 AM |
| Preston | | NO | 61.00 | 63.00 | 2.00 | 0.15 | 61.15 | 10/04/2022 01:10 AM |
| ST-60-S-B | | NO | 74.11 | 74.41 | 0.30 | 0.03 | 74.14 | 10/04/2022 01:11 AM |
| SW_42I | | NO | 75.31 | 75.51 | 0.20 | 0.00 | 75.31 | 10/04/2022 00:00 AM |
| SW_65D | | NO | 77.94 | 78.44 | 0.50 | 0.00 | 77.94 | 10/04/2022 01:13 AM |
| TD_A | | NO | 67.42 | 69.10 | 1.68 | 0.07 | 67.49 | 10/04/2022 01:10 AM |
| TD_B | | NO | 67.88 | 69.13 | 1.25 | 0.12 | 68.00 | 10/04/2022 01:10 AM |
| Wales-OLF-N03 | | NO | 68.20 | 68.40 | 0.20 | 0.01 | 68.21 | 10/04/2022 01:15 AM |
| Wales-OLF-N04 | | NO | 66.75 | 66.95 | 0.20 | 0.01 | 66.76 | 10/04/2022 01:21 AM |
| Wales-OLF-N05 | | NO | 65.50 | 65.70 | 0.20 | 0.00 | 65.50 | 10/04/2022 01:22 AM |

Storage 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Storage Curve | Curve Name | Avg. Depth (m) | Max. Depth (m) | Max. HGL (m) | Max. Volume (1000 m³) | Max. Percent Full (%) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CB130 | 69.90 | 70.10 | 0.20 | TABULAR | CB(600x600) | 0.01 | 0.03 | 69.93 | 0 | 13 | 0.0760 |
| CB65 | 72.16 | 73.70 | 1.54 | TABULAR | CB65 | 0.02 | 0.03 | 72.19 | 0 | 0 | 1.5700 |
| CB95 | 75.52 | 75.82 | 0.30 | TABULAR | CB95-ponding | 0.01 | 0.05 | 75.57 | 0.002 | 2 | 0.6210 |
| CHAMBER-102 | 72.03 | 74.24 | 2.21 | TABULAR | Chamber102 | 0.15 | 0.52 | 72.55 | 0.112 | 24 | 2.7210 |
| CHAMBER-103 | 74.08 | 76.78 | 2.70 | TABULAR | Chamber103 | 0.11 | 0.64 | 74.72 | 0.506 | 24 | 13.6620 |
| CHAMBER-104-A | 70.13 | 72.43 | 2.30 | TABULAR | Chamber104A | 0.10 | 0.51 | 70.64 | 0.288 | 22 | 19.5370 |
| CHAMBER-104B | 69.91 | 72.61 | 2.70 | TABULAR | Chamber104B | 0.20 | 0.72 | 70.63 | 0.454 | 27 | 22.8040 |
| Chamber201 | 67.95 | 69.19 | 1.24 | TABULAR | Chamber201 | 0.09 | 0.38 | 68.33 | 0.158 | 31 | 1.1700 |
| Chamber202 | 70.84 | 72.43 | 1.59 | TABULAR | Chamber202 | 0.08 | 0.38 | 71.22 | 0.149 | 24 | 1.7870 |
| Chamber-203 | 71.42 | 72.90 | 1.48 | TABULAR | Chamber203 | 0.08 | 0.43 | 71.85 | 0.08 | 29 | 0.64 |
| Chamber-204 | 73.03 | 74.36 | 1.33 | TABULAR | Chamber204 | 0.07 | 0.30 | 73.33 | 0.07 | 23 | 0.66 |
| DICB8 | 68.11 | 69.83 | 1.72 | TABULAR | swale | 0.03 | 0.23 | 68.34 | 0.00 | 0 | 2.96 |
| MHST-157-S | 73.80 | 74.23 | 0.43 | TABULAR | CB98-ponding | 0.03 | 0.12 | 73.92 | 0.00 | 4 | 1.53 |
| PS | 64.92 | 70.03 | 5.11 | CYLINDRICAL | * | 0.79 | 1.51 | 66.43 | 0.00 | 30 | 0.23 |
| S-14B | 61.65 | 63.30 | 1.65 | TABULAR | S-14B | 0.18 | 0.20 | 61.85 | 0.00 | 1 | 0.13 |
| S-15 | 62.10 | 63.90 | 1.80 | TABULAR | S-15 | 0.02 | 0.35 | 62.45 | 0.00 | 0 | 0.36 |
| S-19 | 64.00 | 66.00 | 2.00 | TABULAR | S-19 | 0.04 | 0.59 | 64.59 | 0.00 | 0 | 0.21 |
| S-21B | 63.54 | 65.70 | 2.16 | TABULAR | S-21B | 0.46 | 1.58 | 65.12 | 0.02 | 2 | 1.81 |
| S-26B | 67.11 | 69.51 | 2.40 | TABULAR | DICB2ponding | 0.15 | 1.70 | 68.80 | 0.00 | 1 | 0.65 |
| S-26D | 67.19 | 69.25 | 2.06 | TABULAR | DICB1 | 0.00 | 0.00 | 67.19 | 0.00 | 0 | 0.08 |
| S-3Store | 62.20 | 64.24 | 2.04 | TABULAR | S-3 | 0.11 | 0.68 | 62.88 | 0.00 | 1 | 0.39 |
| S-63 | 79.80 | 84.02 | 4.22 | TABULAR | S-63 | 0.31 | 2.70 | 82.50 | 0.01 | 3 | 0.92 |
| SA-1 | 69.50 | 72.50 | 3.00 | TABULAR | S-1 | 0.09 | 0.68 | 70.18 | 0.15 | 23 | 1.24 |
| SA-2 | 62.60 | 65.60 | 3.00 | TABULAR | S-2 | 0.31 | 0.67 | 63.27 | 0.20 | 23 | 0.87 |

# Outlets 1/1

| Name | Inlet Node | Outlet Node | Inlet Elev. (m) | Rating Curve | Curve Name | Control Rules | Max. \|Flow\| (L/s) | Contributing Imp. Area (ha) |
|---|---|---|---|---|---|---|---|---|
| 1 | DICB6 | CBMHST-101 | 74.70 | TABULAR/DEPTH | 2CB | NO | 0.92 | 0.01 |
| 13 | CB_54B | MH-SA56-2 | 79.67 | TABULAR/DEPTH | 3CB | NO | 2.76 | 0.22 |
| 14 | CB95 | CBMHST-104 | 75.52 | TABULAR/DEPTH | 3CB | NO | 77.31 | 0.37 |
| 18 | MHST-141-S | MHST-141 | 75.21 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 21.13 | 0.30 |
| 20 | CB65 | MHST-144 | 72.16 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 7.27 | 0.93 |
| 22 | CB225-S | CB225 | 77.71 | TABULAR/DEPTH | S19_SL2_5 | NO | 0.00 | 0.29 |
| 24 | CBMHST-103-S | CBMHST103 | 74.26 | TABULAR/DEPTH | S28_SL4_0.5 | NO | 0.31 | 1.00 |
| 26 | CB91 | MHST-141 | 75.14 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 5.38 | 0.17 |
| 31 | CB26 | Chamber202 | 75.96 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 0.00 | 0.29 |
| BI-SA1-IC | BI-SA1-S | BI-SA1 | 70.15 | TABULAR/DEPTH | 6@R-B@S=1.5% | NO | 35.12 | 0.37 |
| BI-SA49-IC | BI-SA49-S | D-MHST-146_1 | 75.35 | TABULAR/DEPTH | S19_SL2_1x4 | NO | 34.62 | 0.54 |
| CB101_103_105 | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S22_SL2_5x3 | NO | 2.94 | 0.28 |
| CB102_106_DIC | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 17.20 | 0.28 |
| CB130OUT | CB130 | MHST-130 | 69.90 | TABULAR/DEPTH | S19_SL2_1 | NO | 8.85 | 0.04 |
| CB40,66-68 | CB68 | CONNECT | 72.63 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 49.35 | 0.63 |
| CB42-43 | D-MHST-161-S | MHST-161 | 81.44 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 11.14 | 0.08 |
| CB44-45 | MHST-148-S | MHST-148 | 80.37 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 19.78 | 0.26 |
| CB46_57 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 15.25 | 0.34 |
| CB47-55 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S22_SL2_5x8 | NO | 11.10 | 0.34 |
| CB56_58 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S22_SL2_1x2 | NO | 1.07 | 0.34 |
| CB61_104 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S19_SL2_1x2 | NO | 3.23 | 0.34 |
| CB63,64 | MHST-120-S | CONNECT | 74.46 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 12.87 | 0.63 |
| CB69_75 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 2.04 | 0.13 |
| CB74_76_77 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 18.66 | 0.13 |
| CB79-81 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S19_SL2_5x5 | NO | 13.51 | 0.18 |
| CB82 | MHST-151-S | MHST-151 | 77.12 | TABULAR/DEPTH | DB_S22_SL2_5 | NO | 0.00 | 0.21 |
| CB83 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S22_SL2_5 | NO | 0.79 | 0.18 |
| CB84-85_90 | MHST-136-S | MHST-136 | 81.70 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 20.44 | 0.12 |
| CB88_96 | MHST-137-S | MHST-137 | 79.79 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 14.21 | 0.19 |
| DICB2 | S-26B | BI-SA1 | 67.11 | TABULAR/DEPTH | 100VHV-1 | NO | 13.33 | 0.08 |
| DICB9_OL | DICB9 | CBMHST103 | 74.28 | TABULAR/DEPTH | S19_SL2_5 | NO | 22.19 | 1.00 |
| MHST-100-IC | MHST-100-S | MHST-100 | 66.30 | TABULAR/DEPTH | 1@R-A@S=5.0% | NO | 0.00 | 1.02 |
| MHST-101-IC | MHST-101-S | MHST-101 | 66.07 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 17.70 | 1.02 |
| MHST-102-IC | MHST-102-S | MHST-102 | 66.28 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 16.38 | 0.91 |
| MHST-104-IC | MHST-104-S | MHST-104 | 70.80 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 11.36 | 0.10 |
| MHST-105-IC | MHST-105-S | MHST-105 | 68.64 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 27.40 | 0.40 |
| MHST-106-IC | MHST-106-S | MHST-106 | 71.87 | TABULAR/DEPTH | 2@R-E@S=5.0% | NO | 8.20 | 0.68 |
| MHST-135-IC | MHST-135-S | MHST-135 | 79.68 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 2.66 | 0.03 |
| MHST-157-IC | MHST-157-S | MHST-157 | 73.80 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 81.45 | 0.89 |
| MHST-158-IC | MHST-158-S | MHST-158 | 74.58 | TABULAR/DEPTH | S19_SL2_5x8 | NO | 52.64 | 0.63 |
| MSHT-103-IC | MSHT-103-S | MSHT-103 | 66.13 | TABULAR/DEPTH | 7@R-A@S=5.0% | NO | 48.49 | 0.79 |
| O-1 | SA-1 | MH-SA1 | 69.50 | TABULAR/HEAD | O-1 | NO | 60.00 | 1.24 |
| O-15 | S-15 | MHST-107 | 62.10 | TABULAR/DEPTH | O-15 | NO | 2.79 | 0.01 |
| O-19 | S-19 | MHST-101 | 64.00 | TABULAR/DEPTH | 50VHV-1 | NO | 2.24 | 0.02 |
| O-2 | SA-2 | MH-SAxx | 62.60 | TABULAR/HEAD | O-2 | NO | 7.00 | 0.86 |
| O-21B | S-21B | IN119607 | 63.54 | TABULAR/DEPTH | 50VHV-1 | NO | 3.69 | 0.23 |
| O-26D | S-26D | MHST-105 | 67.19 | TABULAR/DEPTH | 50VHV-1 | NO | 0.35 | 0.00 |
| O-3 | S-3Store | OGS1 | 62.20 | TABULAR/HEAD | 125VHV-2 | NO | 15.48 | 0.11 |
| O-4 | S-14B | Preston | 62.15 | TABULAR/HEAD | 125VHV-2 | NO | 0.00 | 0.00 |
| O-63 | S-63 | MHST-154A | 78.20 | TABULAR/DEPTH | O-63 | NO | 79.26 | 0.59 |
| O-CB209 | CB209 | MHST-209 | 77.64 | TABULAR/DEPTH | S28_SL2_5x2 | NO | 0.88 | 0.23 |
| OL_CB_54A | CB_54A | MH-SA56-1 | 79.65 | TABULAR/DEPTH | 3CB | NO | 40.43 | 0.19 |
| WD-OLF_5 | Wales-OLF-N05 | Preston | 65.50 | TABULAR/DEPTH | 2@R-E@S=1.0% | NO | 0.13 | 0.40 |

## Orifices 1/1

| Name | Inlet Node | Outlet Node | Type | Cross-Section | Height (m) | Width (m) | Inlet Elev. (m) | Discharge Coeff. | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|
| ICD-100-1 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.3 | 0 | 63.06 | 0.62 | 140.95 |
| ICD-100-2 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.1 | 0 | 63.85 | 0.62 | 0 |
| ICD111 | DICB8 | OGS-3 | | CIRCULAR | 0.4 | 0 | 68.11 | 0.62 | 68.06 |
| ICD-142 | MHST-142 | D-MHST-142 | | CIRCULAR | 0.7 | 0 | 69.32 | 0.62 | 691.44 |
| ICD201 | Chamber201 | Chamber201S | | CIRCULAR | 0.35 | 0 | 67.95 | 0.62 | 90.86 |
| ICD202 | Chamber202 | Chamber202-S | | CIRCULAR | 0.245 | 0 | 70.84 | 0.62 | 61.73 |
| ICD203 | Chamber-203 | D-Chamber-203 | | CIRCULAR | 0.225 | 0 | 71.42 | 0.62 | 50.5 |
| ICD204 | Chamber-204 | D-Chamber-204 | | CIRCULAR | 0.19 | 0 | 73.03 | 0.62 | 28.95 |
| OR-145 | MHST-145 | D-MHST-145 | | RECT_CLOSED | 0.75 | 0.75 | 69.9 | 0.62 | 627.63 |
| OR-155 | D-MHST-155 | MHST-155 | | CIRCULAR | 0.675 | 0 | 74.06 | 0.62 | 485.76 |
| OR-170 | MHST-170 | D-MHST-170 | | CIRCULAR | 0.1 | 0 | 71.93 | 0.62 | 15.82 |

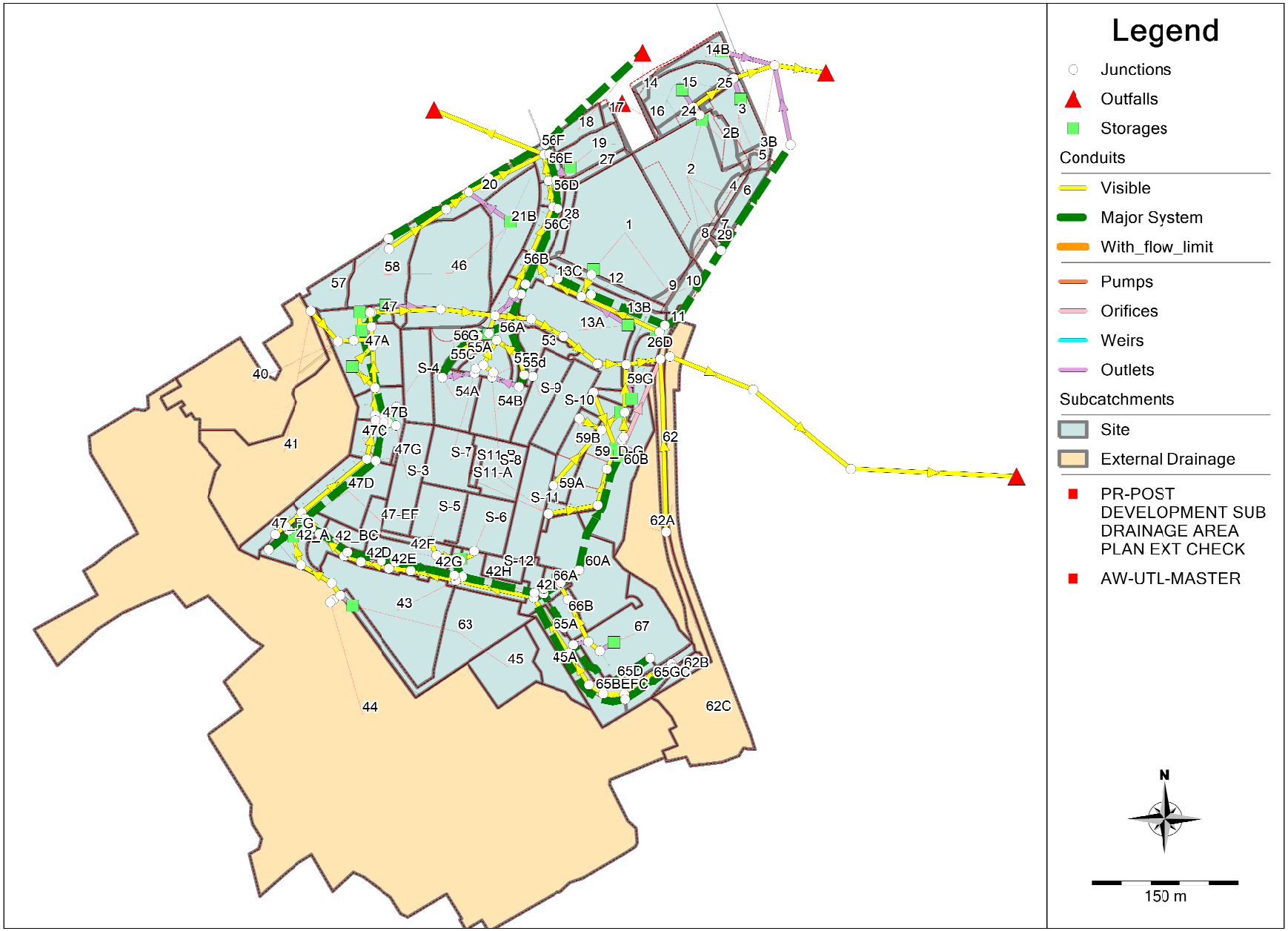
Weirs 1/1

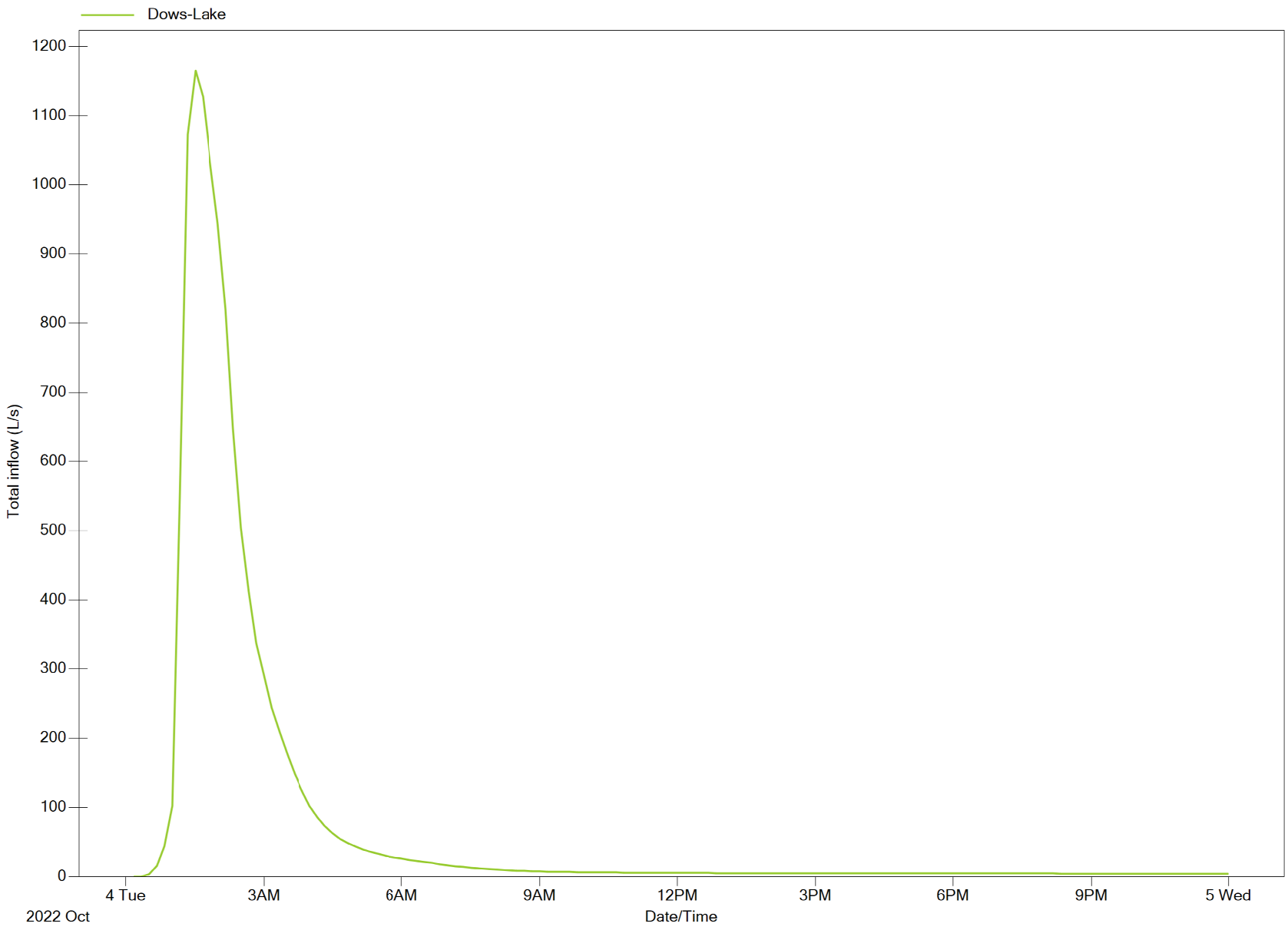
| Name | Inlet Node | Outlet Node | Type | Height (m) | Length (m) | Inlet Elev. (m) | Max. \|Flow\| (L/s) | Time Max. Flow (M/D/Y) | Max/Full Depth | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_1 | MHST-146 | D-MHST-146_1 | SIDEFLOW | 1.4 | 1.5 | 70.17 | 866.64 | 10/04/2022 01:16 AM | 0.49 | 19.249 |
| Weir-142 | MHST-142 | D-MHST-142 | TRANSVERSE | 0.5 | 1.4 | 70.7 | 0 | 10/04/2022 00:00 AM | 0 | 24.988 |
| Weir-145 | MHST-145 | D-MHST-145 | TRANSVERSE | 1 | 2 | 71.64 | 0 | 10/04/2022 00:00 AM | 0 | 22.804 |
| Weir-155 | D-MHST-155 | MHST-155 | TRANSVERSE | 1 | 1 | 76.45 | 0 | 10/04/2022 00:00 AM | 0 | 13.662 |
| Weir-170 | MHST-170 | D-MHST-170 | TRANSVERSE | 0.3 | 1.5 | 73 | 0 | 10/04/2022 00:00 AM | 0 | 2.721 |

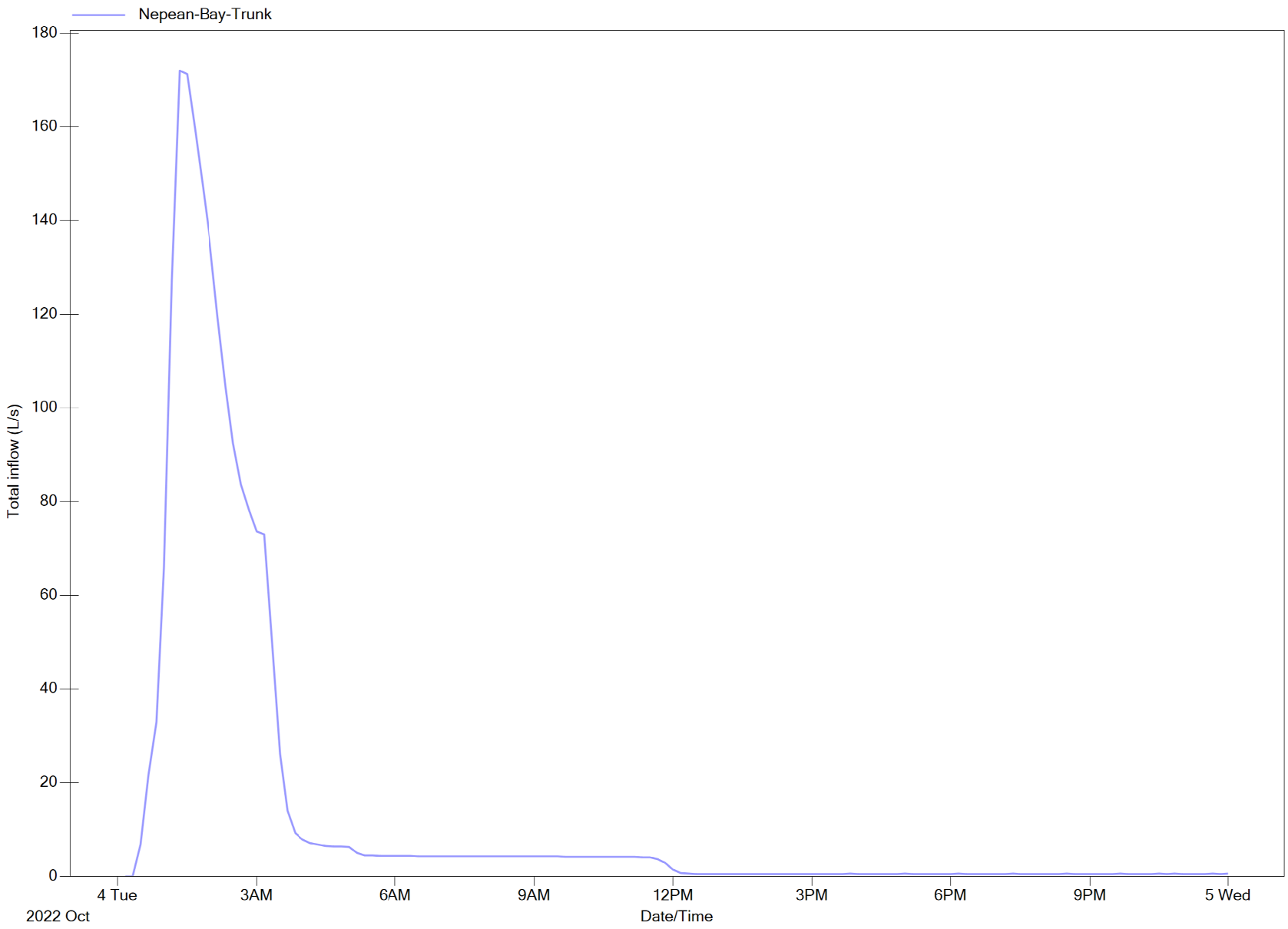
## Outfalls 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Type | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) | Max. Flow (L/s) | Total Flow (ML) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|
| Carling_OLF | 64.6 | 64.8 | FREE | 0.04 | 64.64 | 10/04/2022 01:14 AM | 17.18 | 0.027 | 2.187 |
| Dows-Lake | 63.745 | 66.5 | FREE | 0.5 | 64.24 | 10/04/2022 01:34 AM | 844.46 | 4.717 | 29.625 |
| LRT-Corridor | 56 | 57 | FREE | 0 | 56 | 10/04/2022 00:00 AM | 0.33 | 0 | 0.059 |
| Nepean-Bay-Trunk | 62.8 | 65.21 | NORMAL | 0 | 62.8 | 10/04/2022 00:00 AM | 144.64 | 0.798 | 6.163 |
| Preston_Street | 60.9 | 63.76 | NORMAL | 0.12 | 61.02 | 10/04/2022 01:10 AM | 39.42 | 0.351 | 2.435 |

# PCSWMM OUTPUT
# 3-HOUR CHICAGO -5-YEAR STORM


Legend
Junctions
Outfalls
Storages
Conduits
Visible
Major System
With_flow_limit
Pumps
Orifices
Weirs
Outlets
Subcatchments
Site
External Drainage
PR-POST DEVELOPMENT SUB DRAINAGE AREA PLAN EXT CHECK
AW-UTL-MASTER
N
150 m


Dows-Lake
Total inflow (L/s)
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time


Nepean-Bay-Trunk
Total inflow (L/s)
180
160
140
120
100
80
60
40
20
0
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time

# SUBCATCHMENTS 1/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 1 | | 5yr_3hr_Chicago | SA-1 | 1.2161 | 3.0 | 100.0 | 344.2 | 1.01 |
| 10 | | 5yr_3hr_Chicago | 13B | 0.0822 | 3.0 | 8.1 | 9.2 | 0.25 |
| 11 | | 5yr_3hr_Chicago | MHST-105-S | 0.0302 | 3.0 | 89.3 | 8.4 | 0.92 |
| 12 | | 5yr_3hr_Chicago | BI-SA1-S | 0.1276 | 5.0 | 56.5 | 30.1 | 0.68 |
| 13A | | 5yr_3hr_Chicago | S-26B | 0.6503 | 9.6 | 12.5 | 37.1 | 0.20 |
| 13B | | 5yr_3hr_Chicago | BI-SA1-S | 0.2248 | 5.0 | 87.8 | 60.1 | 0.92 |
| 13C | | 5yr_3hr_Chicago | MHST-104-S | 0.1227 | 5.0 | 78.7 | 30.9 | 0.84 |
| 14 | | 5yr_3hr_Chicago | Carling_OLF | 0.0580 | 3.0 | 60.3 | 11.7 | 0.67 |
| 14B | | 5yr_3hr_Chicago | S-14B | 0.1272 | 3.0 | 0.0 | 15.2 | 0.21 |
| 15 | | 5yr_3hr_Chicago | S-15 | 0.3643 | 3.0 | 3.6 | 19.0 | 0.15 |
| 16 | | 5yr_3hr_Chicago | LRT-Corridor | 0.0229 | 3.0 | 0.0 | 3.7 | 0.26 |
| 17 | | 5yr_3hr_Chicago | LRT-Corridor | 0.0361 | 3.0 | 0.0 | 5.0 | 0.23 |
| 18 | | 5yr_3hr_Chicago | Carling_OLF | 0.1189 | 3.0 | 3.4 | 9.2 | 0.18 |
| 19 | | 5yr_3hr_Chicago | S-19 | 0.2056 | 3.0 | 7.1 | 15.8 | 0.21 |
| 2 | | 5yr_3hr_Chicago | SA-2 | 0.7114 | 3.0 | 100.0 | 207.9 | 1.01 |
| 20 | | 5yr_3hr_Chicago | Carling_OLFN1 | 0.2434 | 8.0 | 0.0 | 26.5 | 0.20 |
| 21B | | 5yr_3hr_Chicago | S-21B | 0.4325 | 10.0 | 9.2 | 75.7 | 0.47 |
| 24 | | 5yr_3hr_Chicago | MHST-107 | 0.0348 | 3.0 | 55.8 | 7.2 | 0.64 |
| 25 | | 5yr_3hr_Chicago | OGS1 | 0.0465 | 3.0 | 80.6 | 11.8 | 0.85 |
| 26D | | 5yr_3hr_Chicago | S-26D | 0.0774 | 25.0 | 0.0 | 9.5 | 0.21 |
| 27 | | 5yr_3hr_Chicago | MHST-101-S | 0.0531 | 3.0 | 84.5 | 14.5 | 0.89 |
| 28 | | 5yr_3hr_Chicago | MHST-102-S | 0.0844 | 5.0 | 62.6 | 20.4 | 0.72 |
| 29 | | 5yr_3hr_Chicago | 7 | 0.0113 | 3.0 | 0.0 | 0.8 | 0.16 |
| 2B | | 5yr_3hr_Chicago | SA-2 | 0.0908 | 3.0 | 100.0 | 26.3 | 1.00 |
| 3 | | 5yr_3hr_Chicago | S-3Store | 0.2154 | 3.0 | 31.8 | 35.9 | 0.53 |
| 3B | | 5yr_3hr_Chicago | 3 | 0.0393 | 3.0 | 100.0 | 11.4 | 1.00 |
| 4 | | 5yr_3hr_Chicago | 2 | 0.0196 | 3.0 | 100.0 | 5.7 | 1.00 |
| 40 | External | 5yr_3hr_Chicago | MHST-156 | 1.1965 | 6.8 | 46.2 | 182.0 | 0.52 |
| 41 | External | 5yr_3hr_Chicago | MHST-132 | 1.5292 | 3.0 | 14.6 | 81.8 | 0.20 |
| 42_A | | 5yr_3hr_Chicago | MHST-135-S | 0.2148 | 5.0 | 12.8 | 14.0 | 0.22 |
| 42_BC | | 5yr_3hr_Chicago | MHST-149-S | 0.1753 | 5.0 | 60.5 | 38.0 | 0.68 |
| 42D | | 5yr_3hr_Chicago | MHST-150-S1 | 0.0509 | 2.0 | 99.0 | 14.7 | 1.00 |
| 42E | | 5yr_3hr_Chicago | MHST-151-S | 0.0245 | 2.0 | 99.0 | 7.1 | 1.00 |
| 42F | | 5yr_3hr_Chicago | CB91 | 0.1997 | 2.0 | 83.0 | 49.4 | 0.87 |
| 42G | | 5yr_3hr_Chicago | MHST-141-S | 0.0958 | 2.0 | 91.0 | 26.8 | 0.94 |
| 42H | | 5yr_3hr_Chicago | MHST-158-S | 0.1983 | 2.0 | 87.4 | 54.4 | 0.91 |
| 42I | | 5yr_3hr_Chicago | DICB9 | 0.1177 | 6.0 | 79.0 | 31.1 | 0.85 |
| 43 | | 5yr_3hr_Chicago | MHST-141 | 0.8632 | 2.0 | 100.0 | 246.2 | 1.01 |
| 44 | External | 5yr_3hr_Chicago | MHST-62534 | 12.7451 | 1.0 | 32.0 | 1276.8 | 0.36 |
| 45 | | 5yr_3hr_Chicago | 63 | 0.2888 | 4.0 | 58.8 | 58.0 | 0.66 |
| 45A | | 5yr_3hr_Chicago | MHST-153-S | 0.2052 | 4.0 | 12.6 | 21.4 | 0.27 |
| 46 | | 5yr_3hr_Chicago | 21B | 0.9308 | 10.0 | 15.6 | 78.9 | 0.30 |

# SUBCATCHMENTS 2/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 47 | | 5yr_3hr_Chicago | CB65 | 0.0374 | 3.0 | 90.6 | 10.4 | 0.93 |
| 47_FG | | 5yr_3hr_Chicago | D-MHST-161-S | 0.1159 | 3.0 | 72.2 | 28.4 | 0.79 |
| 47A | | 5yr_3hr_Chicago | MHST-157-S | 0.5412 | 3.0 | 65.0 | 108.0 | 0.70 |
| 47B | | 5yr_3hr_Chicago | BI-SA49-S | 0.2880 | 3.0 | 69.3 | 64.1 | 0.75 |
| 47C | | 5yr_3hr_Chicago | MHST-147-S | 0.0737 | 3.0 | 100.0 | 21.3 | 1.00 |
| 47D | | 5yr_3hr_Chicago | MHST-148-S | 0.4496 | 3.0 | 32.0 | 51.3 | 0.41 |
| 47-EF | | 5yr_3hr_Chicago | 47D | 0.0559 | 3.0 | 59.0 | 12.9 | 0.69 |
| 47G | | 5yr_3hr_Chicago | MHST-147-S | 0.0080 | 3.0 | 100.0 | 2.3 | 1.00 |
| 5 | | 5yr_3hr_Chicago | preston | 0.0120 | 3.0 | 100.0 | 3.5 | 1.00 |
| 53 | | 5yr_3hr_Chicago | MH-SA56-3 | 0.1516 | 2.0 | 61.5 | 31.8 | 0.68 |
| 54A | | 5yr_3hr_Chicago | CB_54A | 0.2598 | 2.0 | 73.0 | 60.9 | 0.78 |
| 54B | | 5yr_3hr_Chicago | CB_54B | 0.2799 | 2.0 | 77.1 | 68.4 | 0.82 |
| 55A | | 5yr_3hr_Chicago | MH-SA56-1 | 0.0348 | 2.0 | 100.0 | 10.1 | 1.00 |
| 55B | | 5yr_3hr_Chicago | MH-SA56-2 | 0.0244 | 2.0 | 100.0 | 7.1 | 1.00 |
| 55C | | 5yr_3hr_Chicago | CB225-S | 0.0149 | 0.5 | 100.0 | 4.3 | 1.01 |
| 55d | | 5yr_3hr_Chicago | CB209 | 0.0276 | 6.0 | 63.6 | 6.7 | 0.73 |
| 56A | | 5yr_3hr_Chicago | MHST-120-S | 0.3601 | 5.0 | 31.2 | 39.0 | 0.38 |
| 56B | | 5yr_3hr_Chicago | MHST-106-S | 0.0565 | 5.0 | 86.0 | 15.4 | 0.90 |
| 56C | | 5yr_3hr_Chicago | MSHT-103-S | 0.1354 | 5.0 | 82.0 | 35.4 | 0.86 |
| 56D | | 5yr_3hr_Chicago | MHST-102-S | 0.0761 | 5.0 | 84.7 | 20.6 | 0.89 |
| 56E | | 5yr_3hr_Chicago | MHST-101-S | 0.0805 | 5.0 | 77.3 | 20.7 | 0.83 |
| 56F | | 5yr_3hr_Chicago | Carling_OLFN3 | 0.0180 | 5.0 | 77.4 | 4.8 | 0.84 |
| 56G | | 5yr_3hr_Chicago | CB225-S | 0.1673 | 5.0 | 50.1 | 29.7 | 0.58 |
| 57 | | 5yr_3hr_Chicago | Carling_OLF1 | 0.1534 | 15.0 | 6.9 | 24.1 | 0.29 |
| 58 | | 5yr_3hr_Chicago | 46 | 0.4475 | 16.0 | 10.2 | 31.6 | 0.21 |
| 59_D-G | | 5yr_3hr_Chicago | Chamber201 | 0.4461 | 2.0 | 90.7 | 121.2 | 0.94 |
| 59A | | 5yr_3hr_Chicago | TD_A | 0.0501 | 2.0 | 90.7 | 14.0 | 0.93 |
| 59B | | 5yr_3hr_Chicago | TD_B | 0.1795 | 2.0 | 90.7 | 49.9 | 0.94 |
| 59G | | 5yr_3hr_Chicago | CB130 | 0.0764 | 2.0 | 53.4 | 16.7 | 0.64 |
| 6 | | 5yr_3hr_Chicago | 3 | 0.1396 | 3.0 | 2.1 | 11.1 | 0.18 |
| 60A | | 5yr_3hr_Chicago | ST-60-S-B | 0.6561 | 25.0 | 22.7 | 68.3 | 0.33 |
| 60B | | 5yr_3hr_Chicago | DICB8 | 0.4884 | 25.0 | 30.4 | 60.2 | 0.40 |
| 62 | External | 5yr_3hr_Chicago | POW_D1 | 0.2744 | 5.0 | 61.7 | 46.7 | 0.66 |
| 62A | External | 5yr_3hr_Chicago | POW_D1 | 0.6276 | 6.0 | 25.0 | 55.1 | 0.31 |
| 62B | | 5yr_3hr_Chicago | MHST-136-S | 0.0620 | 3.0 | 0.0 | 1.9 | 0.10 |
| 62C | External | 5yr_3hr_Chicago | POW_D1 | 1.1137 | 5.0 | 61.8 | 162.0 | 0.65 |
| 63 | | 5yr_3hr_Chicago | S-63 | 0.6280 | 2.0 | 67.5 | 157.8 | 0.78 |
| 65A | | 5yr_3hr_Chicago | MHST-153-S | 0.0894 | 3.6 | 63.3 | 19.4 | 0.70 |
| 65BEFC | | 5yr_3hr_Chicago | MHST-137-S | 0.2015 | 3.6 | 37.9 | 26.2 | 0.45 |
| 65D | | 5yr_3hr_Chicago | SW_65D | 0.1128 | 3.0 | 5.0 | 4.3 | 0.14 |
| 65GC | | 5yr_3hr_Chicago | MHST-136-S | 0.1771 | 3.6 | 65.5 | 37.1 | 0.71 |
| 66A | | 5yr_3hr_Chicago | CHAMBER-102 | 0.0642 | 6.0 | 53.8 | 13.9 | 0.64 |
| 66B | | 5yr_3hr_Chicago | CBMHST105 | 0.1106 | 6.0 | 73.8 | 27.1 | 0.80 |
| 67 | | 5yr_3hr_Chicago | CB95 | 0.6208 | 3.0 | 59.8 | 121.6 | 0.66 |
| 7 | | 5yr_3hr_Chicago | 2 | 0.0165 | 3.0 | 100.0 | 4.8 | 1.00 |
| 8 | | 5yr_3hr_Chicago | 2 | 0.0188 | 3.0 | 100.0 | 5.5 | 1.00 |
| 9 | | 5yr_3hr_Chicago | 1 | 0.0192 | 3.0 | 100.0 | 5.6 | 1.00 |
| S-10 | | 5yr_3hr_Chicago | MHST-211 | 0.2975 | 2.0 | 100.0 | 83.1 | 1.02 |
| S-11 | | 5yr_3hr_Chicago | MHST-213 | 0.4008 | 2.0 | 100.0 | 108.5 | 1.02 |
| S11-A | | 5yr_3hr_Chicago | MHST-213 | 0.0107 | 2.0 | 100.0 | 3.1 | 1.00 |
| S11-B | | 5yr_3hr_Chicago | MHST-213 | 0.0153 | 2.0 | 69.2 | 3.8 | 0.77 |
| S-12 | | 5yr_3hr_Chicago | MH-SA51-1 | 0.0933 | 2.0 | 74.5 | 23.4 | 0.81 |
| S-3 | | 5yr_3hr_Chicago | MH-SA50 | 0.3456 | 2.0 | 99.9 | 95.1 | 1.02 |
| S-4 | | 5yr_3hr_Chicago | MH-SA49 | 0.2910 | 2.0 | 99.8 | 81.3 | 1.01 |
| S-5 | | 5yr_3hr_Chicago | MH-SA51-2 | 0.2767 | 2.0 | 64.2 | 58.4 | 0.70 |
| S-6 | | 5yr_3hr_Chicago | MH-SA51-1 | 0.2932 | 2.0 | 65.3 | 62.4 | 0.71 |
| S-7 | | 5yr_3hr_Chicago | MH-SA56-1 | 0.2899 | 2.0 | 77.2 | 70.1 | 0.82 |
| S-8 | | 5yr_3hr_Chicago | MH-SA56-2 | 0.2768 | 2.0 | 75.4 | 66.5 | 0.80 |
| S-9 | | 5yr_3hr_Chicago | MH-SA56-3 | 0.2599 | 2.0 | 71.4 | 57.6 | 0.76 |

## CONDUITS 1/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | CBMHST105 | CBMHST103 | | 17.6 | 72.40 | 72.13 | CIRCULAR | 0.38 | | 0.01534 | 148.2 |
| 11 | CB_54A | CB225-S | Major_System | 29.9 | 79.69 | 77.71 | RECT_OPEN | 0.15 | | 0.06634 | 0.0 |
| 12 | CB_54B | CB209 | major_system | 33.4 | 79.67 | 77.64 | RECT_OPEN | 0.15 | | 0.06086 | 63.0 |
| 15 | SW_42I | DICB9 | major_system | 41.1 | 75.31 | 74.28 | TRAPEZOIDAL | 1.00 | | 0.02509 | 0.0 |
| 16 | MH207 | Chamber-204 | | 25.3 | 73.98 | 73.88 | CIRCULAR | 0.38 | | 0.00395 | 57.7 |
| 17 | D-Chamber-204 | MHST-141 | | 21.1 | 73.03 | 72.98 | CIRCULAR | 0.30 | | 0.00237 | 39.7 |
| 19 | DICB9 | CBMHST-103-S | major_system | 21.8 | 74.28 | 74.26 | TRAPEZOIDAL | 0.50 | | 0.00092 | 17.0 |
| 2 | MHST-105-S | Wales-OLF-N03 | Major_System | 17.0 | 68.69 | 68.20 | IRREGULAR | 0.00 | Road-B | 0.02884 | 7.0 |
| 21 | MHST-157-S | CB65 | Major_System | 36.2 | 74.22 | 73.54 | IRREGULAR | 0.00 | Road-D | 0.01881 | 0.0 |
| 23 | CBMHST-103-S | ST-60-S-B | major_system | 22.5 | 74.26 | 74.11 | TRAPEZOIDAL | 0.50 | | 0.00667 | 14.5 |
| 25 | CB91 | CB94 | major_system | 29.3 | 75.14 | 75.03 | RECT_OPEN | 0.30 | | 0.00375 | 38.2 |
| 27 | TD_A | MHST-221 | | 75.5 | 67.42 | 66.62 | CIRCULAR | 0.20 | | 0.01060 | 13.7 |
| 28 | MHST-221 | PS | | 26.8 | 66.63 | 66.42 | CIRCULAR | 0.30 | | 0.00765 | 62.6 |
| 3 | Preston | Preston_Street | | 10.0 | 61.03 | 60.90 | CIRCULAR | 0.30 | | 0.01300 | 73.2 |
| 30 | TD_B | MHST-221 | | 25.5 | 67.88 | 67.60 | CIRCULAR | 0.30 | | 0.01084 | 49.6 |
| 32 | CB225-S | CB26 | Major_System | 28.5 | 77.71 | 75.96 | RECT_OPEN | 0.15 | | 0.06143 | 33.3 |
| 34 | CB26 | MHST-120-S | Major_System | 33.4 | 75.96 | 74.46 | RECT_OPEN | 0.15 | | 0.04502 | 32.8 |
| 4 | OGS-3 | MHST62528 | | 10.0 | 67.62 | 67.60 | CIRCULAR | 1.20 | | 0.00200 | 1182.0 |
| 41 | CB209 | MHST-120-S | Major_System | 34.7 | 77.64 | 74.46 | RECT_OPEN | 0.15 | | 0.09199 | 67.8 |
| 5 | MHST62528 | MHST62545 | | 91.8 | 67.56 | 66.71 | CIRCULAR | 1.20 | | 0.00929 | 1178.3 |
| 6 | MHST62545 | MHST62547 | | 129.6 | 66.69 | 64.45 | CIRCULAR | 1.20 | | 0.01726 | 1175.0 |
| 7 | MHST62547 | Dows-Lake | | 171.0 | 64.17 | 63.75 | CIRCULAR | 1.20 | | 0.00249 | 1169.6 |
| 8 | POW_D1 | OGS-3 | | 180.0 | 78.70 | 69.70 | TRAPEZOIDAL | 0.55 | | 0.05006 | 243.4 |
| 8_1 | CHAMBER-103 | D-MHST-155 | | 3.1 | 74.08 | 74.06 | CIRCULAR | 0.90 | | 0.00645 | 716.9 |
| 8_1-S | CHAMBER-103 | MHST-155 | Major_System | 14.7 | 79.00 | 78.70 | RECT_OPEN | 0.30 | | 0.02037 | 0.0 |
| 9 | CBMHST103 | CHAMBER-102 | | 2.6 | 72.10 | 72.07 | CIRCULAR | 0.38 | | 0.01154 | 182.5 |
| CA-OLF_2 | Carling_OLF1 | Carling_OLFN1 | Major_System | 120.4 | 66.50 | 65.41 | IRREGULAR | 0.00 | CarlingAve | 0.00907 | 21.6 |
| CA-OLF_3 | Carling_OLFN3 | Carling_OLF | Major_System | 66.5 | 64.80 | 64.60 | IRREGULAR | 0.00 | CarlingAve | 0.00301 | 58.1 |
| CA-OLF_4 | Carling_OLFN1 | Carling_OLFN3 | Major_System | 67.1 | 65.41 | 64.80 | IRREGULAR | 0.00 | CarlingAve | 0.00906 | 42.0 |
| CA-STM | IN119607 | D-MHST-100 | | 86.0 | 63.10 | 62.80 | CIRCULAR | 0.30 | | 0.00349 | 4.7 |
| ST-100_2 | D-MHST-100 | Nepean-Bay-Trunk | | 6.0 | 63.06 | 63.04 | CIRCULAR | 0.90 | | 0.00333 | 173.9 |
| ST-100-S | MHST-100-S | Carling_OLFN3 | Major_System | 11.0 | 65.42 | 64.80 | IRREGULAR | 0.00 | Road-A | 0.05645 | 20.9 |
| ST-101I | MHST-101 | MHST-100 | | 27.4 | 63.12 | 63.09 | CIRCULAR | 0.90 | | 0.00109 | 170.4 |
| ST-101I-S | MHST-101-S | MHST-100-S | Major_System | 27.4 | 66.07 | 65.42 | IRREGULAR | 0.00 | Road-A | 0.02371 | 21.1 |
| ST-102 | CBMHST-101 | CBMHST105 | | 47.9 | 73.63 | 72.43 | CIRCULAR | 0.38 | | 0.02505 | 121.0 |

## CONDUITS 2/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-102I | MHST-102 | MHST-101 | | 27.2 | 63.15 | 63.12 | CIRCULAR | 1.50 | | 0.00110 | 161.3 |
| ST-102I-S | MHST-102-S | MHST-101-S | Major_System | 27.2 | 66.28 | 66.07 | IRREGULAR | 0.00 | Road-A | 0.00773 | 10.8 |
| ST-103I | MSHT-103 | MHST-102 | | 52.9 | 63.20 | 63.15 | CIRCULAR | 1.50 | | 0.00100 | 180.6 |
| ST-103I-S | MSHT-103-S | MHST-102-S | Major_System | 52.9 | 66.13 | 66.28 | IRREGULAR | 0.00 | Road-A | -0.00283 | 6.6 |
| ST-104 | CBMHST-104 | CBMHST-101 | | 15.1 | 74.14 | 73.84 | CIRCULAR | 0.38 | | 0.01983 | 117.9 |
| ST-104_1 | BI-SA1 | MHST-104 | | 38.3 | 63.67 | 63.63 | CIRCULAR | 1.20 | | 0.00102 | 175.4 |
| ST-104_2 | MHST-105 | BI-SA1 | | 87.8 | 63.79 | 63.70 | CIRCULAR | 1.20 | | 0.00100 | 58.4 |
| ST-104I | MHST-104 | MSHT-103 | | 32.8 | 63.53 | 63.50 | CIRCULAR | 1.20 | | 0.00101 | 184.3 |
| ST-105I_1-S | BI-SA1-S | MHST-105-S | Major_System | 87.8 | 70.15 | 68.64 | IRREGULAR | 0.00 | Road-B | 0.01719 | 56.1 |
| ST-105I_2-S | MHST-104-S | BI-SA1-S | Major_System | 37.7 | 70.80 | 70.15 | IRREGULAR | 0.00 | Road-B | 0.01723 | 16.1 |
| ST-106I | MHST-106 | MSHT-103 | | 44.7 | 63.23 | 63.20 | CIRCULAR | 1.50 | | 0.00067 | 22.9 |
| ST-106I-S | MHST-106-S | MSHT-103-S | Major_System | 29.6 | 71.87 | 66.13 | IRREGULAR | 0.00 | Road-A | 0.19783 | 48.1 |
| ST-107 | D-MHST-170 | MHST-158 | | 13.3 | 71.93 | 71.80 | CIRCULAR | 0.30 | | 0.00977 | 19.8 |
| ST-120-S_1 | MHST-120-S | CB68 | Major_System | 33.8 | 74.46 | 72.63 | IRREGULAR | 0.00 | Road-A | 0.05427 | 119.9 |
| ST-120-S_2 | CB68 | MHST-106-S | Major_System | 11.0 | 72.63 | 71.87 | IRREGULAR | 0.00 | Road-A | 0.06909 | 44.4 |
| ST-130 | MHST-130 | OGS-3 | | 35.6 | 67.69 | 67.62 | CIRCULAR | 1.00 | | 0.00197 | 1073.5 |
| ST-131_1 | MHST-212 | 13 | | 25.4 | 67.95 | 67.93 | CIRCULAR | 0.83 | | 0.00094 | 137.1 |
| ST-131_2 | 13 | MHST-130 | | 49.1 | 67.93 | 67.88 | CIRCULAR | 0.83 | | 0.00096 | 168.2 |
| ST-132 | MHST-132 | MHST-156 | | 41.9 | 73.25 | 72.62 | CIRCULAR | 0.45 | | 0.01505 | 81.2 |
| ST-133 | Chamber201S | MHST-212 | | 2.9 | 67.95 | 67.95 | CIRCULAR | 0.83 | | -0.00034 | 112.7 |
| ST-134 | MHST-134 | MHST-138 | | 17.5 | 76.62 | 76.18 | CIRCULAR | 0.38 | | 0.02515 | 54.1 |
| ST-135 | MHST-135 | MHST-148 | | 28.3 | 70.62 | 70.60 | CIRCULAR | 1.35 | | 0.00071 | 534.8 |
| ST-136 | MHST-136 | MHST-137 | | 57.8 | 78.65 | 77.30 | CIRCULAR | 0.30 | | 0.02338 | 31.9 |
| ST-136-S | MHST-136-S | MHST-137-S | Major_System | 59.7 | 81.70 | 79.79 | IRREGULAR | 0.00 | Road-E_S | 0.03201 | 6.5 |
| ST-137 | MHST-137 | MHST-134 | | 22.4 | 77.24 | 76.68 | CIRCULAR | 0.38 | | 0.02501 | 54.0 |
| ST-137-S | MHST-137-S | MHST-153-S | Major_System | 85.8 | 79.79 | 76.52 | IRREGULAR | 0.00 | Road-E_S | 0.03813 | 9.7 |
| ST-138 | MHST-138 | MHST-153 | | 38.9 | 75.17 | 74.20 | CIRCULAR | 0.38 | | 0.02494 | 54.0 |
| ST-141 | MHST-141 | MHST-160 | | 47.1 | 71.42 | 71.30 | CIRCULAR | 0.90 | | 0.00255 | 483.8 |
| ST-141-S | MHST-151-S | MHST-141-S | Major_System | 61.2 | 77.12 | 75.21 | IRREGULAR | 0.00 | Road-E_S | 0.03122 | 8.4 |
| ST-142 | D-MHST-142 | MHST-130 | | 29.3 | 67.74 | 67.69 | CIRCULAR | 1.20 | | 0.00171 | 955.0 |
| ST-143 | MHST-143 | MHST-159 | | 38.2 | 69.45 | 69.41 | CIRCULAR | 1.35 | | 0.00105 | 948.9 |
| ST-144A | MHST-144 | CONNECT | | 56.7 | 69.68 | 69.56 | CIRCULAR | 1.35 | | 0.00212 | 860.8 |
| ST-144B | CONNECT | MHST-143 | | 37.1 | 69.56 | 69.48 | CIRCULAR | 1.35 | | 0.00216 | 950.8 |
| ST-145_1 | D-MHST-145 | MHST-144 | | 71.4 | 69.90 | 69.83 | CIRCULAR | 1.20 | | 0.00098 | 863.1 |
| ST-146_1-S | MHST-146-S | BI-SA49-S | Major_System | 5.7 | 75.38 | 75.35 | IRREGULAR | 0.00 | Road-D | 0.00509 | 3.8 |

## CONDUITS 3/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_2 | D-MHST-146_1 | MHST-200 | | 27.7 | 70.17 | 70.13 | CIRCULAR | 1.50 | | 0.00144 | 1332.8 |
| ST-146_2-S | BI-SA49-S | MHST-157-S | Major_System | 91.1 | 75.35 | 74.63 | IRREGULAR | 0.00 | Road-D | 0.00791 | 13.1 |
| ST-147 | MHST-147 | MHST-146 | | 40.9 | 70.25 | 70.20 | CIRCULAR | 1.50 | | 0.00122 | 1228.7 |
| ST-147-S | MHST-147-S | MHST-146-S | Major_System | 40.8 | 76.00 | 75.38 | IRREGULAR | 0.00 | Road-D | 0.01521 | 11.5 |
| ST-148 | MHST-148 | MHST-147 | | 86.4 | 70.45 | 70.28 | CIRCULAR | 1.50 | | 0.00197 | 1198.2 |
| ST-148-S | MHST-148-S | MHST-147-S | Major_System | 93.3 | 80.37 | 76.00 | IRREGULAR | 0.00 | Road-D | 0.04688 | 29.5 |
| ST-149 | MHST-149 | MHST-135 | | 33.9 | 70.69 | 70.65 | CIRCULAR | 1.35 | | 0.00118 | 526.8 |
| ST-149-S | MHST-135-S | MHST-149-S | Major_System | 44.3 | 79.68 | 77.93 | IRREGULAR | 0.00 | Road-E_C | 0.03950 | 6.4 |
| ST-150 | MHST-150 | MHST-149 | | 18.1 | 70.76 | 70.72 | CIRCULAR | 1.35 | | 0.00220 | 503.6 |
| ST-150-S | MHST-149-S | MHST-150-S1 | Major_System | 36.4 | 77.93 | 77.24 | IRREGULAR | 0.00 | Road-E_C | 0.01895 | 8.3 |
| ST-151 | MHST-151 | MHST-150 | | 30.3 | 71.23 | 71.21 | CIRCULAR | 0.90 | | 0.00066 | 485.2 |
| ST-151-S | MHST-150-S1 | MHST-151-S | Major_System | 14.8 | 77.24 | 77.12 | IRREGULAR | 0.00 | Road-E_S | 0.00808 | 1.7 |
| ST-153_2 | MHST-153 | MHST-158 | | 67.4 | 72.86 | 72.19 | CIRCULAR | 0.38 | | 0.00995 | 95.8 |
| ST-153-S | MHST-153-S | DICB9 | Major_System | 77.3 | 76.52 | 74.80 | IRREGULAR | 0.00 | Road-E_S | 0.02224 | 6.4 |
| ST-154 | MHST-154 | CHAMBER-103 | | 16.0 | 75.80 | 75.72 | CIRCULAR | 0.90 | | 0.00500 | 1371.4 |
| ST-154A | MHST-154A | MHST-154B | | 15.5 | 76.18 | 76.10 | CIRCULAR | 0.90 | | 0.00516 | 1367.5 |
| ST-154B | MHST-154B | MHST-154 | | 35.9 | 76.04 | 75.86 | CIRCULAR | 0.90 | | 0.00501 | 1367.4 |
| ST-155_3 | MHST-155 | MHST-148 | | 22.3 | 74.03 | 73.82 | CIRCULAR | 0.90 | | 0.00942 | 724.2 |
| ST-156 | MHST-156 | MHST_156B | | 16.0 | 70.13 | 70.12 | CIRCULAR | 1.50 | | 0.00062 | 258.7 |
| ST-156B | MHST_156B | MHST-157 | | 18.8 | 70.09 | 70.08 | CIRCULAR | 1.50 | | 0.00053 | 249.2 |
| ST-157_1 | MHST-157 | D-MHST-157B | | 13.5 | 70.02 | 70.00 | CIRCULAR | 1.50 | | 0.00148 | 1442.1 |
| ST-157_2 | D-MHST-157B | MHST-145 | | 14.7 | 69.97 | 69.96 | CIRCULAR | 1.50 | | 0.00068 | 696.1 |
| ST-157_3 | D-MHST-157B | CHAMBER-104B | | 9.4 | 69.97 | 69.91 | CIRCULAR | 0.90 | | 0.00638 | 804.6 |
| ST-158 | MHST-158 | MHST-141 | | 82.5 | 71.74 | 71.57 | CIRCULAR | 0.75 | | 0.00206 | 187.5 |
| ST-158-S_1 | MHST-141-S | CB94 | Major_System | 8.2 | 75.21 | 75.03 | IRREGULAR | 0.00 | Road-E_S | 0.02183 | 4.9 |
| ST-158-S_2 | CB94 | MHST-158-S | Major_System | 76.3 | 75.03 | 74.57 | IRREGULAR | 0.00 | Road-E_S | 0.00603 | 38.4 |
| ST-159 | MHST-159 | MHST-142 | | 44.6 | 69.41 | 69.32 | CIRCULAR | 1.35 | | 0.00202 | 947.8 |
| ST-160 | MHST-160 | MHST-151 | | 22.3 | 71.27 | 71.23 | CIRCULAR | 0.90 | | 0.00179 | 483.6 |
| ST-161_2-S | D-MHST-161-S | MHST-148-S | Major_System | 52.7 | 81.44 | 80.37 | IRREGULAR | 0.00 | Road-D | 0.02031 | 10.4 |
| ST-162 | CBMHST-162 | MHST-154A | | 5.4 | 76.27 | 76.24 | CIRCULAR | 0.90 | | 0.00561 | 1279.2 |
| ST-200_1 | MHST-200 | MHST-201 | | 42.9 | 70.11 | 70.05 | CIRCULAR | 1.50 | | 0.00140 | 689.4 |
| ST-200_2 | MHST-200 | CHAMBER-104-A | | 8.4 | 70.17 | 70.13 | CIRCULAR | 0.90 | | 0.00476 | 659.8 |
| ST-201 | MHST-201 | MHST-157 | | 6.5 | 70.07 | 70.05 | CIRCULAR | 1.50 | | 0.00308 | 1200.3 |
| ST-202 | Chamber202-S | CONNECT | | 5.2 | 70.84 | 70.80 | CIRCULAR | 0.45 | | 0.00769 | 80.5 |
| ST-203 | MHST-203 | MHST-205 | | 8.6 | 73.11 | 73.09 | CIRCULAR | 0.68 | | 0.00232 | 140.4 |

## CONDUITS 4/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-204 | MHST-204 | MHST-205 | | 12.7 | 73.11 | 73.09 | CIRCULAR | 0.53 | | 0.00158 | 77.8 |
| ST-205 | MHST-205 | MHST-206 | | 28.9 | 72.94 | 72.91 | CIRCULAR | 0.68 | | 0.00104 | 217.4 |
| ST-206 | MHST-206 | Chamber202 | | 10.3 | 72.91 | 72.88 | CIRCULAR | 0.68 | | 0.00341 | 306.3 |
| ST-208 | MHST-208 | MHST-209 | | 19.4 | 73.41 | 73.35 | CIRCULAR | 0.38 | | 0.00309 | 89.0 |
| ST-209 | MHST-209 | MHST-206 | | 28.6 | 73.32 | 73.21 | CIRCULAR | 0.38 | | 0.00385 | 89.4 |
| ST-211 | MHST-211 | Chamber201 | | 43.1 | 68.31 | 68.24 | CIRCULAR | 0.53 | | 0.00162 | 81.4 |
| ST-214 | MHST-214 | MHST-215 | | 38.3 | 68.23 | 68.27 | CIRCULAR | 0.75 | | -0.00104 | 112.9 |
| ST-215 | MHST-215 | Chamber201 | | 1.7 | 68.27 | 68.27 | CIRCULAR | 0.75 | | 0.00000 | 112.6 |
| ST-225 | CB225 | Chamber202 | | 29.0 | 73.46 | 73.17 | CIRCULAR | 0.20 | | 0.00997 | 0.0 |
| ST-42I | MHST-158-S | DICB9 | major_system | 9.7 | 74.58 | 74.28 | IRREGULAR | 0.00 | Road-E_S | 0.03109 | 13.6 |
| ST-60-S_1 | ST-60-S-B | DICB8 | Major_System | 125.5 | 74.11 | 69.82 | TRAPEZOIDAL | 1.00 | | 0.03419 | 78.2 |
| ST-62534 | MHST-62534 | CBMHST-162 | | 7.2 | 76.90 | 76.27 | CIRCULAR | 0.90 | | 0.08833 | 1278.3 |
| ST-62538 | MHST-161 | MHST-155 | | 13.4 | 78.96 | 78.70 | CIRCULAR | 0.53 | | 0.01941 | 17.6 |
| St-C104 | CHAMBER-104-A | MHST-201 | | 13.1 | 70.13 | 70.07 | CIRCULAR | 0.90 | | 0.00458 | 530.9 |
| ST-C203 | D-Chamber-203 | MHST-146 | | 15.9 | 71.42 | 71.38 | CIRCULAR | 0.30 | | 0.00251 | 63.9 |
| ST-CB6-S | SW_65D | DICB6 | major_system | 104.0 | 77.94 | 76.09 | TRAPEZOIDAL | 0.50 | | 0.01779 | 3.8 |
| ST-G107 | MHST-107 | OGS1 | | 52.5 | 62.03 | 61.24 | CIRCULAR | 0.30 | | 0.01505 | 20.7 |
| ST-OGS1_2 | OGS1 | Preston | | 10.0 | 61.21 | 61.06 | CIRCULAR | 0.30 | | 0.01500 | 54.9 |
| ST-P3 | DICB3 | IN119608 | | 71.1 | 64.23 | 63.80 | CIRCULAR | 0.20 | | 0.00605 | 0.0 |
| ST-P46 | IN119608 | IN119607 | | 30.0 | 63.50 | 63.20 | CIRCULAR | 0.20 | | 0.01000 | 0.0 |
| ST-SA1 | MH-SA1 | BI-SA1 | | 24.7 | 69.45 | 69.08 | CIRCULAR | 0.30 | | 0.01501 | 60.2 |
| ST-SA49 | MH-SA49 | Chamber-203 | | 17.9 | 74.02 | 73.80 | CIRCULAR | 0.38 | | 0.01228 | 81.2 |
| ST-SA50 | MH-SA50 | Chamber-203 | | 13.2 | 74.07 | 73.67 | CIRCULAR | 0.375 | | 0.03032 | 95.1 |
| ST-SA51-1 | MH-SA51-1 | Chamber-204 | | 14.69 | 73.91 | 73.76 | CIRCULAR | 0.45 | | 0.01021 | 85.7 |
| ST-SA51-2 | MH-SA51-2 | MH207 | | 16.236 | 74.11 | 73.98 | CIRCULAR | 0.375 | | 0.00801 | 58.29 |
| ST-SA52_1 | MHST-213 | MHST-214 | | 51.841 | 68.54 | 68.45 | CIRCULAR | 0.525 | | 0.00174 | 112.9 |
| ST-SA56-1 | MH-SA56-1 | MHST-203 | | 5.031 | 73.24 | 73.19 | CIRCULAR | 0.525 | | 0.00994 | 140.49 |
| ST-SA56-2 | MH-SA56-2 | MHST-204 | | 4.866 | 73.24 | 73.19 | CIRCULAR | 0.45 | | 0.01028 | 78.47 |
| ST-SA56-3 | MH-SA56-3 | MHST-208 | | 8.906 | 73.8 | 73.44 | CIRCULAR | 0.375 | | 0.04046 | 89.31 |
| ST-UGS6B | CHAMBER-102 | MHST-170 | | 16.625 | 72.03 | 71.96 | CIRCULAR | 0.375 | | 0.00421 | 19.77 |
| ST-UGS-Z1 | CHAMBER-104B | MHST-145 | | 8.4 | 69.91 | 69.90 | CIRCULAR | 0.90 | | 0.00119 | 282.2 |
| ST-xx | MH-SAxx | MHST-107 | | 10.7 | 62.45 | 62.15 | CIRCULAR | 0.20 | | 0.02805 | 7.0 |
| WD-OLF_3 | Wales-OLF-N03 | Wales-OLF-N04 | Major_System | 81.2 | 68.20 | 66.75 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01786 | 6.6 |
| WD-OLF_4 | Wales-OLF-N04 | Wales-OLF-N05 | Major_System | 95.0 | 66.75 | 65.50 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01316 | 4.4 |

# Junctions 1/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| 13 | | NO | 67.93 | 70.22 | 2.29 | 0.47 | 68.40 | 10/04/2022 01:32 AM |
| BI-SA1 | | NO | 63.50 | 70.48 | 6.98 | 0.52 | 64.02 | 10/04/2022 01:24 AM |
| BI-SA1-S | Major_System | NO | 70.15 | 70.30 | 0.15 | 0.05 | 70.20 | 10/04/2022 01:10 AM |
| BI-SA49-S | Major_System | NO | 75.35 | 75.51 | 0.16 | 0.03 | 75.38 | 10/04/2022 01:10 AM |
| Carling_OLF1 | | NO | 66.50 | 66.70 | 0.20 | 0.05 | 66.55 | 10/04/2022 01:11 AM |
| Carling_OLFN1 | | NO | 65.41 | 65.61 | 0.20 | 0.06 | 65.47 | 10/04/2022 01:12 AM |
| Carling_OLFN3 | | NO | 64.80 | 65.00 | 0.20 | 0.10 | 64.90 | 10/04/2022 01:14 AM |
| CB_54A | | NO | 79.65 | 79.95 | 0.30 | 0.04 | 79.69 | 10/04/2022 01:10 AM |
| CB_54B | | NO | 79.67 | 79.97 | 0.30 | 0.01 | 79.68 | 10/04/2022 01:10 AM |
| CB209 | | NO | 77.64 | 77.79 | 0.15 | 0.01 | 77.65 | 10/04/2022 01:10 AM |
| CB225 | | NO | 73.46 | 77.72 | 4.26 | 0.00 | 73.45 | 10/04/2022 00:00 AM |
| CB225-S | | NO | 77.71 | 77.86 | 0.15 | 0.01 | 77.72 | 10/04/2022 01:10 AM |
| CB26 | | NO | 75.96 | 76.11 | 0.15 | 0.01 | 75.97 | 10/04/2022 01:10 AM |
| CB68 | | NO | 72.63 | 72.79 | 0.16 | 0.03 | 72.66 | 10/04/2022 01:11 AM |
| CB91 | | NO | 75.14 | 75.44 | 0.30 | 0.02 | 75.16 | 10/04/2022 01:10 AM |
| CB94 | | NO | 75.03 | 75.20 | 0.17 | 0.06 | 75.09 | 10/04/2022 01:12 AM |
| CBMHST-101 | | NO | 73.63 | 76.41 | 2.78 | 0.17 | 73.80 | 10/04/2022 01:10 AM |
| CBMHST103 | | NO | 72.10 | 74.28 | 2.18 | 0.76 | 72.86 | 10/04/2022 01:41 AM |
| CBMHST-103-S | | NO | 74.26 | 74.56 | 0.30 | 0.02 | 74.28 | 10/04/2022 01:11 AM |
| CBMHST-104 | | NO | 74.14 | 76.59 | 2.45 | 0.18 | 74.32 | 10/04/2022 01:10 AM |
| CBMHST105 | | NO | 72.40 | 74.73 | 2.33 | 0.47 | 72.87 | 10/04/2022 01:41 AM |
| CBMHST-162 | | NO | 76.10 | 82.72 | 6.62 | 0.84 | 76.94 | 10/04/2022 01:10 AM |
| Chamber201S | | NO | 67.95 | 68.95 | 1.00 | 0.46 | 68.41 | 10/04/2022 01:28 AM |
| Chamber202-S | | NO | 70.84 | 73.59 | 2.75 | 0.18 | 71.02 | 10/04/2022 01:24 AM |
| CONNECT | | NO | 69.56 | 74.02 | 4.46 | 0.94 | 70.50 | 10/04/2022 01:37 AM |
| D-Chamber-203 | | NO | 71.42 | 75.05 | 3.63 | 0.25 | 71.67 | 10/04/2022 01:20 AM |
| D-Chamber-204 | | NO | 73.03 | 74.63 | 1.60 | 0.19 | 73.22 | 10/04/2022 01:23 AM |
| DICB3 | | NO | 64.00 | 66.43 | 2.43 | 0.00 | 64.00 | 10/04/2022 00:00 AM |
| DICB6 | | NO | 74.70 | 76.59 | 1.89 | 0.01 | 74.71 | 10/04/2022 01:13 AM |
| DICB9 | | NO | 74.28 | 74.48 | 0.20 | 0.05 | 74.33 | 10/04/2022 01:10 AM |
| D-MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 0.70 | 63.30 | 10/04/2022 01:23 AM |
| D-MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 0.60 | 68.40 | 10/04/2022 01:32 AM |
| D-MHST-145 | | NO | 69.90 | 74.34 | 4.44 | 0.71 | 70.61 | 10/04/2022 01:36 AM |
| D-MHST-146_1 | | NO | 70.17 | 75.39 | 5.22 | 0.76 | 70.93 | 10/04/2022 01:34 AM |
| D-MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 0.93 | 74.96 | 10/04/2022 01:18 AM |
| D-MHST-157B | | NO | 69.97 | 74.44 | 4.47 | 0.95 | 70.92 | 10/04/2022 01:35 AM |
| D-MHST-161-S | Major_System | NO | 81.44 | 81.60 | 0.16 | 0.02 | 81.46 | 10/04/2022 01:10 AM |
| D-MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 0.13 | 72.06 | 10/04/2022 01:11 AM |
| IN119607 | | NO | 63.00 | 65.62 | 2.62 | 0.30 | 63.30 | 10/04/2022 01:24 AM |
| IN119608 | | NO | 63.50 | 66.14 | 2.64 | 0.00 | 63.50 | 10/04/2022 00:00 AM |
| MH207 | | NO | 73.95 | 75.43 | 1.48 | 0.22 | 74.17 | 10/04/2022 01:10 AM |
| MH-SA1 | | NO | 69.45 | 70.55 | 1.10 | 0.15 | 69.60 | 10/04/2022 01:01 AM |
| MH-SA49 | | NO | 73.97 | 75.45 | 1.48 | 0.22 | 74.19 | 10/04/2022 01:10 AM |
| MH-SA50 | | NO | 74.07 | 75.83 | 1.76 | 0.14 | 74.21 | 10/04/2022 01:10 AM |

## Junctions 2/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MH-SA51-1 | | NO | 74.08 | 76.53 | 2.45 | 0.14 | 74.22 | 10/04/2022 01:10 AM |
| MH-SA51-2 | | NO | 74.84 | 76.50 | 1.66 | 0.10 | 74.94 | 10/04/2022 01:10 AM |
| MH-SA56-1 | | NO | 73.24 | 74.54 | 1.30 | 0.21 | 73.45 | 10/04/2022 01:10 AM |
| MH-SA56-2 | | NO | 73.24 | 74.54 | 1.30 | 0.16 | 73.40 | 10/04/2022 01:10 AM |
| MH-SA56-3 | | NO | 73.80 | 75.80 | 2.00 | 0.13 | 73.93 | 10/04/2022 01:10 AM |
| MH-SAxx | | NO | 62.00 | 64.50 | 2.50 | 0.50 | 62.50 | 10/04/2022 00:25 AM |
| MHST_156B | | NO | 70.09 | 74.24 | 4.15 | 0.83 | 70.92 | 10/04/2022 01:35 AM |
| MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 1.41 | 64.01 | 10/04/2022 01:23 AM |
| MHST-100-S | Major_System | NO | 65.42 | 65.72 | 0.30 | 0.02 | 65.44 | 10/04/2022 01:10 AM |
| MHST-101 | | NO | 63.00 | 66.07 | 3.07 | 1.01 | 64.01 | 10/04/2022 01:23 AM |
| MHST-101-S | Major_System | NO | 66.07 | 66.23 | 0.16 | 0.03 | 66.10 | 10/04/2022 01:10 AM |
| MHST-102 | | NO | 63.00 | 66.28 | 3.28 | 1.01 | 64.01 | 10/04/2022 01:23 AM |
| MHST-102-S | Major_System | NO | 66.28 | 66.44 | 0.16 | 0.03 | 66.31 | 10/04/2022 01:10 AM |
| MHST-104 | | NO | 63.30 | 70.80 | 7.50 | 0.71 | 64.01 | 10/04/2022 01:24 AM |
| MHST-104-S | Major_System | NO | 70.80 | 70.95 | 0.15 | 0.03 | 70.83 | 10/04/2022 01:10 AM |
| MHST-105 | | NO | 63.60 | 69.13 | 5.53 | 0.42 | 64.02 | 10/04/2022 01:21 AM |
| MHST-105-S | Major_System | NO | 68.64 | 68.79 | 0.15 | 0.07 | 68.71 | 10/04/2022 01:11 AM |
| MHST-106 | | NO | 63.00 | 71.87 | 8.87 | 1.01 | 64.01 | 10/04/2022 01:24 AM |
| MHST-106-S | Major_System | NO | 71.87 | 72.03 | 0.16 | 0.03 | 71.90 | 10/04/2022 01:11 AM |
| MHST-107 | | NO | 62.00 | 64.32 | 2.32 | 0.11 | 62.11 | 10/04/2022 01:10 AM |
| MHST-120-S | Major_System | NO | 74.46 | 74.62 | 0.16 | 0.05 | 74.51 | 10/04/2022 01:10 AM |
| MHST-130 | | NO | 67.69 | 70.21 | 2.52 | 0.67 | 68.36 | 10/04/2022 01:32 AM |
| MHST-132 | | NO | 73.25 | 75.96 | 2.71 | 0.15 | 73.40 | 10/04/2022 01:10 AM |
| MHST-134 | | NO | 76.62 | 79.19 | 2.57 | 0.11 | 76.73 | 10/04/2022 01:10 AM |
| MHST-135 | | NO | 70.62 | 79.31 | 8.69 | 0.54 | 71.16 | 10/04/2022 01:14 AM |
| MHST-135-S | Major_System | NO | 79.68 | 79.83 | 0.15 | 0.02 | 79.70 | 10/04/2022 01:10 AM |
| MHST-136 | | NO | 78.65 | 81.94 | 3.29 | 0.09 | 78.74 | 10/04/2022 01:10 AM |
| MHST-136-S | | NO | 81.70 | 82.00 | 0.30 | 0.02 | 81.72 | 10/04/2022 01:10 AM |
| MHST-137 | | NO | 77.24 | 80.00 | 2.76 | 0.11 | 77.35 | 10/04/2022 01:10 AM |
| MHST-137-S | | NO | 79.79 | 80.09 | 0.30 | 0.02 | 79.81 | 10/04/2022 01:10 AM |
| MHST-138 | | NO | 75.17 | 78.56 | 3.39 | 0.11 | 75.28 | 10/04/2022 01:10 AM |
| MHST-141 | | NO | 71.42 | 75.17 | 3.75 | 0.47 | 71.89 | 10/04/2022 01:10 AM |
| MHST-141-S | Major_System | NO | 75.21 | 75.36 | 0.15 | 0.02 | 75.23 | 10/04/2022 01:10 AM |
| MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 2.67 | 70.47 | 10/04/2022 01:37 AM |
| MHST-143 | | NO | 69.45 | 74.02 | 4.57 | 1.05 | 70.50 | 10/04/2022 01:37 AM |
| MHST-144 | | NO | 69.68 | 75.30 | 5.62 | 0.84 | 70.52 | 10/04/2022 01:37 AM |
| MHST-145 | | NO | 69.90 | 73.97 | 4.07 | 1.02 | 70.92 | 10/04/2022 01:35 AM |
| MHST-146 | | NO | 70.17 | 75.39 | 5.22 | 0.87 | 71.04 | 10/04/2022 01:15 AM |

## Junctions 3/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-146-S | Major_System | NO | 75.38 | 75.58 | 0.20 | 0.02 | 75.40 | 10/04/2022 01:11 AM |
| MHST-147 | | NO | 70.25 | 75.92 | 5.67 | 0.82 | 71.07 | 10/04/2022 01:15 AM |
| MHST-147-S | Major_System | NO | 76.00 | 76.20 | 0.20 | 0.02 | 76.02 | 10/04/2022 01:11 AM |
| MHST-148 | | NO | 70.45 | 80.13 | 9.68 | 0.70 | 71.15 | 10/04/2022 01:14 AM |
| MHST-148-S | Major_System | NO | 80.37 | 80.53 | 0.16 | 0.03 | 80.40 | 10/04/2022 01:10 AM |
| MHST-149 | | NO | 70.69 | 78.30 | 7.61 | 0.50 | 71.19 | 10/04/2022 01:12 AM |
| MHST-149-S | Major_System | NO | 77.93 | 78.08 | 0.15 | 0.02 | 77.95 | 10/04/2022 01:10 AM |
| MHST-150 | | NO | 70.76 | 77.32 | 6.56 | 0.45 | 71.21 | 10/04/2022 01:12 AM |
| MHST-150-S1 | Major_System | NO | 77.24 | 77.39 | 0.15 | 0.02 | 77.26 | 10/04/2022 01:10 AM |
| MHST-151 | | NO | 71.23 | 77.10 | 5.87 | 0.48 | 71.71 | 10/04/2022 01:11 AM |
| MHST-151-S | Major_System | NO | 77.12 | 77.27 | 0.15 | 0.02 | 77.14 | 10/04/2022 01:10 AM |
| MHST-153 | | NO | 72.86 | 77.00 | 4.14 | 0.20 | 73.06 | 10/04/2022 01:11 AM |
| MHST-153-S | TGCB102 | NO | 76.52 | 76.82 | 0.30 | 0.02 | 76.54 | 10/04/2022 01:10 AM |
| MHST-154 | | NO | 75.60 | 81.92 | 6.32 | 0.92 | 76.52 | 10/04/2022 01:10 AM |
| MHST-154A | | NO | 76.00 | 82.52 | 6.52 | 0.89 | 76.89 | 10/04/2022 01:10 AM |
| MHST-154B | | NO | 75.90 | 81.89 | 5.99 | 0.88 | 76.78 | 10/04/2022 01:10 AM |
| MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 0.40 | 74.43 | 10/04/2022 01:18 AM |
| MHST-156 | | NO | 70.13 | 74.49 | 4.36 | 0.79 | 70.92 | 10/04/2022 01:35 AM |
| MHST-157 | | NO | 70.02 | 74.65 | 4.63 | 0.90 | 70.92 | 10/04/2022 01:35 AM |
| MHST-158 | | YES | 71.74 | 74.80 | 3.06 | 0.32 | 72.06 | 10/04/2022 01:11 AM |
| MHST-158-S | Major_System | NO | 74.58 | 74.88 | 0.30 | 0.03 | 74.61 | 10/04/2022 01:10 AM |
| MHST-159 | | NO | 69.38 | 74.96 | 5.58 | 1.10 | 70.48 | 10/04/2022 01:37 AM |
| MHST-160 | | NO | 71.27 | 76.79 | 5.52 | 0.49 | 71.76 | 10/04/2022 01:11 AM |
| MHST-161 | | NO | 78.96 | 81.88 | 2.92 | 0.06 | 79.02 | 10/04/2022 01:10 AM |
| MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 0.93 | 72.86 | 10/04/2022 01:41 AM |
| MHST-200 | | NO | 70.10 | 74.81 | 4.71 | 0.83 | 70.93 | 10/04/2022 01:35 AM |
| MHST-201 | | NO | 69.96 | 74.74 | 4.78 | 0.96 | 70.92 | 10/04/2022 01:35 AM |
| MHST-203 | | NO | 73.11 | 78.83 | 5.72 | 0.25 | 73.36 | 10/04/2022 01:10 AM |
| MHST-204 | | NO | 73.11 | 78.79 | 5.68 | 0.24 | 73.35 | 10/04/2022 01:10 AM |
| MHST-205 | | NO | 72.94 | 78.20 | 5.26 | 0.39 | 73.33 | 10/04/2022 01:10 AM |
| MHST-206 | | NO | 72.91 | 75.77 | 2.86 | 0.36 | 73.27 | 10/04/2022 01:10 AM |
| MHST-208 | | NO | 73.41 | 77.80 | 4.39 | 0.26 | 73.67 | 10/04/2022 01:10 AM |
| MHST-209 | | NO | 73.35 | 75.76 | 2.41 | 0.23 | 73.58 | 10/04/2022 01:10 AM |
| MHST-211 | | NO | 68.31 | 70.38 | 2.07 | 0.24 | 68.55 | 10/04/2022 01:10 AM |
| MHST-212 | | NO | 67.95 | 70.22 | 2.27 | 0.46 | 68.41 | 10/04/2022 01:28 AM |
| MHST-213 | | NO | 68.54 | 70.24 | 1.70 | 0.29 | 68.83 | 10/04/2022 01:10 AM |

## Junctions 4/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-214 | | NO | 68.23 | 70.31 | 2.08 | 0.33 | 68.56 | 10/04/2022 01:10 AM |
| MHST-215 | | NO | 68.27 | 70.25 | 1.98 | 0.21 | 68.48 | 10/04/2022 01:24 AM |
| MHST-221 | | NO | 66.62 | 69.70 | 3.08 | 0.20 | 66.82 | 10/04/2022 01:10 AM |
| MHST62528 | | NO | 67.34 | 70.08 | 2.74 | 0.68 | 68.02 | 10/04/2022 01:28 AM |
| MHST-62534 | | NO | 76.90 | 82.80 | 5.90 | 0.32 | 77.22 | 10/04/2022 01:10 AM |
| MHST62545 | | NO | 66.53 | 69.90 | 3.37 | 0.55 | 67.08 | 10/04/2022 01:29 AM |
| MHST62547 | | NO | 64.00 | 71.80 | 7.80 | 0.84 | 64.84 | 10/04/2022 01:29 AM |
| MSHT-103 | | NO | 63.00 | 66.13 | 3.13 | 1.01 | 64.01 | 10/04/2022 01:23 AM |
| MSHT-103-S | Major_System | NO | 66.13 | 66.29 | 0.16 | 0.06 | 66.19 | 10/04/2022 01:12 AM |
| OGS1 | | NO | 61.00 | 63.82 | 2.82 | 0.35 | 61.35 | 10/04/2022 01:10 AM |
| OGS-3 | | NO | 67.62 | 70.34 | 2.72 | 0.61 | 68.23 | 10/04/2022 01:28 AM |
| POW_D1 | | NO | 78.70 | 79.30 | 0.60 | 0.12 | 78.82 | 10/04/2022 01:11 AM |
| Preston | | NO | 61.00 | 63.00 | 2.00 | 0.21 | 61.21 | 10/04/2022 01:10 AM |
| ST-60-S-B | | NO | 74.11 | 74.41 | 0.30 | 0.04 | 74.15 | 10/04/2022 01:11 AM |
| SW_42I | | NO | 75.31 | 75.51 | 0.20 | 0.00 | 75.31 | 10/04/2022 00:00 AM |
| SW_65D | | NO | 77.94 | 78.44 | 0.50 | 0.01 | 77.95 | 10/04/2022 01:13 AM |
| TD_A | | NO | 67.42 | 69.10 | 1.68 | 0.09 | 67.51 | 10/04/2022 01:10 AM |
| TD_B | | NO | 67.88 | 69.13 | 1.25 | 0.15 | 68.02 | 10/04/2022 01:10 AM |
| Wales-OLF-N03 | | NO | 68.20 | 68.40 | 0.20 | 0.03 | 68.23 | 10/04/2022 01:12 AM |
| Wales-OLF-N04 | | NO | 66.75 | 66.95 | 0.20 | 0.03 | 66.78 | 10/04/2022 01:16 AM |
| Wales-OLF-N05 | | NO | 65.50 | 65.70 | 0.20 | 0.02 | 65.52 | 10/04/2022 01:18 AM |

## Storage 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Storage Curve | Curve Name | Avg. Depth (m) | Max. Depth (m) | Max. HGL (m) | Max. Volume (1000 m³) | Max. Percent Full (%) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CB130 | 69.90 | 70.10 | 0.20 | TABULAR | CB(600x600) | 0.01 | 0.03 | 69.93 | 0 | 16 | 0.0760 |
| CB65 | 72.16 | 73.70 | 1.54 | TABULAR | CB65 | 0.02 | 0.03 | 72.19 | 0 | 0 | 1.5700 |
| CB95 | 75.52 | 75.82 | 0.30 | TABULAR | CB95-ponding | 0.01 | 0.06 | 75.58 | 0.003 | 4 | 0.6210 |
| CHAMBER-102 | 72.03 | 74.24 | 2.21 | TABULAR | Chamber102 | 0.27 | 0.83 | 72.86 | 0.179 | 38 | 2.7210 |
| CHAMBER-103 | 74.08 | 76.78 | 2.70 | TABULAR | Chamber103 | 0.16 | 0.89 | 74.97 | 0.7 | 33 | 13.6620 |
| CHAMBER-104-A | 70.13 | 72.43 | 2.30 | TABULAR | Chamber104A | 0.16 | 0.79 | 70.92 | 0.453 | 35 | 19.5370 |
| CHAMBER-104B | 69.91 | 72.61 | 2.70 | TABULAR | Chamber104B | 0.26 | 1.01 | 70.92 | 0.637 | 37 | 22.8040 |
| Chamber201 | 67.95 | 69.19 | 1.24 | TABULAR | Chamber201 | 0.13 | 0.53 | 68.48 | 0.217 | 43 | 1.1700 |
| Chamber202 | 70.84 | 72.43 | 1.59 | TABULAR | Chamber202 | 0.12 | 0.56 | 71.40 | 0.221 | 35 | 1.7870 |
| Chamber-203 | 71.42 | 72.90 | 1.48 | TABULAR | Chamber203 | 0.11 | 0.59 | 72.01 | 0.11 | 40 | 0.64 |
| Chamber-204 | 73.03 | 74.36 | 1.33 | TABULAR | Chamber204 | 0.10 | 0.45 | 73.48 | 0.10 | 34 | 0.66 |
| DICB8 | 68.11 | 69.83 | 1.72 | TABULAR | swale | 0.04 | 0.37 | 68.48 | 0.00 | 0 | 2.96 |
| MHST-157-S | 73.80 | 74.23 | 0.43 | TABULAR | CB98-ponding | 0.03 | 0.14 | 73.94 | 0.00 | 7 | 1.53 |
| PS | 64.92 | 70.03 | 5.11 | CYLINDRIC | * | 0.68 | 1.51 | 66.43 | 0.00 | 30 | 0.23 |
| S-14B | 61.65 | 63.30 | 1.65 | TABULAR | S-14B | 0.51 | 1.13 | 62.78 | 0.00 | 3 | 0.13 |
| S-15 | 62.10 | 63.90 | 1.80 | TABULAR | S-15 | 0.21 | 1.40 | 63.50 | 0.01 | 8 | 0.36 |
| S-19 | 64.00 | 66.00 | 2.00 | TABULAR | S-19 | 0.29 | 1.51 | 65.51 | 0.01 | 3 | 0.21 |
| S-21B | 63.54 | 65.70 | 2.16 | TABULAR | S-21B | 1.04 | 1.67 | 65.21 | 0.13 | 10 | 1.81 |
| S-26B | 67.11 | 69.51 | 2.40 | TABULAR | DICB2ponding | 0.35 | 1.88 | 68.98 | 0.02 | 8 | 0.65 |
| S-26D | 67.19 | 69.25 | 2.06 | TABULAR | DICB1 | 0.16 | 1.82 | 69.02 | 0.00 | 4 | 0.08 |
| S-3Store | 62.20 | 64.24 | 2.04 | TABULAR | S-3 | 0.24 | 1.60 | 63.80 | 0.01 | 13 | 0.39 |
| S-63 | 79.80 | 84.02 | 4.22 | TABULAR | S-63 | 0.53 | 3.74 | 83.54 | 0.04 | 14 | 0.92 |
| SA-1 | 69.50 | 72.50 | 3.00 | TABULAR | S-1 | 0.21 | 1.07 | 70.57 | 0.24 | 36 | 1.24 |
| SA-2 | 62.60 | 65.60 | 3.00 | TABULAR | S-2 | 0.49 | 0.97 | 63.57 | 0.29 | 32 | 0.87 |

# Outlets 1/1

| Name | Inlet Node | Outlet Node | Inlet Elev. (m) | Rating Curve | Curve Name | Control Rules | Max. \|Flow\| (L/s) | Contributing Imp. Area (ha) |
|---|---|---|---|---|---|---|---|---|
| 1 | DICB6 | CBMHST-101 | 74.70 | TABULAR/DEPTH | 2CB | NO | 3.75 | 0.01 |
| 13 | CB_54B | MH-SA56-2 | 79.67 | TABULAR/DEPTH | 3CB | NO | 4.91 | 0.22 |
| 14 | CB95 | CBMHST-104 | 75.52 | TABULAR/DEPTH | 3CB | NO | 117.80 | 0.37 |
| 18 | MHST-141-S | MHST-141 | 75.21 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 29.79 | 0.30 |
| 20 | CB65 | MHST-144 | 72.16 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 10.39 | 0.93 |
| 22 | CB225-S | CB225 | 77.71 | TABULAR/DEPTH | S19_SL2_5 | NO | 0.00 | 0.29 |
| 24 | CBMHST-103-S | CBMHST103 | 74.26 | TABULAR/DEPTH | S28_SL4_0.5 | NO | 2.30 | 1.00 |
| 26 | CB91 | MHST-141 | 75.14 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 10.34 | 0.17 |
| 31 | CB26 | Chamber202 | 75.96 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 0.00 | 0.29 |
| BI-SA1-IC | BI-SA1-S | BI-SA1 | 70.15 | TABULAR/DEPTH | 6@R-B@S=1.5% | NO | 45.42 | 0.37 |
| BI-SA49-IC | BI-SA49-S | D-MHST-146_1 | 75.35 | TABULAR/DEPTH | S19_SL2_1x4 | NO | 52.13 | 0.54 |
| CB101_103_105 | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S22_SL2_5x3 | NO | 4.94 | 0.28 |
| CB102_106_DIC | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 37.89 | 0.28 |
| CB130OUT | CB130 | MHST-130 | 69.90 | TABULAR/DEPTH | S19_SL2_1 | NO | 16.73 | 0.04 |
| CB40,66-68 | CB68 | CONNECT | 72.63 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 75.40 | 0.63 |
| CB42-43 | D-MHST-161-S | MHST-161 | 81.44 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 17.59 | 0.08 |
| CB44-45 | MHST-148-S | MHST-148 | 80.37 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 30.40 | 0.26 |
| CB46_57 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 23.92 | 0.34 |
| CB47-55 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S22_SL2_5x8 | NO | 15.96 | 0.34 |
| CB56_58 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S22_SL2_1x2 | NO | 2.14 | 0.34 |
| CB61_104 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S19_SL2_1x2 | NO | 5.45 | 0.34 |
| CB63,64 | MHST-120-S | CONNECT | 74.46 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 16.13 | 0.63 |
| CB69_75 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 2.93 | 0.13 |
| CB74_76_77 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 32.66 | 0.13 |
| CB79-81 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S19_SL2_5x5 | NO | 20.10 | 0.18 |
| CB82 | MHST-151-S | MHST-151 | 77.12 | TABULAR/DEPTH | DB_S22_SL2_5 | NO | 0.00 | 0.21 |
| CB83 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S22_SL2_5 | NO | 0.95 | 0.18 |
| CB84-85_90 | MHST-136-S | MHST-136 | 81.70 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 32.30 | 0.12 |
| CB88_96 | MHST-137-S | MHST-137 | 79.79 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 22.13 | 0.19 |
| DICB2 | S-26B | BI-SA1 | 67.11 | TABULAR/DEPTH | 100VHV-1 | NO | 14.10 | 0.08 |
| DICB9_OL | DICB9 | CBMHST103 | 74.28 | TABULAR/DEPTH | S19_SL2_5 | NO | 32.71 | 1.00 |
| MHST-100-IC | MHST-100-S | MHST-100 | 66.30 | TABULAR/DEPTH | 1@R-A@S=5.0% | NO | 0.00 | 1.02 |
| MHST-101-IC | MHST-101-S | MHST-101 | 66.07 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 23.68 | 1.02 |
| MHST-102-IC | MHST-102-S | MHST-102 | 66.28 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 21.92 | 0.91 |
| MHST-104-IC | MHST-104-S | MHST-104 | 70.80 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 14.22 | 0.10 |
| MHST-105-IC | MHST-105-S | MHST-105 | 68.64 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 54.97 | 0.40 |
| MHST-106-IC | MHST-106-S | MHST-106 | 71.87 | TABULAR/DEPTH | 2@R-E@S=5.0% | NO | 10.45 | 0.68 |
| MHST-135-IC | MHST-135-S | MHST-135 | 79.68 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 7.43 | 0.03 |
| MHST-157-IC | MHST-157-S | MHST-157 | 73.80 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 119.89 | 0.89 |
| MHST-158-IC | MHST-158-S | MHST-158 | 74.58 | TABULAR/DEPTH | S19_SL2_5x8 | NO | 75.05 | 0.63 |
| MSHT-103-IC | MSHT-103-S | MSHT-103 | 66.13 | TABULAR/DEPTH | 7@R-A@S=5.0% | NO | 80.39 | 0.79 |
| O-1 | SA-1 | MH-SA1 | 69.50 | TABULAR/HEAD | O-1 | NO | 60.00 | 1.24 |
| O-15 | S-15 | MHST-107 | 62.10 | TABULAR/DEPTH | O-15 | NO | 6.95 | 0.01 |
| O-19 | S-19 | MHST-101 | 64.00 | TABULAR/DEPTH | 50VHV-1 | NO | 3.62 | 0.02 |
| O-2 | SA-2 | MH-SAxx | 62.60 | TABULAR/HEAD | O-2 | NO | 7.00 | 0.86 |
| O-21B | S-21B | IN119607 | 63.54 | TABULAR/DEPTH | 50VHV-1 | NO | 3.80 | 0.23 |
| O-26D | S-26D | MHST-105 | 67.19 | TABULAR/DEPTH | 50VHV-1 | NO | 3.99 | 0.00 |
| O-3 | S-3Store | OGS1 | 62.20 | TABULAR/HEAD | 125VHV-2 | NO | 23.43 | 0.11 |
| O-4 | S-14B | Preston | 62.15 | TABULAR/HEAD | 125VHV-2 | NO | 14.90 | 0.00 |
| O-63 | S-63 | MHST-154A | 78.20 | TABULAR/DEPTH | O-63 | NO | 94.36 | 0.59 |
| O-CB209 | CB209 | MHST-209 | 77.64 | TABULAR/DEPTH | S28_SL2_5x2 | NO | 1.12 | 0.23 |
| OL_CB_54A | CB_54A | MH-SA56-1 | 79.65 | TABULAR/DEPTH | 3CB | NO | 60.31 | 0.19 |
| WD-OLF_5 | Wales-OLF-N05 | Preston | 65.50 | TABULAR/DEPTH | 2@R-E@S=1.0% | NO | 3.97 | 0.40 |

## Orifices 1/1

| Name | Inlet Node | Outlet Node | Type | Cross-Section | Height (m) | Width (m) | Inlet Elev. (m) | Discharge Coeff. | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|
| ICD-100-1 | MHST-100 | D-MHST-100 | SIDE | CIRCULAR | 0.3 | 0 | 63.06 | 0.62 | 163.2 |
| ICD-100-2 | MHST-100 | D-MHST-100 | SIDE | CIRCULAR | 0.1 | 0 | 63.85 | 0.62 | 7.06 |
| ICD111 | DICB8 | OGS-3 | SIDE | CIRCULAR | 0.4 | 0 | 68.11 | 0.62 | 135.38 |
| ICD-142 | MHST-142 | D-MHST-142 | SIDE | CIRCULAR | 0.7 | 0 | 69.32 | 0.62 | 947.61 |
| ICD201 | Chamber201 | Chamber201S | SIDE | CIRCULAR | 0.35 | 0 | 67.95 | 0.62 | 112.79 |
| ICD202 | Chamber202 | Chamber202-S | SIDE | CIRCULAR | 0.245 | 0 | 70.84 | 0.62 | 80.44 |
| ICD203 | Chamber-203 | D-Chamber-203 | SIDE | CIRCULAR | 0.225 | 0 | 71.42 | 0.62 | 63.94 |
| ICD204 | Chamber-204 | D-Chamber-204 | SIDE | CIRCULAR | 0.19 | 0 | 73.03 | 0.62 | 39.7 |
| OR-145 | MHST-145 | D-MHST-145 | SIDE | RECT_CLOSED | 0.75 | 0.75 | 69.9 | 0.62 | 866.64 |
| OR-155 | D-MHST-155 | MHST-155 | SIDE | CIRCULAR | 0.675 | 0 | 74.06 | 0.62 | 716.88 |
| OR-170 | MHST-170 | D-MHST-170 | SIDE | CIRCULAR | 0.1 | 0 | 71.93 | 0.62 | 19.77 |

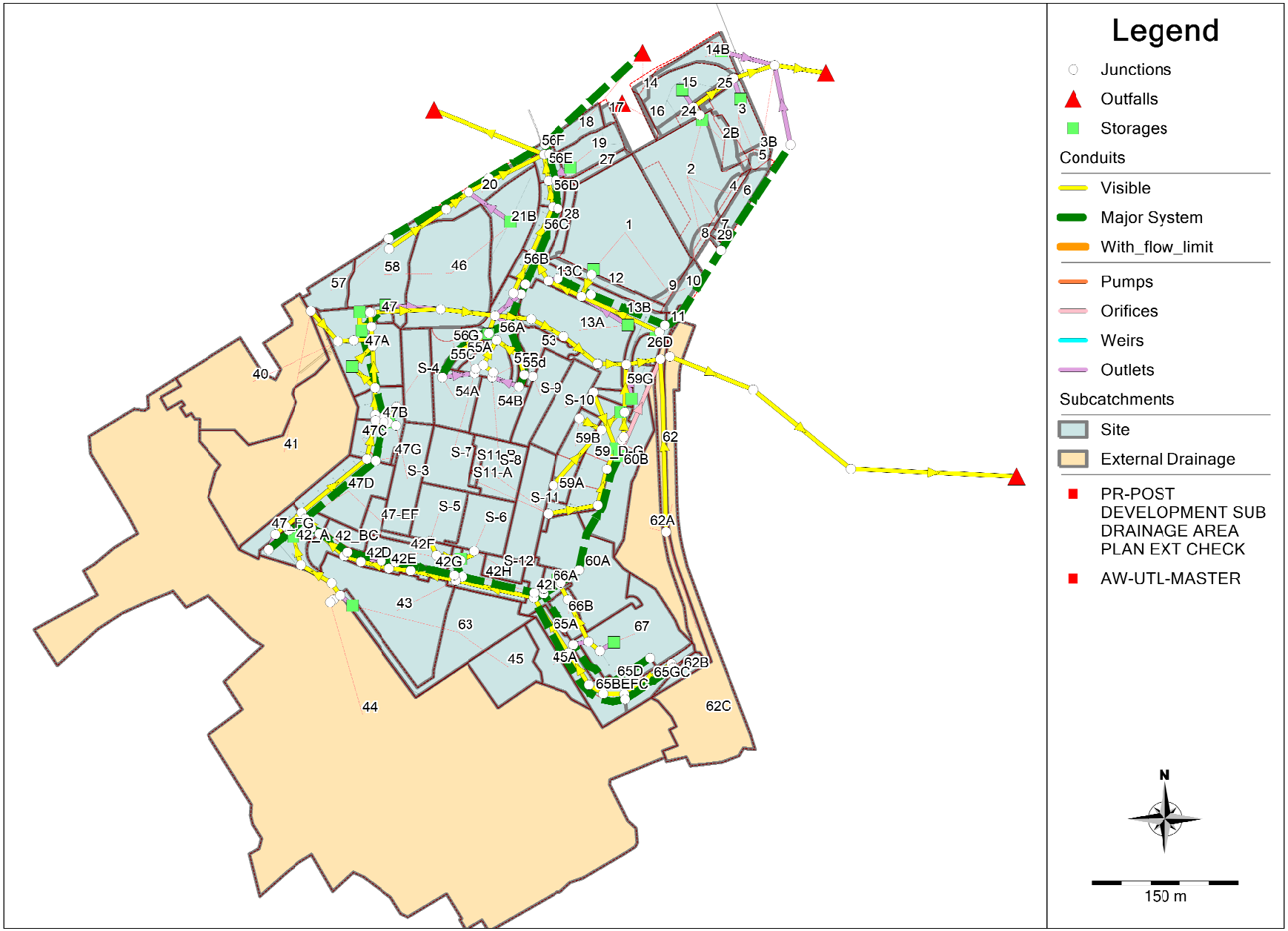
Weirs 1/1

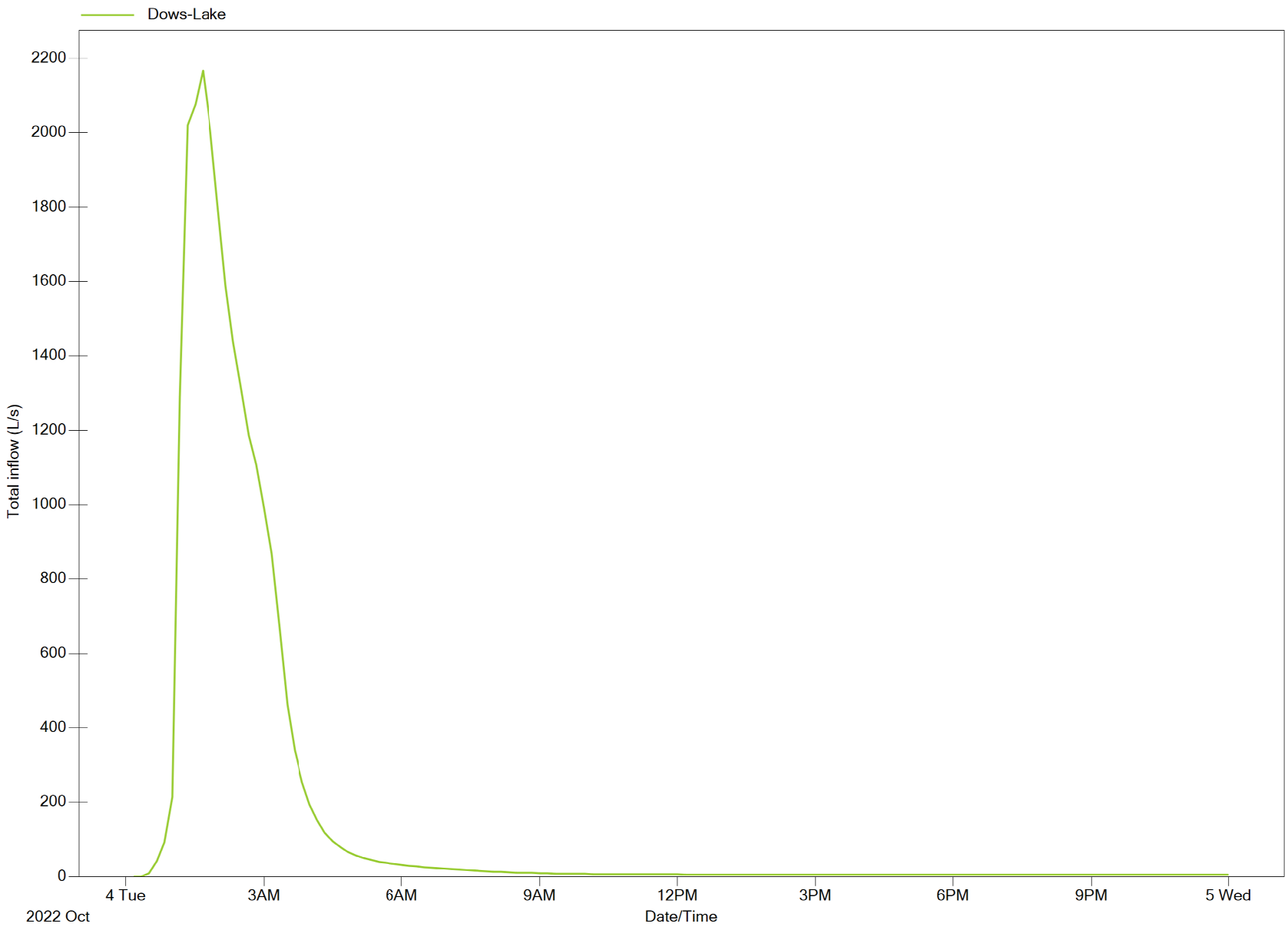
| Name | Inlet Node | Outlet Node | Type | Height (m) | Length (m) | Inlet Elev. (m) | Max. \|Flow\| (L/s) | Time Max. Flow (M/D/Y) | Max/Full Depth | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_1 | MHST-146 | D-MHST-146_1 | SIDEFLOW | 1.4 | 1.5 | 70.17 | 1294.45 | 10/04/2022 01:15 AM | 0.62 | 19.249 |
| Weir-142 | MHST-142 | D-MHST-142 | TRANSVERSE | 0.5 | 1.4 | 70.7 | 0 | 10/04/2022 00:00 AM | 0 | 24.988 |
| Weir-145 | MHST-145 | D-MHST-145 | TRANSVERSE | 1 | 2 | 71.64 | 0 | 10/04/2022 00:00 AM | 0 | 22.804 |
| Weir-155 | D-MHST-155 | MHST-155 | TRANSVERSE | 1 | 1 | 76.45 | 0 | 10/04/2022 00:00 AM | 0 | 13.662 |
| Weir-170 | MHST-170 | D-MHST-170 | TRANSVERSE | 0.3 | 1.5 | 73 | 0 | 10/04/2022 00:00 AM | 0 | 2.721 |

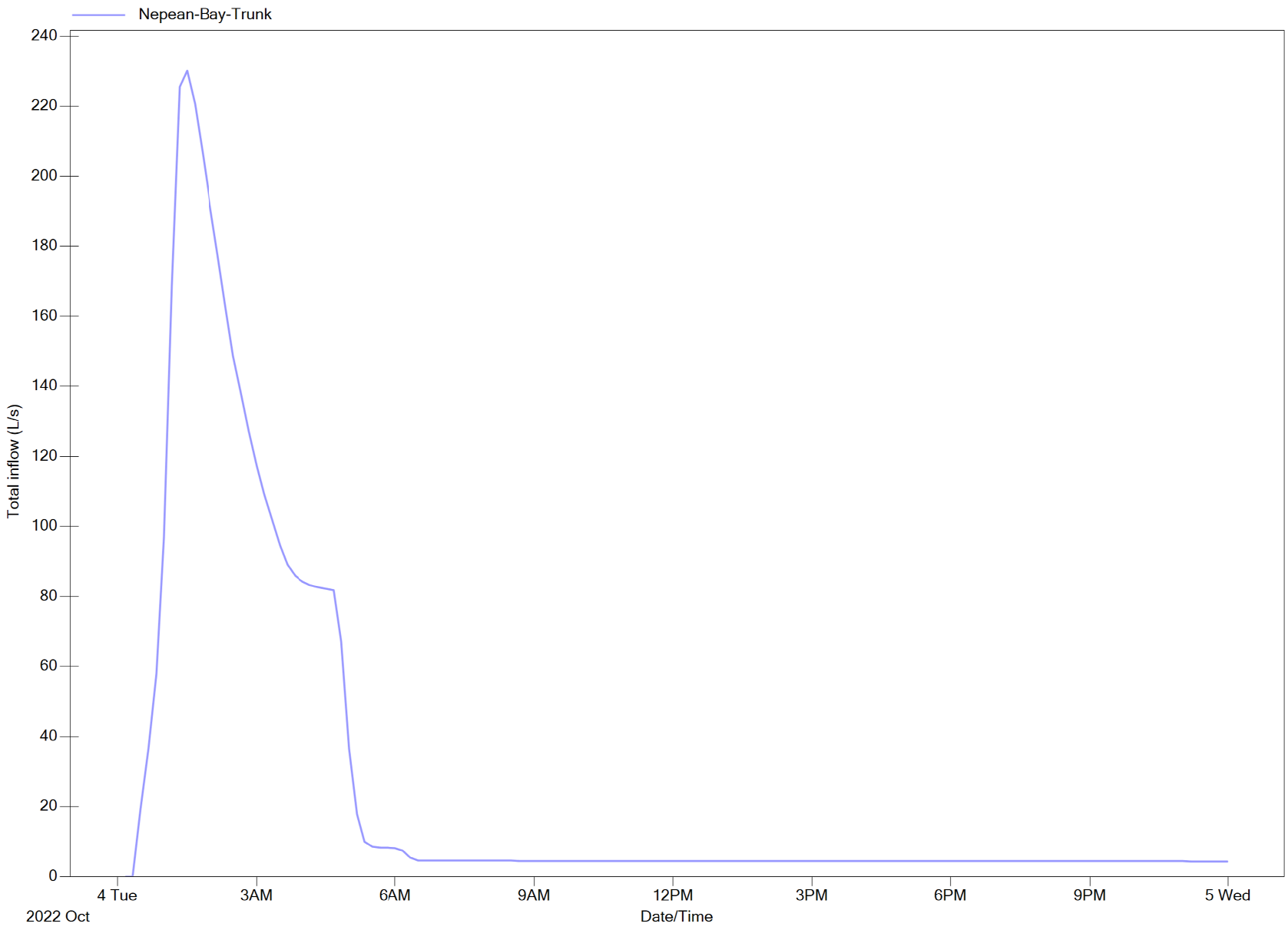
## Outfalls 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Type | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) | Max. Flow (L/s) | Total Flow (ML) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|
| Carling_OLF | 64.6 | 64.8 | FREE | 0.08 | 64.68 | 10/04/2022 01:14 AM | 73.68 | 0.085 | 2.187 |
| Dows-Lake | 63.745 | 66.5 | FREE | 0.59 | 64.33 | 10/04/2022 01:30 AM | 1169.61 | 6.748 | 29.625 |
| LRT-Corridor | 56 | 57 | FREE | 0 | 56 | 10/04/2022 00:00 AM | 8.73 | 0.006 | 0.059 |
| Nepean-Bay-Trunk | 62.8 | 65.21 | NORMAL | 0 | 62.8 | 10/04/2022 00:00 AM | 173.93 | 1.212 | 6.163 |
| Preston_Street | 60.9 | 63.76 | NORMAL | 0.18 | 61.08 | 10/04/2022 01:10 AM | 73.17 | 0.519 | 2.435 |

# PCSWMM OUTPUT
# 3-HOUR CHICAGO -100-YEAR STORM


Legend
Junctions
Outfalls
Storages
Conduits
Visible
Major System
With_flow_limit
Pumps
Orifices
Weirs
Outlets
Subcatchments
Site
External Drainage
PR-POST DEVELOPMENT SUB DRAINAGE AREA PLAN EXT CHECK
AW-UTL-MASTER
N
150 m


Dows-Lake
Total inflow (L/s)
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time


Nepean-Bay-Trunk
Total inflow (L/s)
240
220
200
180
160
140
120
100
80
60
40
20
0
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time

# SUBCATCHMENTS 1/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 1 | | 100yr_3hr_Chicago | SA-1 | 1.2161 | 3.0 | 100.0 | 599.4 | 1.01 |
| 10 | | 100yr_3hr_Chicago | 13B | 0.0822 | 3.0 | 8.1 | 31.4 | 0.50 |
| 11 | | 100yr_3hr_Chicago | MHST-105-S | 0.0302 | 3.0 | 89.3 | 14.7 | 0.94 |
| 12 | | 100yr_3hr_Chicago | BI-SA1-S | 0.1276 | 5.0 | 56.5 | 58.8 | 0.77 |
| 13A | | 100yr_3hr_Chicago | S-26B | 0.6503 | 9.6 | 12.5 | 129.5 | 0.45 |
| 13B | | 100yr_3hr_Chicago | BI-SA1-S | 0.2248 | 5.0 | 87.8 | 109.1 | 0.95 |
| 13C | | 100yr_3hr_Chicago | MHST-104-S | 0.1227 | 5.0 | 78.7 | 58.2 | 0.89 |
| 14 | | 100yr_3hr_Chicago | Carling_OLF | 0.0580 | 3.0 | 60.3 | 24.8 | 0.78 |
| 14B | | 100yr_3hr_Chicago | S-14B | 0.1272 | 3.0 | 0.0 | 50.5 | 0.46 |
| 15 | | 100yr_3hr_Chicago | S-15 | 0.3643 | 3.0 | 3.6 | 92.5 | 0.43 |
| 16 | | 100yr_3hr_Chicago | LRT-Corridor | 0.0229 | 3.0 | 0.0 | 9.5 | 0.46 |
| 17 | | 100yr_3hr_Chicago | LRT-Corridor | 0.0361 | 3.0 | 0.0 | 14.7 | 0.46 |
| 18 | | 100yr_3hr_Chicago | Carling_OLF | 0.1189 | 3.0 | 3.4 | 39.3 | 0.46 |
| 19 | | 100yr_3hr_Chicago | S-19 | 0.2056 | 3.0 | 7.1 | 64.7 | 0.47 |
| 2 | | 100yr_3hr_Chicago | SA-2 | 0.7114 | 3.0 | 100.0 | 358.2 | 1.01 |
| 20 | | 100yr_3hr_Chicago | Carling_OLFN1 | 0.2434 | 8.0 | 0.0 | 94.3 | 0.46 |
| 21B | | 100yr_3hr_Chicago | S-21B | 0.4325 | 10.0 | 9.2 | 298.1 | 0.77 |
| 24 | | 100yr_3hr_Chicago | MHST-107 | 0.0348 | 3.0 | 55.8 | 15.5 | 0.76 |
| 25 | | 100yr_3hr_Chicago | OGS1 | 0.0465 | 3.0 | 80.6 | 22.1 | 0.90 |
| 26D | | 100yr_3hr_Chicago | S-26D | 0.0774 | 25.0 | 0.0 | 30.9 | 0.46 |
| 27 | | 100yr_3hr_Chicago | MHST-101-S | 0.0531 | 3.0 | 84.5 | 25.7 | 0.92 |
| 28 | | 100yr_3hr_Chicago | MHST-102-S | 0.0844 | 5.0 | 62.6 | 39.3 | 0.80 |
| 29 | | 100yr_3hr_Chicago | 7 | 0.0113 | 3.0 | 0.0 | 3.7 | 0.44 |
| 2B | | 100yr_3hr_Chicago | SA-2 | 0.0908 | 3.0 | 100.0 | 45.0 | 1.00 |
| 3 | | 100yr_3hr_Chicago | S-3Store | 0.2154 | 3.0 | 31.8 | 91.9 | 0.73 |
| 3B | | 100yr_3hr_Chicago | 3 | 0.0393 | 3.0 | 100.0 | 19.5 | 1.00 |
| 4 | | 100yr_3hr_Chicago | 2 | 0.0196 | 3.0 | 100.0 | 9.7 | 1.00 |
| 40 | External | 100yr_3hr_Chicago | MHST-156 | 1.1965 | 6.8 | 46.2 | 408.9 | 0.68 |
| 41 | External | 100yr_3hr_Chicago | MHST-132 | 1.5292 | 3.0 | 14.6 | 234.1 | 0.42 |
| 42_A | | 100yr_3hr_Chicago | MHST-135-S | 0.2148 | 5.0 | 12.8 | 50.9 | 0.47 |
| 42_BC | | 100yr_3hr_Chicago | MHST-149-S | 0.1753 | 5.0 | 60.5 | 79.2 | 0.79 |
| 42D | | 100yr_3hr_Chicago | MHST-150-S1 | 0.0509 | 2.0 | 99.0 | 25.2 | 1.00 |
| 42E | | 100yr_3hr_Chicago | MHST-151-S | 0.0245 | 2.0 | 99.0 | 12.1 | 1.00 |
| 42F | | 100yr_3hr_Chicago | CB91 | 0.1997 | 2.0 | 83.0 | 92.8 | 0.91 |
| 42G | | 100yr_3hr_Chicago | MHST-141-S | 0.0958 | 2.0 | 91.0 | 46.8 | 0.95 |
| 42H | | 100yr_3hr_Chicago | MHST-158-S | 0.1983 | 2.0 | 87.4 | 96.4 | 0.93 |
| 42I | | 100yr_3hr_Chicago | DICB9 | 0.1177 | 6.0 | 79.0 | 56.4 | 0.89 |
| 43 | | 100yr_3hr_Chicago | MHST-141 | 0.8632 | 2.0 | 100.0 | 426.0 | 1.01 |
| 44 | External | 100yr_3hr_Chicago | MHST-62534 | 12.7451 | 1.0 | 32.0 | 2801.2 | 0.54 |
| 45 | | 100yr_3hr_Chicago | 63 | 0.2888 | 4.0 | 58.8 | 124.0 | 0.77 |
| 45A | | 100yr_3hr_Chicago | MHST-153-S | 0.2052 | 4.0 | 12.6 | 74.1 | 0.52 |
| 46 | | 100yr_3hr_Chicago | 21B | 0.9308 | 10.0 | 15.6 | 270.4 | 0.58 |

# SUBCATCHMENTS 2/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 47 | | 100yr_3hr_Chicago | CB65 | 0.0374 | 3.0 | 90.6 | 18.3 | 0.95 |
| 47_FG | | 100yr_3hr_Chicago | D-MHST-161-S | 0.1159 | 3.0 | 72.2 | 54.5 | 0.85 |
| 47A | | 100yr_3hr_Chicago | MHST-157-S | 0.5412 | 3.0 | 65.0 | 217.7 | 0.80 |
| 47B | | 100yr_3hr_Chicago | BI-SA49-S | 0.2880 | 3.0 | 69.3 | 128.3 | 0.83 |
| 47C | | 100yr_3hr_Chicago | MHST-147-S | 0.0737 | 3.0 | 100.0 | 36.6 | 1.00 |
| 47D | | 100yr_3hr_Chicago | MHST-148-S | 0.4496 | 3.0 | 32.0 | 127.0 | 0.61 |
| 47-EF | | 100yr_3hr_Chicago | 47D | 0.0559 | 3.0 | 59.0 | 25.8 | 0.78 |
| 47G | | 100yr_3hr_Chicago | MHST-147-S | 0.0080 | 3.0 | 100.0 | 4.0 | 1.00 |
| 5 | | 100yr_3hr_Chicago | preston | 0.0120 | 3.0 | 100.0 | 6.0 | 1.00 |
| 53 | | 100yr_3hr_Chicago | MH-SA56-3 | 0.1516 | 2.0 | 61.5 | 66.7 | 0.79 |
| 54A | | 100yr_3hr_Chicago | CB_54A | 0.2598 | 2.0 | 73.0 | 119.1 | 0.86 |
| 54B | | 100yr_3hr_Chicago | CB_54B | 0.2799 | 2.0 | 77.1 | 130.7 | 0.88 |
| 55A | | 100yr_3hr_Chicago | MH-SA56-1 | 0.0348 | 2.0 | 100.0 | 17.3 | 1.00 |
| 55B | | 100yr_3hr_Chicago | MH-SA56-2 | 0.0244 | 2.0 | 100.0 | 12.1 | 1.00 |
| 55C | | 100yr_3hr_Chicago | CB225-S | 0.0149 | 0.5 | 100.0 | 7.4 | 1.01 |
| 55d | | 100yr_3hr_Chicago | CB209 | 0.0276 | 6.0 | 63.6 | 12.9 | 0.81 |
| 56A | | 100yr_3hr_Chicago | MHST-120-S | 0.3601 | 5.0 | 31.2 | 97.5 | 0.57 |
| 56B | | 100yr_3hr_Chicago | MHST-106-S | 0.0565 | 5.0 | 86.0 | 27.4 | 0.93 |
| 56C | | 100yr_3hr_Chicago | MSHT-103-S | 0.1354 | 5.0 | 82.0 | 65.0 | 0.91 |
| 56D | | 100yr_3hr_Chicago | MHST-102-S | 0.0761 | 5.0 | 84.7 | 36.8 | 0.92 |
| 56E | | 100yr_3hr_Chicago | MHST-101-S | 0.0805 | 5.0 | 77.3 | 38.4 | 0.88 |
| 56F | | 100yr_3hr_Chicago | Carling_OLFN3 | 0.0180 | 5.0 | 77.4 | 8.6 | 0.88 |
| 56G | | 100yr_3hr_Chicago | CB225-S | 0.1673 | 5.0 | 50.1 | 67.7 | 0.72 |
| 57 | | 100yr_3hr_Chicago | Carling_OLF1 | 0.1534 | 15.0 | 6.9 | 64.0 | 0.50 |
| 58 | | 100yr_3hr_Chicago | 46 | 0.4475 | 16.0 | 10.2 | 124.7 | 0.47 |
| 59_D-G | | 100yr_3hr_Chicago | Chamber201 | 0.4461 | 2.0 | 90.7 | 216.8 | 0.96 |
| 59A | | 100yr_3hr_Chicago | TD_A | 0.0501 | 2.0 | 90.7 | 24.5 | 0.95 |
| 59B | | 100yr_3hr_Chicago | TD_B | 0.1795 | 2.0 | 90.7 | 87.7 | 0.95 |
| 59G | | 100yr_3hr_Chicago | CB130 | 0.0764 | 2.0 | 53.4 | 34.8 | 0.75 |
| 6 | | 100yr_3hr_Chicago | 3 | 0.1396 | 3.0 | 2.1 | 47.4 | 0.46 |
| 60A | | 100yr_3hr_Chicago | ST-60-S-B | 0.6561 | 25.0 | 22.7 | 209.3 | 0.55 |
| 60B | | 100yr_3hr_Chicago | DICB8 | 0.4884 | 25.0 | 30.4 | 165.0 | 0.60 |
| 62 | External | 100yr_3hr_Chicago | POW_D1 | 0.2744 | 5.0 | 61.7 | 92.9 | 0.76 |
| 62A | External | 100yr_3hr_Chicago | POW_D1 | 0.6276 | 6.0 | 25.0 | 143.5 | 0.52 |
| 62B | | 100yr_3hr_Chicago | MHST-136-S | 0.0620 | 3.0 | 0.0 | 11.8 | 0.39 |
| 62C | External | 100yr_3hr_Chicago | POW_D1 | 1.1137 | 5.0 | 61.8 | 326.4 | 0.74 |
| 63 | | 100yr_3hr_Chicago | S-63 | 0.6280 | 2.0 | 67.5 | 309.7 | 0.86 |
| 65A | | 100yr_3hr_Chicago | MHST-153-S | 0.0894 | 3.6 | 63.3 | 40.1 | 0.80 |
| 65BEFC | | 100yr_3hr_Chicago | MHST-137-S | 0.2015 | 3.6 | 37.9 | 63.0 | 0.62 |
| 65D | | 100yr_3hr_Chicago | SW_65D | 0.1128 | 3.0 | 5.0 | 20.4 | 0.40 |
| 65GC | | 100yr_3hr_Chicago | MHST-136-S | 0.1771 | 3.6 | 65.5 | 75.7 | 0.81 |
| 66A | | 100yr_3hr_Chicago | CHAMBER-102 | 0.0642 | 6.0 | 53.8 | 29.2 | 0.75 |
| 66B | | 100yr_3hr_Chicago | CBMHST105 | 0.1106 | 6.0 | 73.8 | 52.0 | 0.86 |
| 67 | | 100yr_3hr_Chicago | CB95 | 0.6208 | 3.0 | 59.8 | 256.8 | 0.77 |
| 7 | | 100yr_3hr_Chicago | 2 | 0.0165 | 3.0 | 100.0 | 8.2 | 1.00 |
| 8 | | 100yr_3hr_Chicago | 2 | 0.0188 | 3.0 | 100.0 | 9.3 | 1.00 |
| 9 | | 100yr_3hr_Chicago | 1 | 0.0192 | 3.0 | 100.0 | 9.5 | 1.00 |
| S-10 | | 100yr_3hr_Chicago | MHST-211 | 0.2975 | 2.0 | 100.0 | 145.4 | 1.01 |
| S-11 | | 100yr_3hr_Chicago | MHST-213 | 0.4008 | 2.0 | 100.0 | 192.6 | 1.02 |
| S11-A | | 100yr_3hr_Chicago | MHST-213 | 0.0107 | 2.0 | 100.0 | 5.3 | 1.00 |
| S11-B | | 100yr_3hr_Chicago | MHST-213 | 0.0153 | 2.0 | 69.2 | 7.2 | 0.83 |
| S-12 | | 100yr_3hr_Chicago | MH-SA51-1 | 0.0933 | 2.0 | 74.5 | 44.2 | 0.87 |
| S-3 | | 100yr_3hr_Chicago | MH-SA50 | 0.3456 | 2.0 | 99.9 | 167.7 | 1.01 |
| S-4 | | 100yr_3hr_Chicago | MH-SA49 | 0.2910 | 2.0 | 99.8 | 142.3 | 1.01 |
| S-5 | | 100yr_3hr_Chicago | MH-SA51-2 | 0.2767 | 2.0 | 64.2 | 120.5 | 0.80 |
| S-6 | | 100yr_3hr_Chicago | MH-SA51-1 | 0.2932 | 2.0 | 65.3 | 127.9 | 0.81 |
| S-7 | | 100yr_3hr_Chicago | MH-SA56-1 | 0.2899 | 2.0 | 77.2 | 134.4 | 0.88 |
| S-8 | | 100yr_3hr_Chicago | MH-SA56-2 | 0.2768 | 2.0 | 75.4 | 128.4 | 0.87 |
| S-9 | | 100yr_3hr_Chicago | MH-SA56-3 | 0.2599 | 2.0 | 71.4 | 113.8 | 0.84 |

# CONDUITS 1/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | CBMHST105 | CBMHST103 | | 17.6 | 72.40 | 72.13 | CIRCULAR | 0.38 | | 0.01534 | 217.2 |
| 11 | CB_54A | CB225-S | Major_System | 29.9 | 79.69 | 77.71 | RECT_OPEN | 0.15 | | 0.06634 | 34.9 |
| 12 | CB_54B | CB209 | major_system | 33.4 | 79.67 | 77.64 | RECT_OPEN | 0.15 | | 0.06086 | 118.2 |
| 15 | SW_42I | DICB9 | major_system | 41.1 | 75.31 | 74.28 | TRAPEZOIDAL | 1.00 | | 0.02509 | 0.0 |
| 16 | MH207 | Chamber-204 | | 25.3 | 73.98 | 73.88 | CIRCULAR | 0.38 | | 0.00395 | 119.0 |
| 17 | D-Chamber-204 | MHST-141 | | 21.1 | 73.03 | 72.98 | CIRCULAR | 0.30 | | 0.00237 | 63.7 |
| 19 | DICB9 | CBMHST-103-S | major_system | 21.8 | 74.28 | 74.26 | TRAPEZOIDAL | 0.50 | | 0.00092 | 61.1 |
| 2 | MHST-105-S | Wales-OLF-N03 | Major_System | 17.0 | 68.69 | 68.20 | IRREGULAR | 0.00 | Road-B | 0.02884 | 24.4 |
| 21 | MHST-157-S | CB65 | Major_System | 36.2 | 74.22 | 73.54 | IRREGULAR | 0.00 | Road-D | 0.01881 | 0.0 |
| 23 | CBMHST-103-S | ST-60-S-B | major_system | 22.5 | 74.26 | 74.11 | TRAPEZOIDAL | 0.50 | | 0.00667 | 49.5 |
| 25 | CB91 | CB94 | major_system | 29.3 | 75.14 | 75.03 | RECT_OPEN | 0.30 | | 0.00375 | 67.4 |
| 27 | TD_A | MHST-221 | | 75.5 | 67.42 | 66.62 | CIRCULAR | 0.20 | | 0.01060 | 24.0 |
| 28 | MHST-221 | PS | | 26.8 | 66.63 | 66.42 | CIRCULAR | 0.30 | | 0.00765 | 107.2 |
| 3 | Preston | Preston_Street | | 10.0 | 61.03 | 60.90 | CIRCULAR | 0.30 | | 0.01300 | 105.2 |
| 30 | TD_B | MHST-221 | | 25.5 | 67.88 | 67.60 | CIRCULAR | 0.30 | | 0.01084 | 87.1 |
| 32 | CB225-S | CB26 | Major_System | 28.5 | 77.71 | 75.96 | RECT_OPEN | 0.15 | | 0.06143 | 105.0 |
| 34 | CB26 | MHST-120-S | Major_System | 33.4 | 75.96 | 74.46 | RECT_OPEN | 0.15 | | 0.04502 | 96.5 |
| 4 | OGS-3 | MHST62528 | | 10.0 | 67.62 | 67.60 | CIRCULAR | 1.20 | | 0.00200 | 2229.6 |
| 41 | CB209 | MHST-120-S | Major_System | 34.7 | 77.64 | 74.46 | RECT_OPEN | 0.15 | | 0.09199 | 128.1 |
| 5 | MHST62528 | MHST62545 | | 91.8 | 67.56 | 66.71 | CIRCULAR | 1.20 | | 0.00929 | 2216.7 |
| 6 | MHST62545 | MHST62547 | | 129.6 | 66.69 | 64.45 | CIRCULAR | 1.20 | | 0.01726 | 2211.2 |
| 7 | MHST62547 | Dows-Lake | | 171.0 | 64.17 | 63.75 | CIRCULAR | 1.20 | | 0.00249 | 2185.4 |
| 8 | POW_D1 | OGS-3 | | 180.0 | 78.70 | 69.70 | TRAPEZOIDAL | 0.55 | | 0.05006 | 527.7 |
| 8_1 | CHAMBER-103 | D-MHST-155 | | 3.1 | 74.08 | 74.06 | CIRCULAR | 0.90 | | 0.00645 | 1246.2 |
| 8_1-S | CHAMBER-103 | MHST-155 | Major_System | 14.7 | 79.00 | 78.70 | RECT_OPEN | 0.30 | | 0.02037 | 0.0 |
| 9 | CBMHST103 | CHAMBER-102 | | 2.6 | 72.10 | 72.07 | CIRCULAR | 0.38 | | 0.01154 | 279.0 |
| CA-OLF_2 | Carling_OLF1 | Carling_OLFN1 | Major_System | 120.4 | 66.50 | 65.41 | IRREGULAR | 0.00 | CarlingAve | 0.00907 | 58.7 |
| CA-OLF_3 | Carling_OLFN3 | Carling_OLF | Major_System | 66.5 | 64.80 | 64.60 | IRREGULAR | 0.00 | CarlingAve | 0.00301 | 185.2 |
| CA-OLF_4 | Carling_OLFN1 | Carling_OLFN3 | Major_System | 67.1 | 65.41 | 64.80 | IRREGULAR | 0.00 | CarlingAve | 0.00906 | 139.1 |
| CA-STM | IN119607 | D-MHST-100 | | 86.0 | 63.10 | 62.80 | CIRCULAR | 0.30 | | 0.00349 | 6.0 |
| ST-100_2 | D-MHST-100 | Nepean-Bay-Trunk | | 6.0 | 63.06 | 63.04 | CIRCULAR | 0.90 | | 0.00333 | 232.9 |
| ST-100-S | MHST-100-S | Carling_OLFN3 | Major_System | 11.0 | 65.42 | 64.80 | IRREGULAR | 0.00 | Road-A | 0.05645 | 54.1 |
| ST-101I | MHST-101 | MHST-100 | | 27.4 | 63.12 | 63.09 | CIRCULAR | 0.90 | | 0.00109 | 229.1 |
| ST-101I-S | MHST-101-S | MHST-100-S | Major_System | 27.4 | 66.07 | 65.42 | IRREGULAR | 0.00 | Road-A | 0.02371 | 54.6 |
| ST-102 | CBMHST-101 | CBMHST105 | | 47.9 | 73.63 | 72.43 | CIRCULAR | 0.38 | | 0.02505 | 168.1 |

# CONDUITS 2/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-102I | MHST-102 | MHST-101 | | 27.2 | 63.15 | 63.12 | CIRCULAR | 1.50 | | 0.00110 | 226.1 |
| ST-102I-S | MHST-102-S | MHST-101-S | Major_System | 27.2 | 66.28 | 66.07 | IRREGULAR | 0.00 | Road-A | 0.00773 | 26.4 |
| ST-103I | MSHT-103 | MHST-102 | | 52.9 | 63.20 | 63.15 | CIRCULAR | 1.50 | | 0.00100 | 254.0 |
| ST-103I-S | MSHT-103-S | MHST-102-S | Major_System | 52.9 | 66.13 | 66.28 | IRREGULAR | 0.00 | Road-A | -0.00283 | 16.0 |
| ST-104 | CBMHST-104 | CBMHST-101 | | 15.1 | 74.14 | 73.84 | CIRCULAR | 0.38 | | 0.01983 | 150.5 |
| ST-104_1 | BI-SA1 | MHST-104 | | 38.3 | 63.67 | 63.63 | CIRCULAR | 1.20 | | 0.00102 | 221.6 |
| ST-104_2 | MHST-105 | BI-SA1 | | 87.8 | 63.79 | 63.70 | CIRCULAR | 1.20 | | 0.00100 | 102.2 |
| ST-104I | MHST-104 | MSHT-103 | | 32.8 | 63.53 | 63.50 | CIRCULAR | 1.20 | | 0.00101 | 211.9 |
| ST-105I_1-S | BI-SA1-S | MHST-105-S | Major_System | 87.8 | 70.15 | 68.64 | IRREGULAR | 0.00 | Road-B | 0.01719 | 109.0 |
| ST-105I_2-S | MHST-104-S | BI-SA1-S | Major_System | 37.7 | 70.80 | 70.15 | IRREGULAR | 0.00 | Road-B | 0.01723 | 37.6 |
| ST-106I | MHST-106 | MSHT-103 | | 44.7 | 63.23 | 63.20 | CIRCULAR | 1.50 | | 0.00067 | 52.5 |
| ST-106I-S | MHST-106-S | MSHT-103-S | Major_System | 29.6 | 71.87 | 66.13 | IRREGULAR | 0.00 | Road-A | 0.19783 | 163.3 |
| ST-107 | D-MHST-170 | MHST-158 | | 13.3 | 71.93 | 71.80 | CIRCULAR | 0.30 | | 0.00977 | 178.3 |
| ST-120-S_1 | MHST-120-S | CB68 | Major_System | 33.8 | 74.46 | 72.63 | IRREGULAR | 0.00 | Road-A | 0.05427 | 293.8 |
| ST-120-S_2 | CB68 | MHST-106-S | Major_System | 11.0 | 72.63 | 71.87 | IRREGULAR | 0.00 | Road-A | 0.06909 | 154.5 |
| ST-130 | MHST-130 | OGS-3 | | 35.6 | 67.69 | 67.62 | CIRCULAR | 1.00 | | 0.00197 | 2041.5 |
| ST-131_1 | MHST-212 | 13 | | 25.4 | 67.95 | 67.93 | CIRCULAR | 0.83 | | 0.00094 | 186.9 |
| ST-131_2 | 13 | MHST-130 | | 49.1 | 67.93 | 67.88 | CIRCULAR | 0.83 | | 0.00096 | 252.9 |
| ST-132 | MHST-132 | MHST-156 | | 41.9 | 73.25 | 72.62 | CIRCULAR | 0.45 | | 0.01505 | 233.4 |
| ST-133 | Chamber201S | MHST-212 | | 2.9 | 67.95 | 67.95 | CIRCULAR | 0.83 | | -0.00034 | 153.2 |
| ST-134 | MHST-134 | MHST-138 | | 17.5 | 76.62 | 76.18 | CIRCULAR | 0.38 | | 0.02515 | 116.0 |
| ST-135 | MHST-135 | MHST-148 | | 28.3 | 70.62 | 70.60 | CIRCULAR | 1.35 | | 0.00071 | 969.7 |
| ST-136 | MHST-136 | MHST-137 | | 57.8 | 78.65 | 77.30 | CIRCULAR | 0.30 | | 0.02338 | 69.1 |
| ST-136-S | MHST-136-S | MHST-137-S | Major_System | 59.7 | 81.70 | 79.79 | IRREGULAR | 0.00 | Road-E_S | 0.03201 | 17.2 |
| ST-137 | MHST-137 | MHST-134 | | 22.4 | 77.24 | 76.68 | CIRCULAR | 0.38 | | 0.02501 | 115.9 |
| ST-137-S | MHST-137-S | MHST-153-S | Major_System | 85.8 | 79.79 | 76.52 | IRREGULAR | 0.00 | Road-E_S | 0.03813 | 30.9 |
| ST-138 | MHST-138 | MHST-153 | | 38.9 | 75.17 | 74.20 | CIRCULAR | 0.38 | | 0.02494 | 115.9 |
| ST-141 | MHST-141 | MHST-160 | | 47.1 | 71.42 | 71.30 | CIRCULAR | 0.90 | | 0.00255 | 863.8 |
| ST-141-S | MHST-151-S | MHST-141-S | Major_System | 61.2 | 77.12 | 75.21 | IRREGULAR | 0.00 | Road-E_S | 0.03122 | 13.6 |
| ST-142 | D-MHST-142 | MHST-130 | | 29.3 | 67.74 | 67.69 | CIRCULAR | 1.20 | | 0.00171 | 1898.1 |
| ST-143 | MHST-143 | MHST-159 | | 38.2 | 69.45 | 69.41 | CIRCULAR | 1.35 | | 0.00105 | 1873.4 |
| ST-144A | MHST-144 | CONNECT | | 56.7 | 69.68 | 69.56 | CIRCULAR | 1.35 | | 0.00212 | 1738.4 |
| ST-144B | CONNECT | MHST-143 | | 37.1 | 69.56 | 69.48 | CIRCULAR | 1.35 | | 0.00216 | 1873.4 |
| ST-145_1 | D-MHST-145 | MHST-144 | | 71.4 | 69.90 | 69.83 | CIRCULAR | 1.20 | | 0.00098 | 1736.6 |
| ST-146_1-S | MHST-146-S | BI-SA49-S | Major_System | 5.7 | 75.38 | 75.35 | IRREGULAR | 0.00 | Road-D | 0.00509 | 9.5 |

## CONDUITS 3/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_2 | D-MHST-146_1 | MHST-200 | | 27.7 | 70.17 | 70.13 | CIRCULAR | 1.50 | | 0.00144 | 2228.2 |
| ST-146_2-S | BI-SA49-S | MHST-157-S | Major_System | 91.1 | 75.35 | 74.63 | IRREGULAR | 0.00 | Road-D | 0.00791 | 29.5 |
| ST-147 | MHST-147 | MHST-146 | | 40.9 | 70.25 | 70.20 | CIRCULAR | 1.50 | | 0.00122 | 2065.4 |
| ST-147-S | MHST-147-S | MHST-146-S | Major_System | 40.8 | 76.00 | 75.38 | IRREGULAR | 0.00 | Road-D | 0.01521 | 34.2 |
| ST-148 | MHST-148 | MHST-147 | | 86.4 | 70.45 | 70.28 | CIRCULAR | 1.50 | | 0.00197 | 2030.2 |
| ST-148-S | MHST-148-S | MHST-147-S | Major_System | 93.3 | 80.37 | 76.00 | IRREGULAR | 0.00 | Road-D | 0.04688 | 88.0 |
| ST-149 | MHST-149 | MHST-135 | | 33.9 | 70.69 | 70.65 | CIRCULAR | 1.35 | | 0.00118 | 964.8 |
| ST-149-S | MHST-135-S | MHST-149-S | Major_System | 44.3 | 79.68 | 77.93 | IRREGULAR | 0.00 | Road-E_C | 0.03950 | 23.8 |
| ST-150 | MHST-150 | MHST-149 | | 18.1 | 70.76 | 70.72 | CIRCULAR | 1.35 | | 0.00220 | 902.7 |
| ST-150-S | MHST-149-S | MHST-150-S1 | Major_System | 36.4 | 77.93 | 77.24 | IRREGULAR | 0.00 | Road-E_C | 0.01895 | 22.0 |
| ST-151 | MHST-151 | MHST-150 | | 30.3 | 71.23 | 71.21 | CIRCULAR | 0.90 | | 0.00066 | 867.5 |
| ST-151-S | MHST-150-S1 | MHST-151-S | Major_System | 14.8 | 77.24 | 77.12 | IRREGULAR | 0.00 | Road-E_S | 0.00808 | 3.4 |
| ST-153_2 | MHST-153 | MHST-158 | | 67.4 | 72.86 | 72.19 | CIRCULAR | 0.38 | | 0.00995 | 217.0 |
| ST-153-S | MHST-153-S | DICB9 | Major_System | 77.3 | 76.52 | 74.80 | IRREGULAR | 0.00 | Road-E_S | 0.02224 | 26.0 |
| ST-154 | MHST-154 | CHAMBER-103 | | 16.0 | 75.80 | 75.72 | CIRCULAR | 0.90 | | 0.00500 | 2899.9 |
| ST-154A | MHST-154A | MHST-154B | | 15.5 | 76.18 | 76.10 | CIRCULAR | 0.90 | | 0.00516 | 2899.2 |
| ST-154B | MHST-154B | MHST-154 | | 35.9 | 76.04 | 75.86 | CIRCULAR | 0.90 | | 0.00501 | 2899.6 |
| ST-155_3 | MHST-155 | MHST-148 | | 22.3 | 74.03 | 73.82 | CIRCULAR | 0.90 | | 0.00942 | 1253.4 |
| ST-156 | MHST-156 | MHST_156B | | 16.0 | 70.13 | 70.12 | CIRCULAR | 1.50 | | 0.00062 | 631.6 |
| ST-156B | MHST_156B | MHST-157 | | 18.8 | 70.09 | 70.08 | CIRCULAR | 1.50 | | 0.00053 | 611.5 |
| ST-157_1 | MHST-157 | D-MHST-157B | | 13.5 | 70.02 | 70.00 | CIRCULAR | 1.50 | | 0.00148 | 2206.5 |
| ST-157_2 | D-MHST-157B | MHST-145 | | 14.7 | 69.97 | 69.96 | CIRCULAR | 1.50 | | 0.00068 | 1421.9 |
| ST-157_3 | D-MHST-157B | CHAMBER-104B | | 9.4 | 69.97 | 69.91 | CIRCULAR | 0.90 | | 0.00638 | 1331.9 |
| ST-158 | MHST-158 | MHST-141 | | 82.5 | 71.74 | 71.57 | CIRCULAR | 0.75 | | 0.00206 | 385.2 |
| ST-158-S_1 | MHST-141-S | CB94 | Major_System | 8.2 | 75.21 | 75.03 | IRREGULAR | 0.00 | Road-E_S | 0.02183 | 9.1 |
| ST-158-S_2 | CB94 | MHST-158-S | Major_System | 76.3 | 75.03 | 74.57 | IRREGULAR | 0.00 | Road-E_S | 0.00603 | 70.0 |
| ST-159 | MHST-159 | MHST-142 | | 44.6 | 69.41 | 69.32 | CIRCULAR | 1.35 | | 0.00202 | 1873.4 |
| ST-160 | MHST-160 | MHST-151 | | 22.3 | 71.27 | 71.23 | CIRCULAR | 0.90 | | 0.00179 | 863.7 |
| ST-161_2-S | D-MHST-161-S | MHST-148-S | Major_System | 52.7 | 81.44 | 80.37 | IRREGULAR | 0.00 | Road-D | 0.02031 | 21.8 |
| ST-162 | CBMHST-162 | MHST-154A | | 5.4 | 76.27 | 76.24 | CIRCULAR | 0.90 | | 0.00561 | 2801.8 |
| ST-200_1 | MHST-200 | MHST-201 | | 42.9 | 70.11 | 70.05 | CIRCULAR | 1.50 | | 0.00140 | 1399.6 |
| ST-200_2 | MHST-200 | CHAMBER-104-A | | 8.4 | 70.17 | 70.13 | CIRCULAR | 0.90 | | 0.00476 | 1063.2 |
| ST-201 | MHST-201 | MHST-157 | | 6.5 | 70.07 | 70.05 | CIRCULAR | 1.50 | | 0.00308 | 1586.0 |
| ST-202 | Chamber202-S | CONNECT | | 5.2 | 70.84 | 70.80 | CIRCULAR | 0.45 | | 0.00769 | 121.3 |
| ST-203 | MHST-203 | MHST-205 | | 8.6 | 73.11 | 73.09 | CIRCULAR | 0.68 | | 0.00232 | 234.2 |

# CONDUITS 4/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-204 | MHST-204 | MHST-205 | | 12.7 | 73.11 | 73.09 | CIRCULAR | 0.53 | | 0.00158 | 151.2 |
| ST-205 | MHST-205 | MHST-206 | | 28.9 | 72.94 | 72.91 | CIRCULAR | 0.68 | | 0.00104 | 383.1 |
| ST-206 | MHST-206 | Chamber202 | | 10.3 | 72.91 | 72.88 | CIRCULAR | 0.68 | | 0.00341 | 564.7 |
| ST-208 | MHST-208 | MHST-209 | | 19.4 | 73.41 | 73.35 | CIRCULAR | 0.38 | | 0.00309 | 179.9 |
| ST-209 | MHST-209 | MHST-206 | | 28.6 | 73.32 | 73.21 | CIRCULAR | 0.38 | | 0.00385 | 181.7 |
| ST-211 | MHST-211 | Chamber201 | | 43.1 | 68.31 | 68.24 | CIRCULAR | 0.53 | | 0.00162 | 142.2 |
| ST-214 | MHST-214 | MHST-215 | | 38.3 | 68.23 | 68.27 | CIRCULAR | 0.75 | | -0.00104 | 202.4 |
| ST-215 | MHST-215 | Chamber201 | | 1.7 | 68.27 | 68.27 | CIRCULAR | 0.75 | | 0.00000 | 194.8 |
| ST-225 | CB225 | Chamber202 | | 29.0 | 73.46 | 73.17 | CIRCULAR | 0.20 | | 0.00997 | 3.0 |
| ST-42I | MHST-158-S | DICB9 | major_system | 9.7 | 74.58 | 74.28 | IRREGULAR | 0.00 | Road-E_S | 0.03109 | 33.4 |
| ST-60-S_1 | ST-60-S-B | DICB8 | Major_System | 125.5 | 74.11 | 69.82 | TRAPEZOIDAL | 1.00 | | 0.03419 | 246.3 |
| ST-62534 | MHST-62534 | CBMHST-162 | | 7.2 | 76.90 | 76.27 | CIRCULAR | 0.90 | | 0.08833 | 2801.0 |
| ST-62538 | MHST-161 | MHST-155 | | 13.4 | 78.96 | 78.70 | CIRCULAR | 0.53 | | 0.01941 | 31.7 |
| St-C104 | CHAMBER-104-A | MHST-201 | | 13.1 | 70.13 | 70.07 | CIRCULAR | 0.90 | | 0.00458 | 442.6 |
| ST-C203 | D-Chamber-203 | MHST-146 | | 15.9 | 71.42 | 71.38 | CIRCULAR | 0.30 | | 0.00251 | 92.5 |
| ST-CB6-S | SW_65D | DICB6 | major_system | 104.0 | 77.94 | 76.09 | TRAPEZOIDAL | 0.50 | | 0.01779 | 19.0 |
| ST-G107 | MHST-107 | OGS1 | | 52.5 | 62.03 | 61.24 | CIRCULAR | 0.30 | | 0.01505 | 29.5 |
| ST-OGS1_2 | OGS1 | Preston | | 10.0 | 61.21 | 61.06 | CIRCULAR | 0.30 | | 0.01500 | 75.1 |
| ST-P3 | DICB3 | IN119608 | | 71.1 | 64.23 | 63.80 | CIRCULAR | 0.20 | | 0.00605 | 0.0 |
| ST-P46 | IN119608 | IN119607 | | 30.0 | 63.50 | 63.20 | CIRCULAR | 0.20 | | 0.01000 | 0.0 |
| ST-SA1 | MH-SA1 | BI-SA1 | | 24.7 | 69.45 | 69.08 | CIRCULAR | 0.30 | | 0.01501 | 60.2 |
| ST-SA49 | MH-SA49 | Chamber-203 | | 17.9 | 74.02 | 73.80 | CIRCULAR | 0.38 | | 0.01228 | 142.0 |
| ST-SA50 | MH-SA50 | Chamber-203 | | 13.2 | 74.07 | 73.67 | CIRCULAR | 0.375 | | 0.03032 | 167.64 |
| ST-SA51-1 | MH-SA51-1 | Chamber-204 | | 14.69 | 73.91 | 73.76 | CIRCULAR | 0.45 | | 0.01021 | 172.03 |
| ST-SA51-2 | MH-SA51-2 | MH207 | | 16.236 | 74.11 | 73.98 | CIRCULAR | 0.375 | | 0.00801 | 120.31 |
| ST-SA52_1 | MHST-213 | MHST-214 | | 51.841 | 68.54 | 68.45 | CIRCULAR | 0.525 | | 0.00174 | 201.11 |
| ST-SA56-1 | MH-SA56-1 | MHST-203 | | 5.031 | 73.24 | 73.19 | CIRCULAR | 0.525 | | 0.00994 | 234.87 |
| ST-SA56-2 | MH-SA56-2 | MHST-204 | | 4.866 | 73.24 | 73.19 | CIRCULAR | 0.45 | | 0.01028 | 152.14 |
| ST-SA56-3 | MH-SA56-3 | MHST-208 | | 8.906 | 73.8 | 73.44 | CIRCULAR | 0.375 | | 0.04046 | 179.87 |
| ST-UGS6B | CHAMBER-102 | MHST-170 | | 16.625 | 72.03 | 71.96 | CIRCULAR | 0.375 | | 0.00421 | 178.52 |
| ST-UGS-Z1 | CHAMBER-104B | MHST-145 | | 8.4 | 69.91 | 69.90 | CIRCULAR | 0.90 | | 0.00119 | 345.0 |
| ST-xx | MH-SAxx | MHST-107 | | 10.7 | 62.45 | 62.15 | CIRCULAR | 0.20 | | 0.02805 | 7.0 |
| WD-OLF_3 | Wales-OLF-N03 | Wales-OLF-N04 | Major_System | 81.2 | 68.20 | 66.75 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01786 | 24.3 |
| WD-OLF_4 | Wales-OLF-N04 | Wales-OLF-N05 | Major_System | 95.0 | 66.75 | 65.50 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01316 | 23.3 |

## Junctions 1/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| 13 | | NO | 67.93 | 70.22 | 2.29 | 1.29 | 69.22 | 10/04/2022 01:37 AM |
| BI-SA1 | | NO | 63.50 | 70.48 | 6.98 | 1.04 | 64.54 | 10/04/2022 01:26 AM |
| BI-SA1-S | Major_System | NO | 70.15 | 70.30 | 0.15 | 0.07 | 70.22 | 10/04/2022 01:10 AM |
| BI-SA49-S | Major_System | NO | 75.35 | 75.51 | 0.16 | 0.04 | 75.39 | 10/04/2022 01:10 AM |
| Carling_OLF1 | | NO | 66.50 | 66.70 | 0.20 | 0.07 | 66.57 | 10/04/2022 01:11 AM |
| Carling_OLFN1 | | NO | 65.41 | 65.61 | 0.20 | 0.10 | 65.51 | 10/04/2022 01:11 AM |
| Carling_OLFN3 | | NO | 64.80 | 65.00 | 0.20 | 0.14 | 64.94 | 10/04/2022 01:13 AM |
| CB_54A | | NO | 79.65 | 79.95 | 0.30 | 0.05 | 79.70 | 10/04/2022 01:10 AM |
| CB_54B | | NO | 79.67 | 79.97 | 0.30 | 0.02 | 79.69 | 10/04/2022 01:10 AM |
| CB209 | | NO | 77.64 | 77.79 | 0.15 | 0.02 | 77.66 | 10/04/2022 01:10 AM |
| CB225 | | NO | 73.46 | 77.72 | 4.26 | 0.04 | 73.50 | 10/04/2022 01:10 AM |
| CB225-S | | NO | 77.71 | 77.86 | 0.15 | 0.02 | 77.73 | 10/04/2022 01:10 AM |
| CB26 | | NO | 75.96 | 76.11 | 0.15 | 0.02 | 75.98 | 10/04/2022 01:10 AM |
| CB68 | | NO | 72.63 | 72.79 | 0.16 | 0.05 | 72.68 | 10/04/2022 01:10 AM |
| CB91 | | NO | 75.14 | 75.44 | 0.30 | 0.03 | 75.17 | 10/04/2022 01:10 AM |
| CB94 | | NO | 75.03 | 75.20 | 0.17 | 0.08 | 75.11 | 10/04/2022 01:11 AM |
| CBMHST-101 | | NO | 73.63 | 76.41 | 2.78 | 0.28 | 73.91 | 10/04/2022 01:24 AM |
| CBMHST103 | | NO | 72.10 | 74.28 | 2.18 | 1.26 | 73.36 | 10/04/2022 01:26 AM |
| CBMHST-103-S | | NO | 74.26 | 74.56 | 0.30 | 0.05 | 74.31 | 10/04/2022 01:11 AM |
| CBMHST-104 | | NO | 74.14 | 76.59 | 2.45 | 0.21 | 74.35 | 10/04/2022 01:06 AM |
| CBMHST105 | | NO | 72.40 | 74.73 | 2.33 | 1.23 | 73.63 | 10/04/2022 01:07 AM |
| CBMHST-162 | | NO | 76.10 | 82.72 | 6.62 | 2.42 | 78.52 | 10/04/2022 01:10 AM |
| Chamber201S | | NO | 67.95 | 68.95 | 1.00 | 0.89 | 68.84 | 10/04/2022 01:37 AM |
| Chamber202-S | | NO | 70.84 | 73.59 | 2.75 | 0.42 | 71.26 | 10/04/2022 01:38 AM |
| CONNECT | | NO | 69.56 | 74.02 | 4.46 | 1.70 | 71.26 | 10/04/2022 01:38 AM |
| D-Chamber-203 | | NO | 71.42 | 75.05 | 3.63 | 0.76 | 72.18 | 10/04/2022 01:35 AM |
| D-Chamber-204 | | NO | 73.03 | 74.63 | 1.60 | 0.26 | 73.29 | 10/04/2022 01:26 AM |
| DICB3 | | NO | 64.00 | 66.43 | 2.43 | 0.00 | 64.00 | 10/04/2022 00:00 AM |
| DICB6 | | NO | 74.70 | 76.59 | 1.89 | 0.03 | 74.73 | 10/04/2022 01:12 AM |
| DICB9 | | NO | 74.28 | 74.48 | 0.20 | 0.08 | 74.36 | 10/04/2022 01:10 AM |
| D-MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 0.74 | 63.34 | 10/04/2022 01:28 AM |
| D-MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 1.01 | 68.81 | 10/04/2022 01:38 AM |
| D-MHST-145 | | NO | 69.90 | 74.34 | 4.44 | 1.56 | 71.46 | 10/04/2022 01:38 AM |
| D-MHST-146_1 | | NO | 70.17 | 75.39 | 5.22 | 1.84 | 72.01 | 10/04/2022 01:37 AM |
| D-MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 2.17 | 76.20 | 10/04/2022 01:25 AM |
| D-MHST-157B | | NO | 69.97 | 74.44 | 4.47 | 2.01 | 71.98 | 10/04/2022 01:38 AM |
| D-MHST-161-S | Major_System | NO | 81.44 | 81.60 | 0.16 | 0.03 | 81.47 | 10/04/2022 01:10 AM |
| D-MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 0.69 | 72.62 | 10/04/2022 01:27 AM |
| IN119607 | | NO | 63.00 | 65.62 | 2.62 | 0.34 | 63.34 | 10/04/2022 01:26 AM |
| IN119608 | | NO | 63.50 | 66.14 | 2.64 | 0.00 | 63.50 | 10/04/2022 00:00 AM |
| MH207 | | NO | 73.95 | 75.43 | 1.48 | 0.33 | 74.28 | 10/04/2022 01:10 AM |
| MH-SA1 | | NO | 69.45 | 70.55 | 1.10 | 0.15 | 69.60 | 10/04/2022 00:55 AM |
| MH-SA49 | | NO | 73.97 | 75.45 | 1.48 | 0.29 | 74.26 | 10/04/2022 01:10 AM |
| MH-SA50 | | NO | 74.07 | 75.83 | 1.76 | 0.20 | 74.27 | 10/04/2022 01:10 AM |

## Junctions 2/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MH-SA51-1 | | NO | 74.08 | 76.53 | 2.45 | 0.20 | 74.28 | 10/04/2022 01:10 AM |
| MH-SA51-2 | | NO | 74.84 | 76.50 | 1.66 | 0.14 | 74.98 | 10/04/2022 01:10 AM |
| MH-SA56-1 | | NO | 73.24 | 74.54 | 1.30 | 0.30 | 73.54 | 10/04/2022 01:10 AM |
| MH-SA56-2 | | NO | 73.24 | 74.54 | 1.30 | 0.28 | 73.52 | 10/04/2022 01:10 AM |
| MH-SA56-3 | | NO | 73.80 | 75.80 | 2.00 | 0.31 | 74.11 | 10/04/2022 01:10 AM |
| MH-SAxx | | NO | 62.00 | 64.50 | 2.50 | 0.50 | 62.50 | 10/04/2022 00:18 AM |
| MHST_156B | | NO | 70.09 | 74.24 | 4.15 | 1.90 | 71.99 | 10/04/2022 01:38 AM |
| MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 1.93 | 64.53 | 10/04/2022 01:28 AM |
| MHST-100-S | Major_System | NO | 65.42 | 65.72 | 0.30 | 0.03 | 65.45 | 10/04/2022 01:10 AM |
| MHST-101 | | NO | 63.00 | 66.07 | 3.07 | 1.54 | 64.54 | 10/04/2022 01:28 AM |
| MHST-101-S | Major_System | NO | 66.07 | 66.23 | 0.16 | 0.04 | 66.11 | 10/04/2022 01:10 AM |
| MHST-102 | | NO | 63.00 | 66.28 | 3.28 | 1.53 | 64.53 | 10/04/2022 01:27 AM |
| MHST-102-S | Major_System | NO | 66.28 | 66.44 | 0.16 | 0.04 | 66.32 | 10/04/2022 01:10 AM |
| MHST-104 | | NO | 63.30 | 70.80 | 7.50 | 1.23 | 64.53 | 10/04/2022 01:25 AM |
| MHST-104-S | Major_System | NO | 70.80 | 70.95 | 0.15 | 0.05 | 70.85 | 10/04/2022 01:10 AM |
| MHST-105 | | NO | 63.60 | 69.13 | 5.53 | 0.94 | 64.54 | 10/04/2022 01:26 AM |
| MHST-105-S | Major_System | NO | 68.64 | 68.79 | 0.15 | 0.09 | 68.73 | 10/04/2022 01:11 AM |
| MHST-106 | | NO | 63.00 | 71.87 | 8.87 | 1.54 | 64.54 | 10/04/2022 01:27 AM |
| MHST-106-S | Major_System | NO | 71.87 | 72.03 | 0.16 | 0.04 | 71.91 | 10/04/2022 01:11 AM |
| MHST-107 | | NO | 62.00 | 64.32 | 2.32 | 0.13 | 62.13 | 10/04/2022 01:10 AM |
| MHST-120-S | Major_System | NO | 74.46 | 74.62 | 0.16 | 0.07 | 74.53 | 10/04/2022 01:10 AM |
| MHST-130 | | NO | 67.69 | 70.21 | 2.52 | 1.07 | 68.76 | 10/04/2022 01:38 AM |
| MHST-132 | | NO | 73.25 | 75.96 | 2.71 | 0.27 | 73.52 | 10/04/2022 01:10 AM |
| MHST-134 | | NO | 76.62 | 79.19 | 2.57 | 0.17 | 76.79 | 10/04/2022 01:10 AM |
| MHST-135 | | NO | 70.62 | 79.31 | 8.69 | 1.56 | 72.18 | 10/04/2022 01:35 AM |
| MHST-135-S | Major_System | NO | 79.68 | 79.83 | 0.15 | 0.03 | 79.71 | 10/04/2022 01:10 AM |
| MHST-136 | | NO | 78.65 | 81.94 | 3.29 | 0.14 | 78.79 | 10/04/2022 01:10 AM |
| MHST-136-S | | NO | 81.70 | 82.00 | 0.30 | 0.03 | 81.73 | 10/04/2022 01:10 AM |
| MHST-137 | | NO | 77.24 | 80.00 | 2.76 | 0.17 | 77.41 | 10/04/2022 01:10 AM |
| MHST-137-S | | NO | 79.79 | 80.09 | 0.30 | 0.04 | 79.83 | 10/04/2022 01:10 AM |
| MHST-138 | | NO | 75.17 | 78.56 | 3.39 | 0.17 | 75.34 | 10/04/2022 01:10 AM |
| MHST-141 | | NO | 71.42 | 75.17 | 3.75 | 0.78 | 72.20 | 10/04/2022 01:34 AM |
| MHST-141-S | Major_System | NO | 75.21 | 75.36 | 0.15 | 0.03 | 75.24 | 10/04/2022 01:10 AM |
| MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 3.31 | 71.11 | 10/04/2022 01:38 AM |
| MHST-143 | | NO | 69.45 | 74.02 | 4.57 | 1.76 | 71.21 | 10/04/2022 01:37 AM |
| MHST-144 | | NO | 69.68 | 75.30 | 5.62 | 1.64 | 71.32 | 10/04/2022 01:38 AM |
| MHST-145 | | NO | 69.90 | 73.97 | 4.07 | 2.07 | 71.97 | 10/04/2022 01:38 AM |
| MHST-146 | | NO | 70.17 | 75.39 | 5.22 | 1.95 | 72.12 | 10/04/2022 01:36 AM |

## Junctions 3/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-146-S | Major_System | NO | 75.38 | 75.58 | 0.20 | 0.03 | 75.41 | 10/04/2022 01:11 AM |
| MHST-147 | | NO | 70.25 | 75.92 | 5.67 | 1.89 | 72.14 | 10/04/2022 01:36 AM |
| MHST-147-S | Major_System | NO | 76.00 | 76.20 | 0.20 | 0.04 | 76.04 | 10/04/2022 01:11 AM |
| MHST-148 | | NO | 70.45 | 80.13 | 9.68 | 1.73 | 72.18 | 10/04/2022 01:35 AM |
| MHST-148-S | Major_System | NO | 80.37 | 80.53 | 0.16 | 0.04 | 80.41 | 10/04/2022 01:10 AM |
| MHST-149 | | NO | 70.69 | 78.30 | 7.61 | 1.49 | 72.18 | 10/04/2022 01:35 AM |
| MHST-149-S | Major_System | NO | 77.93 | 78.08 | 0.15 | 0.03 | 77.96 | 10/04/2022 01:10 AM |
| MHST-150 | | NO | 70.76 | 77.32 | 6.56 | 1.42 | 72.18 | 10/04/2022 01:35 AM |
| MHST-150-S1 | Major_System | NO | 77.24 | 77.39 | 0.15 | 0.02 | 77.26 | 10/04/2022 01:10 AM |
| MHST-151 | | NO | 71.23 | 77.10 | 5.87 | 0.96 | 72.19 | 10/04/2022 01:35 AM |
| MHST-151-S | Major_System | NO | 77.12 | 77.27 | 0.15 | 0.03 | 77.15 | 10/04/2022 01:10 AM |
| MHST-153 | | NO | 72.86 | 77.00 | 4.14 | 0.66 | 73.52 | 10/04/2022 01:12 AM |
| MHST-153-S | TGCB102 | NO | 76.52 | 76.82 | 0.30 | 0.04 | 76.56 | 10/04/2022 01:10 AM |
| MHST-154 | | NO | 75.60 | 81.92 | 6.32 | 1.44 | 77.04 | 10/04/2022 01:10 AM |
| MHST-154A | | NO | 76.00 | 82.52 | 6.52 | 2.39 | 78.39 | 10/04/2022 01:10 AM |
| MHST-154B | | NO | 75.90 | 81.89 | 5.99 | 2.08 | 77.98 | 10/04/2022 01:10 AM |
| MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 0.56 | 74.59 | 10/04/2022 01:25 AM |
| MHST-156 | | NO | 70.13 | 74.49 | 4.36 | 1.86 | 71.99 | 10/04/2022 01:38 AM |
| MHST-157 | | NO | 70.02 | 74.65 | 4.63 | 1.97 | 71.99 | 10/04/2022 01:37 AM |
| MHST-158 | | YES | 71.74 | 74.80 | 3.06 | 0.49 | 72.23 | 10/04/2022 01:11 AM |
| MHST-158-S | Major_System | NO | 74.58 | 74.88 | 0.30 | 0.04 | 74.62 | 10/04/2022 01:10 AM |
| MHST-159 | | NO | 69.38 | 74.96 | 5.58 | 1.79 | 71.17 | 10/04/2022 01:38 AM |
| MHST-160 | | NO | 71.27 | 76.79 | 5.52 | 0.92 | 72.19 | 10/04/2022 01:35 AM |
| MHST-161 | | NO | 78.96 | 81.88 | 2.92 | 0.08 | 79.04 | 10/04/2022 01:10 AM |
| MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 1.23 | 73.16 | 10/04/2022 01:26 AM |
| MHST-200 | | NO | 70.10 | 74.81 | 4.71 | 1.90 | 72.00 | 10/04/2022 01:38 AM |
| MHST-201 | | NO | 69.96 | 74.74 | 4.78 | 2.03 | 71.99 | 10/04/2022 01:38 AM |
| MHST-203 | | NO | 73.11 | 78.83 | 5.72 | 0.40 | 73.51 | 10/04/2022 01:10 AM |
| MHST-204 | | NO | 73.11 | 78.79 | 5.68 | 0.40 | 73.51 | 10/04/2022 01:10 AM |
| MHST-205 | | NO | 72.94 | 78.20 | 5.26 | 0.55 | 73.49 | 10/04/2022 01:10 AM |
| MHST-206 | | NO | 72.91 | 75.77 | 2.86 | 0.50 | 73.41 | 10/04/2022 01:10 AM |
| MHST-208 | | NO | 73.41 | 77.80 | 4.39 | 0.63 | 74.04 | 10/04/2022 01:10 AM |
| MHST-209 | | NO | 73.35 | 75.76 | 2.41 | 0.48 | 73.83 | 10/04/2022 01:10 AM |
| MHST-211 | | NO | 68.31 | 70.38 | 2.07 | 0.57 | 68.88 | 10/04/2022 01:24 AM |
| MHST-212 | | NO | 67.95 | 70.22 | 2.27 | 0.91 | 68.86 | 10/04/2022 01:37 AM |
| MHST-213 | | NO | 68.54 | 70.24 | 1.70 | 0.40 | 68.94 | 10/04/2022 01:10 AM |

## Junctions 4/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-214 | | NO | 68.23 | 70.31 | 2.08 | 0.65 | 68.88 | 10/04/2022 01:24 AM |
| MHST-215 | | NO | 68.27 | 70.25 | 1.98 | 0.60 | 68.87 | 10/04/2022 01:26 AM |
| MHST-221 | | NO | 66.62 | 69.70 | 3.08 | 0.38 | 67.00 | 10/04/2022 01:10 AM |
| MHST62528 | | NO | 67.34 | 70.08 | 2.74 | 0.89 | 68.23 | 10/04/2022 01:34 AM |
| MHST-62534 | | NO | 76.90 | 82.80 | 5.90 | 1.80 | 78.70 | 10/04/2022 01:10 AM |
| MHST62545 | | NO | 66.53 | 69.90 | 3.37 | 0.71 | 67.24 | 10/04/2022 01:35 AM |
| MHST62547 | | NO | 64.00 | 71.80 | 7.80 | 1.20 | 65.20 | 10/04/2022 01:35 AM |
| MSHT-103 | | NO | 63.00 | 66.13 | 3.13 | 1.54 | 64.54 | 10/04/2022 01:25 AM |
| MSHT-103-S | Major_System | NO | 66.13 | 66.29 | 0.16 | 0.08 | 66.21 | 10/04/2022 01:11 AM |
| OGS1 | | NO | 61.00 | 63.82 | 2.82 | 0.39 | 61.39 | 10/04/2022 01:10 AM |
| OGS-3 | | NO | 67.62 | 70.34 | 2.72 | 0.85 | 68.47 | 10/04/2022 01:34 AM |
| POW_D1 | | NO | 78.70 | 79.30 | 0.60 | 0.18 | 78.88 | 10/04/2022 01:11 AM |
| Preston | | NO | 61.00 | 63.00 | 2.00 | 0.26 | 61.26 | 10/04/2022 01:10 AM |
| ST-60-S-B | | NO | 74.11 | 74.41 | 0.30 | 0.08 | 74.19 | 10/04/2022 01:11 AM |
| SW_42I | | NO | 75.31 | 75.51 | 0.20 | 0.00 | 75.31 | 10/04/2022 00:00 AM |
| SW_65D | | NO | 77.94 | 78.44 | 0.50 | 0.02 | 77.96 | 10/04/2022 01:12 AM |
| TD_A | | NO | 67.42 | 69.10 | 1.68 | 0.12 | 67.54 | 10/04/2022 01:10 AM |
| TD_B | | NO | 67.88 | 69.13 | 1.25 | 0.22 | 68.09 | 10/04/2022 01:10 AM |
| Wales-OLF-N03 | | NO | 68.20 | 68.40 | 0.20 | 0.05 | 68.25 | 10/04/2022 01:11 AM |
| Wales-OLF-N04 | | NO | 66.75 | 66.95 | 0.20 | 0.05 | 66.80 | 10/04/2022 01:13 AM |
| Wales-OLF-N05 | | NO | 65.50 | 65.70 | 0.20 | 0.06 | 65.56 | 10/04/2022 01:17 AM |

## Storage 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Storage Curve | Curve Name | Avg. Depth (m) | Max. Depth (m) | Max. HGL (m) | Max. Volume (1000 m³) | Max. Percent Full (%) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CB130 | 69.90 | 70.10 | 0.20 | TABULAR | CB(600x600) | 0.01 | 0.05 | 69.95 | 0 | 27 | 0.0760 |
| CB65 | 72.16 | 73.70 | 1.54 | TABULAR | CB65 | 0.02 | 0.04 | 72.20 | 0 | 0 | 1.5700 |
| CB95 | 75.52 | 75.82 | 0.30 | TABULAR | CB95-ponding | 0.02 | 0.21 | 75.73 | 0.041 | 49 | 0.6210 |
| CHAMBER-102 | 72.03 | 74.24 | 2.21 | TABULAR | Chamber102 | 0.37 | 1.31 | 73.34 | 0.28 | 59 | 2.7210 |
| CHAMBER-103 | 74.08 | 76.78 | 2.70 | TABULAR | Chamber103 | 0.37 | 2.13 | 76.21 | 1.681 | 79 | 13.6620 |
| CHAMBER-104-A | 70.13 | 72.43 | 2.30 | TABULAR | Chamber104A | 0.42 | 1.87 | 72.00 | 1.062 | 81 | 19.5370 |
| CHAMBER-104B | 69.91 | 72.61 | 2.70 | TABULAR | Chamber104B | 0.53 | 2.06 | 71.97 | 1.303 | 77 | 22.8040 |
| Chamber201 | 67.95 | 69.19 | 1.24 | TABULAR | Chamber201 | 0.23 | 0.92 | 68.87 | 0.38 | 75 | 1.1700 |
| Chamber202 | 70.84 | 72.43 | 1.59 | TABULAR | Chamber202 | 0.25 | 1.10 | 71.94 | 0.434 | 70 | 1.7870 |
| Chamber-203 | 71.42 | 72.90 | 1.48 | TABULAR | Chamber203 | 0.23 | 1.09 | 72.51 | 0.20 | 74 | 0.64 |
| Chamber-204 | 73.03 | 74.36 | 1.33 | TABULAR | Chamber204 | 0.20 | 0.93 | 73.96 | 0.21 | 70 | 0.66 |
| DICB8 | 68.11 | 69.83 | 1.72 | TABULAR | swale | 0.12 | 1.19 | 69.30 | 0.02 | 9 | 2.96 |
| MHST-157-S | 73.80 | 74.23 | 0.43 | TABULAR | CB98-ponding | 0.04 | 0.22 | 74.02 | 0.00 | 18 | 1.53 |
| PS | 64.92 | 70.03 | 5.11 | CYLINDRI | * | 0.81 | 1.52 | 66.44 | 0.00 | 30 | 0.23 |
| S-14B | 61.65 | 63.30 | 1.65 | TABULAR | S-14B | 0.59 | 1.65 | 63.30 | 0.01 | 100 | 0.13 |
| S-15 | 62.10 | 63.90 | 1.80 | TABULAR | S-15 | 0.66 | 1.74 | 63.84 | 0.09 | 76 | 0.36 |
| S-19 | 64.00 | 66.00 | 2.00 | TABULAR | S-19 | 0.70 | 1.64 | 65.64 | 0.06 | 21 | 0.21 |
| S-21B | 63.54 | 65.70 | 2.16 | TABULAR | S-21B | 1.70 | 1.88 | 65.42 | 0.57 | 45 | 1.81 |
| S-26B | 67.11 | 69.51 | 2.40 | TABULAR | DICB2ponding | 0.86 | 2.31 | 69.42 | 0.13 | 72 | 0.65 |
| S-26D | 67.19 | 69.25 | 2.06 | TABULAR | DICB1 | 0.48 | 1.94 | 69.13 | 0.02 | 42 | 0.08 |
| S-3Store | 62.20 | 64.24 | 2.04 | TABULAR | S-3 | 1.90 | 2.04 | 64.24 | 0.08 | 100 | 0.39 |
| S-63 | 79.80 | 84.02 | 4.22 | TABULAR | S-63 | 0.90 | 4.11 | 83.91 | 0.18 | 67 | 0.92 |
| SA-1 | 69.50 | 72.50 | 3.00 | TABULAR | S-1 | 0.65 | 2.26 | 71.76 | 0.50 | 76 | 1.24 |
| SA-2 | 62.60 | 65.60 | 3.00 | TABULAR | S-2 | 1.11 | 1.81 | 64.41 | 0.54 | 60 | 0.87 |

# Outlets 1/1

| Name | Inlet Node | Outlet Node | Inlet Elev. (m) | Rating Curve | Curve Name | Control Rules | Max. \|Flow\| (L/s) | Contributing Imp. Area (ha) |
|---|---|---|---|---|---|---|---|---|
| 1 | DICB6 | CBMHST-101 | 74.70 | TABULAR/DEPTH | 2CB | NO | 18.97 | 0.01 |
| 13 | CB_54B | MH-SA56-2 | 79.67 | TABULAR/DEPTH | 3CB | NO | 11.86 | 0.22 |
| 14 | CB95 | CBMHST-104 | 75.52 | TABULAR/DEPTH | 3CB | NO | 150.00 | 0.37 |
| 18 | MHST-141-S | MHST-141 | 75.21 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 50.72 | 0.30 |
| 20 | CB65 | MHST-144 | 72.16 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 18.18 | 0.93 |
| 22 | CB225-S | CB225 | 77.71 | TABULAR/DEPTH | S19_SL2_5 | NO | 3.20 | 0.29 |
| 24 | CBMHST-103-S | CBMHST103 | 74.26 | TABULAR/DEPTH | S28_SL4_0.5 | NO | 11.16 | 1.00 |
| 26 | CB91 | MHST-141 | 75.14 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 24.14 | 0.17 |
| 31 | CB26 | Chamber202 | 75.96 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 7.53 | 0.29 |
| BI-SA1-IC | BI-SA1-S | BI-SA1 | 70.15 | TABULAR/DEPTH | 6@R-B@S=1.5% | NO | 91.68 | 0.37 |
| BI-SA49-IC | BI-SA49-S | D-MHST-146_1 | 75.35 | TABULAR/DEPTH | S19_SL2_1x4 | NO | 99.78 | 0.54 |
| CB101_103_105 | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S22_SL2_5x3 | NO | 15.64 | 0.28 |
| CB102_106_DIC | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 97.70 | 0.28 |
| CB130OUT | CB130 | MHST-130 | 69.90 | TABULAR/DEPTH | S19_SL2_1 | NO | 34.71 | 0.04 |
| CB40,66-68 | CB68 | CONNECT | 72.63 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 138.84 | 0.63 |
| CB42-43 | D-MHST-161-S | MHST-161 | 81.44 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 31.67 | 0.08 |
| CB44-45 | MHST-148-S | MHST-148 | 80.37 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 56.85 | 0.26 |
| CB46_57 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 48.85 | 0.34 |
| CB47-55 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S22_SL2_5x8 | NO | 41.69 | 0.34 |
| CB56_58 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S22_SL2_1x2 | NO | 4.94 | 0.34 |
| CB61_104 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S19_SL2_1x2 | NO | 19.64 | 0.34 |
| CB63,64 | MHST-120-S | CONNECT | 74.46 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 23.52 | 0.63 |
| CB69_75 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 6.46 | 0.13 |
| CB74_76_77 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 72.63 | 0.13 |
| CB79-81 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S19_SL2_5x5 | NO | 41.83 | 0.18 |
| CB82 | MHST-151-S | MHST-151 | 77.12 | TABULAR/DEPTH | DB_S22_SL2_5 | NO | 1.42 | 0.21 |
| CB83 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S22_SL2_5 | NO | 1.49 | 0.18 |
| CB84-85_90 | MHST-136-S | MHST-136 | 81.70 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 69.62 | 0.12 |
| CB88_96 | MHST-137-S | MHST-137 | 79.79 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 46.69 | 0.19 |
| DICB2 | S-26B | BI-SA1 | 67.11 | TABULAR/DEPTH | 100VHV-1 | NO | 15.70 | 0.08 |
| DICB9_OL | DICB9 | CBMHST103 | 74.28 | TABULAR/DEPTH | S19_SL2_5 | NO | 51.78 | 1.00 |
| MHST-100-IC | MHST-100-S | MHST-100 | 66.30 | TABULAR/DEPTH | 1@R-A@S=5.0% | NO | 0.00 | 1.02 |
| MHST-101-IC | MHST-101-S | MHST-101 | 66.07 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 33.76 | 1.02 |
| MHST-102-IC | MHST-102-S | MHST-102 | 66.28 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 30.64 | 0.91 |
| MHST-104-IC | MHST-104-S | MHST-104 | 70.80 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 19.54 | 0.10 |
| MHST-105-IC | MHST-105-S | MHST-105 | 68.64 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 96.76 | 0.40 |
| MHST-106-IC | MHST-106-S | MHST-106 | 71.87 | TABULAR/DEPTH | 2@R-E@S=5.0% | NO | 16.53 | 0.68 |
| MHST-135-IC | MHST-135-S | MHST-135 | 79.68 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 26.53 | 0.03 |
| MHST-157-IC | MHST-157-S | MHST-157 | 73.80 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 241.63 | 0.89 |
| MHST-158-IC | MHST-158-S | MHST-158 | 74.58 | TABULAR/DEPTH | S19_SL2_5x8 | NO | 126.93 | 0.63 |
| MSHT-103-IC | MSHT-103-S | MSHT-103 | 66.13 | TABULAR/DEPTH | 7@R-A@S=5.0% | NO | 235.84 | 0.79 |
| O-1 | SA-1 | MH-SA1 | 69.50 | TABULAR/HEAD | O-1 | NO | 60.00 | 1.24 |
| O-15 | S-15 | MHST-107 | 62.10 | TABULAR/DEPTH | O-15 | NO | 7.73 | 0.01 |
| O-19 | S-19 | MHST-101 | 64.00 | TABULAR/DEPTH | 50VHV-1 | NO | 3.77 | 0.02 |
| O-2 | SA-2 | MH-SAxx | 62.60 | TABULAR/HEAD | O-2 | NO | 7.00 | 0.86 |
| O-21B | S-21B | IN119607 | 63.54 | TABULAR/DEPTH | 50VHV-1 | NO | 4.05 | 0.23 |
| O-26D | S-26D | MHST-105 | 67.19 | TABULAR/DEPTH | 50VHV-1 | NO | 4.13 | 0.00 |
| O-3 | S-3Store | OGS1 | 62.20 | TABULAR/HEAD | 125VHV-2 | NO | 26.69 | 0.11 |
| O-4 | S-14B | Preston | 62.15 | TABULAR/HEAD | 125VHV-2 | NO | 20.15 | 0.00 |
| O-63 | S-63 | MHST-154A | 78.20 | TABULAR/DEPTH | O-63 | NO | 99.58 | 0.59 |
| O-CB209 | CB209 | MHST-209 | 77.64 | TABULAR/DEPTH | S28_SL2_5x2 | NO | 1.82 | 0.23 |
| OL_CB_54A | CB_54A | MH-SA56-1 | 79.65 | TABULAR/DEPTH | 3CB | NO | 83.39 | 0.19 |
| WD-OLF_5 | Wales-OLF-N05 | Preston | 65.50 | TABULAR/DEPTH | 2@R-E@S=1.0% | NO | 19.11 | 0.40 |

# Orifices 1/1

| Name | Inlet Node | Outlet Node | Type | Cross-Section | Height (m) | Width (m) | Inlet Elev. (m) | Discharge Coeff. | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|
| ICD201 | Chamber201 | Chamber201S | | CIRCULAR | 0.35 | 0 | 67.95 | 0.62 | 152.44 |
| ICD204 | Chamber-204 | D-Chamber-204 | | CIRCULAR | 0.19 | 0 | 73.03 | 0.62 | 63.71 |
| ICD203 | Chamber-203 | D-Chamber-203 | | CIRCULAR | 0.225 | 0 | 71.42 | 0.62 | 92.44 |
| ICD202 | Chamber202 | Chamber202-S | | CIRCULAR | 0.245 | 0 | 70.84 | 0.62 | 121.27 |
| ICD-100-1 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.3 | 0 | 63.06 | 0.62 | 211.97 |
| ICD-100-2 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.1 | 0 | 63.85 | 0.62 | 17.14 |
| ICD111 | DICB8 | OGS-3 | | CIRCULAR | 0.4 | 0 | 68.11 | 0.62 | 326.88 |
| ICD-142 | MHST-142 | D-MHST-142 | | CIRCULAR | 0.7 | 0 | 69.32 | 0.62 | 1268.29 |
| OR-145 | MHST-145 | D-MHST-145 | | RECT_CLOSED | 0.75 | 0.75 | 69.9 | 0.62 | 1218.27 |
| OR-155 | D-MHST-155 | MHST-155 | | CIRCULAR | 0.675 | 0 | 74.06 | 0.62 | 1246.24 |
| OR-170 | MHST-170 | D-MHST-170 | | CIRCULAR | 0.1 | 0 | 71.93 | 0.62 | 21.34 |

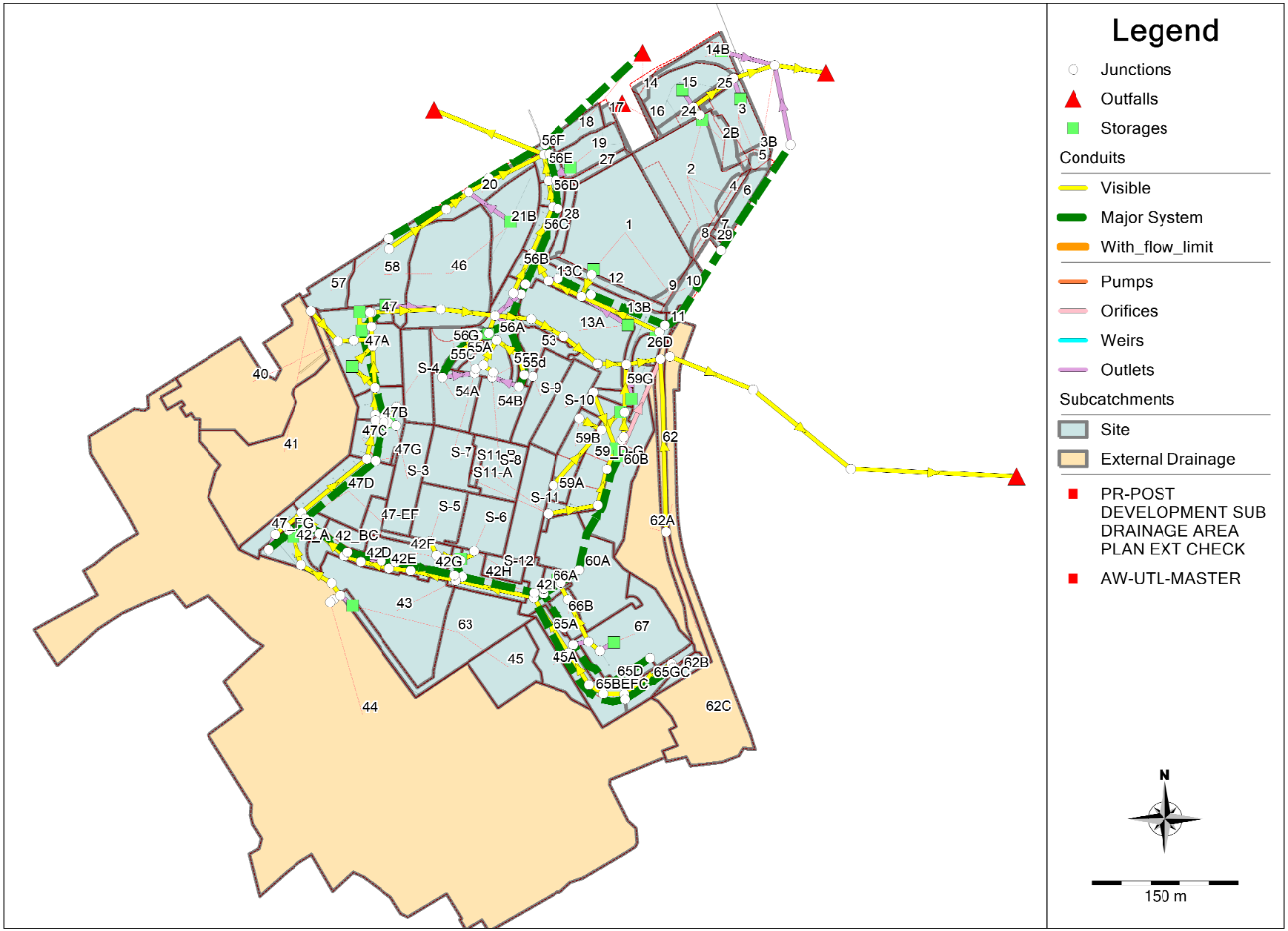
# Weirs 1/1

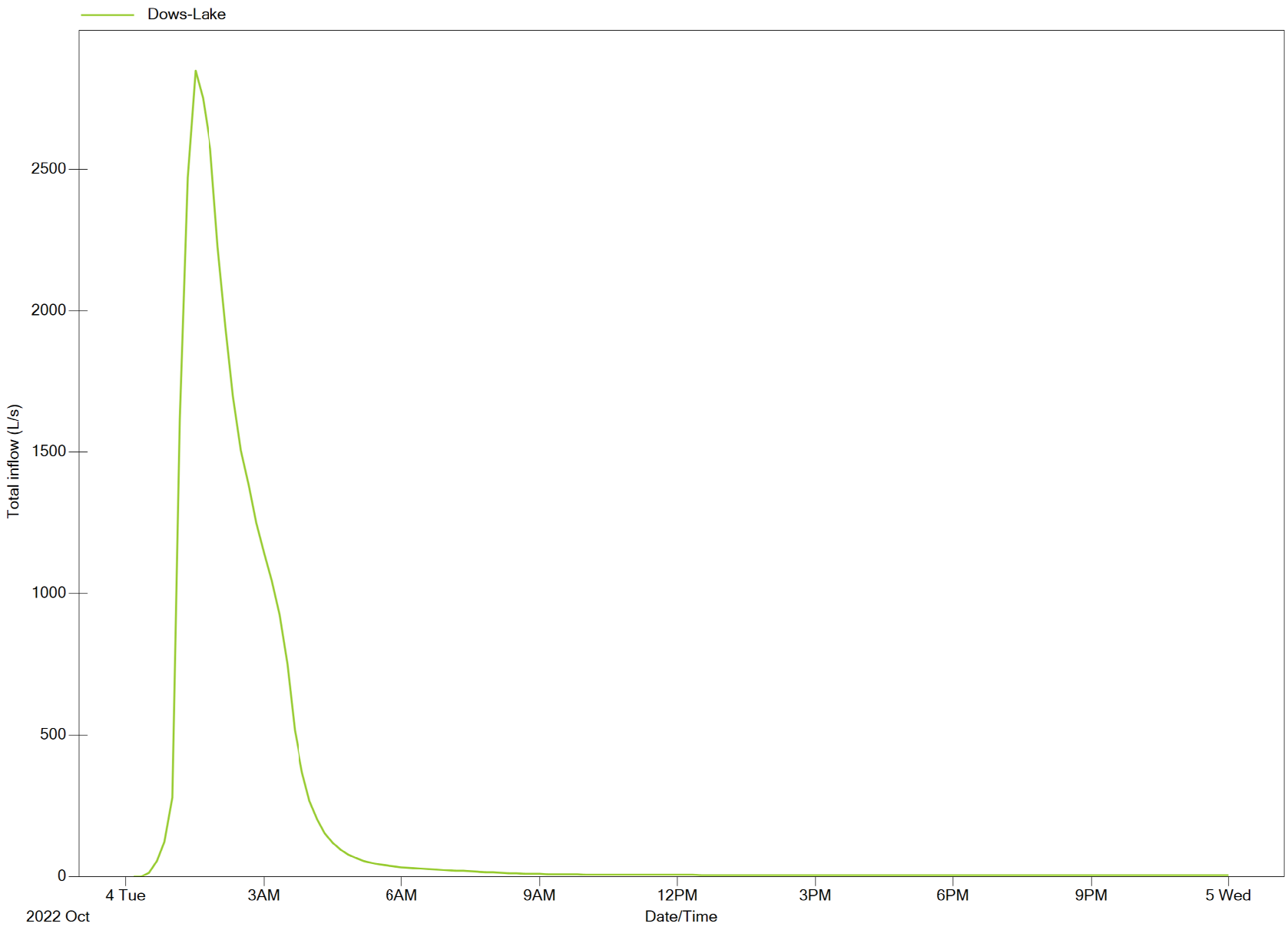
| Name | Inlet Node | Outlet Node | Type | Height (m) | Length (m) | Inlet Elev. (m) | Max. \|Flow\| (L/s) | Time Max. Flow (M/D/Y) | Max/Full Depth | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_1 | MHST-146 | D-MHST-146_1 | SIDEFLOW | 1.4 | 1.5 | 70.17 | 2154.85 | 10/04/2022 01:13 AM | 1 | 19.249 |
| Weir-142 | MHST-142 | D-MHST-142 | TRANSVERSE | 0.5 | 1.4 | 70.7 | 605.09 | 10/04/2022 01:38 AM | 0.82 | 24.988 |
| Weir-145 | MHST-145 | D-MHST-145 | TRANSVERSE | 1 | 2 | 71.64 | 629.89 | 10/04/2022 01:38 AM | 0.33 | 22.804 |
| Weir-155 | D-MHST-15 | MHST-155 | TRANSVERSE | 1 | 1 | 76.45 | 0 | 10/04/2022 00:00 AM | 0 | 13.662 |
| Weir-170 | MHST-170 | D-MHST-170 | TRANSVERSE | 0.3 | 1.5 | 73 | 162.52 | 10/04/2022 01:26 AM | 0.54 | 2.721 |

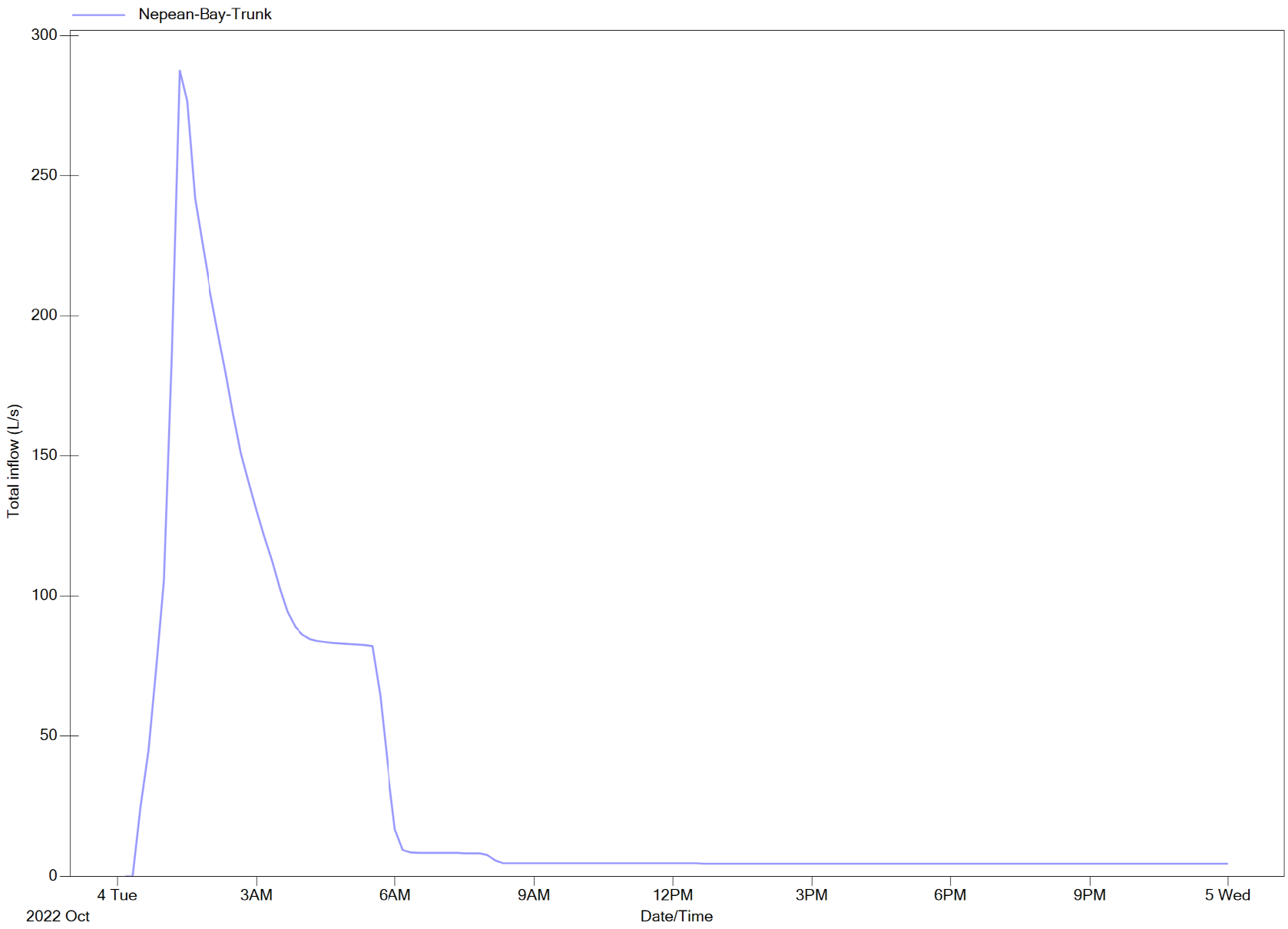
## Outfalls 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Type | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) | Max. Flow (L/s) | Total Flow (ML) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|
| Carling_OLF | 64.6 | 64.8 | FREE | 0.12 | 64.72 | 10/04/2022 01:13 AM | 236.25 | 0.257 | 2.187 |
| Dows-Lake | 63.745 | 66.5 | FREE | 0.81 | 64.56 | 10/04/2022 01:39 AM | 2185.43 | 14.149 | 29.625 |
| LRT-Corridor | 56 | 57 | FREE | 0 | 56 | 10/04/2022 00:00 AM | 24.23 | 0.02 | 0.059 |
| Nepean-Bay-Trunk | 62.8 | 65.21 | NORMAL | 0 | 62.8 | 10/04/2022 00:00 AM | 232.85 | 2.317 | 6.163 |
| Preston_Street | 60.9 | 63.76 | NORMAL | 0.23 | 61.13 | 10/04/2022 01:10 AM | 105.21 | 3.037 | 2.435 |

# PCSWMM OUTPUT
# 3-HOUR CHICAGO -100-YEAR + 20% STORM


Legend
Junctions
Outfalls
Storages
Conduits
Visible
Major System
With_flow_limit
Pumps
Orifices
Weirs
Outlets
Subcatchments
Site
External Drainage
PR-POST DEVELOPMENT SUB DRAINAGE AREA PLAN EXT CHECK
AW-UTL-MASTER
N
150 m


Dows-Lake
Total inflow (L/s)
2500
2000
1500
1000
500
0
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time


Nepean-Bay-Trunk
300
250
200
150
100
50
0
Total inflow (L/s)
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time

# SUBCATCHMENTS 1/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 1 | | 100yr_3hr_Chicago_Climate_Change | SA-1 | 1.2161 | 3.0 | 100.0 | 721.5 | 1.01 |
| 10 | | 100yr_3hr_Chicago_Climate_Change | 13B | 0.0822 | 3.0 | 8.1 | 41.2 | 0.56 |
| 11 | | 100yr_3hr_Chicago_Climate_Change | MHST-105-S | 0.0302 | 3.0 | 89.3 | 17.7 | 0.95 |
| 12 | | 100yr_3hr_Chicago_Climate_Change | BI-SA1-S | 0.1276 | 5.0 | 56.5 | 71.9 | 0.78 |
| 13A | | 100yr_3hr_Chicago_Climate_Change | S-26B | 0.6503 | 9.6 | 12.5 | 188.7 | 0.52 |
| 13B | | 100yr_3hr_Chicago_Climate_Change | BI-SA1-S | 0.2248 | 5.0 | 87.8 | 132.1 | 0.95 |
| 13C | | 100yr_3hr_Chicago_Climate_Change | MHST-104-S | 0.1227 | 5.0 | 78.7 | 70.8 | 0.90 |
| 14 | | 100yr_3hr_Chicago_Climate_Change | Carling_OLF | 0.0580 | 3.0 | 60.3 | 31.1 | 0.81 |
| 14B | | 100yr_3hr_Chicago_Climate_Change | S-14B | 0.1272 | 3.0 | 0.0 | 65.0 | 0.51 |
| 15 | | 100yr_3hr_Chicago_Climate_Change | S-15 | 0.3643 | 3.0 | 3.6 | 134.9 | 0.51 |
| 16 | | 100yr_3hr_Chicago_Climate_Change | LRT-Corridor | 0.0229 | 3.0 | 0.0 | 11.9 | 0.51 |
| 17 | | 100yr_3hr_Chicago_Climate_Change | LRT-Corridor | 0.0361 | 3.0 | 0.0 | 18.7 | 0.51 |
| 18 | | 100yr_3hr_Chicago_Climate_Change | Carling_OLF | 0.1189 | 3.0 | 3.4 | 54.1 | 0.53 |
| 19 | | 100yr_3hr_Chicago_Climate_Change | S-19 | 0.2056 | 3.0 | 7.1 | 90.0 | 0.54 |
| 2 | | 100yr_3hr_Chicago_Climate_Change | SA-2 | 0.7114 | 3.0 | 100.0 | 430.3 | 1.01 |
| 20 | | 100yr_3hr_Chicago_Climate_Change | Carling_OLFN1 | 0.2434 | 8.0 | 0.0 | 122.8 | 0.52 |
| 21B | | 100yr_3hr_Chicago_Climate_Change | S-21B | 0.4325 | 10.0 | 9.2 | 438.3 | 0.83 |
| 24 | | 100yr_3hr_Chicago_Climate_Change | MHST-107 | 0.0348 | 3.0 | 55.8 | 19.2 | 0.79 |
| 25 | | 100yr_3hr_Chicago_Climate_Change | OGS1 | 0.0465 | 3.0 | 80.6 | 26.8 | 0.91 |
| 26D | | 100yr_3hr_Chicago_Climate_Change | S-26D | 0.0774 | 25.0 | 0.0 | 39.7 | 0.51 |
| 27 | | 100yr_3hr_Chicago_Climate_Change | MHST-101-S | 0.0531 | 3.0 | 84.5 | 31.0 | 0.92 |
| 28 | | 100yr_3hr_Chicago_Climate_Change | MHST-102-S | 0.0844 | 5.0 | 62.6 | 47.9 | 0.82 |
| 29 | | 100yr_3hr_Chicago_Climate_Change | 7 | 0.0113 | 3.0 | 0.0 | 5.1 | 0.51 |
| 2B | | 100yr_3hr_Chicago_Climate_Change | SA-2 | 0.0908 | 3.0 | 100.0 | 54.1 | 1.00 |
| 3 | | 100yr_3hr_Chicago_Climate_Change | S-3Store | 0.2154 | 3.0 | 31.8 | 118.9 | 0.77 |
| 3B | | 100yr_3hr_Chicago_Climate_Change | 3 | 0.0393 | 3.0 | 100.0 | 23.4 | 1.00 |
| 4 | | 100yr_3hr_Chicago_Climate_Change | 2 | 0.0196 | 3.0 | 100.0 | 11.7 | 1.00 |
| 40 | External | 100yr_3hr_Chicago_Climate_Change | MHST-156 | 1.1965 | 6.8 | 46.2 | 533.5 | 0.72 |
| 41 | External | 100yr_3hr_Chicago_Climate_Change | MHST-132 | 1.5292 | 3.0 | 14.6 | 334.9 | 0.50 |
| 42_A | | 100yr_3hr_Chicago_Climate_Change | MHST-135-S | 0.2148 | 5.0 | 12.8 | 73.3 | 0.54 |
| 42_BC | | 100yr_3hr_Chicago_Climate_Change | MHST-149-S | 0.1753 | 5.0 | 60.5 | 97.9 | 0.81 |
| 42D | | 100yr_3hr_Chicago_Climate_Change | MHST-150-S1 | 0.0509 | 2.0 | 99.0 | 30.3 | 1.00 |
| 42E | | 100yr_3hr_Chicago_Climate_Change | MHST-151-S | 0.0245 | 2.0 | 99.0 | 14.6 | 1.00 |
| 42F | | 100yr_3hr_Chicago_Climate_Change | CB91 | 0.1997 | 2.0 | 83.0 | 113.6 | 0.92 |
| 42G | | 100yr_3hr_Chicago_Climate_Change | MHST-141-S | 0.0958 | 2.0 | 91.0 | 56.4 | 0.96 |
| 42H | | 100yr_3hr_Chicago_Climate_Change | MHST-158-S | 0.1983 | 2.0 | 87.4 | 116.2 | 0.94 |
| 42I | | 100yr_3hr_Chicago_Climate_Change | DICB9 | 0.1177 | 6.0 | 79.0 | 68.2 | 0.90 |
| 43 | | 100yr_3hr_Chicago_Climate_Change | MHST-141 | 0.8632 | 2.0 | 100.0 | 512.1 | 1.01 |
| 44 | External | 100yr_3hr_Chicago_Climate_Change | MHST-62534 | 12.7451 | 1.0 | 32.0 | 3711.0 | 0.60 |
| 45 | | 100yr_3hr_Chicago_Climate_Change | 63 | 0.2888 | 4.0 | 58.8 | 155.8 | 0.80 |
| 45A | | 100yr_3hr_Chicago_Climate_Change | MHST-153-S | 0.2052 | 4.0 | 12.6 | 99.0 | 0.58 |
| 46 | | 100yr_3hr_Chicago_Climate_Change | 21B | 0.9308 | 10.0 | 15.6 | 379.1 | 0.65 |

# SUBCATCHMENTS 2/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 47 | | 100yr_3hr_Chicago_Climate_Change | CB65 | 0.0374 | 3.0 | 90.6 | 22.0 | 0.95 |
| 47_FG | | 100yr_3hr_Chicago_Climate_Change | D-MHST-161-S | 0.1159 | 3.0 | 72.2 | 66.4 | 0.87 |
| 47A | | 100yr_3hr_Chicago_Climate_Change | MHST-157-S | 0.5412 | 3.0 | 65.0 | 274.5 | 0.83 |
| 47B | | 100yr_3hr_Chicago_Climate_Change | BI-SA49-S | 0.2880 | 3.0 | 69.3 | 159.2 | 0.85 |
| 47C | | 100yr_3hr_Chicago_Climate_Change | MHST-147-S | 0.0737 | 3.0 | 100.0 | 43.9 | 1.00 |
| 47D | | 100yr_3hr_Chicago_Climate_Change | MHST-148-S | 0.4496 | 3.0 | 32.0 | 172.0 | 0.66 |
| 47-EF | | 100yr_3hr_Chicago_Climate_Change | 47D | 0.0559 | 3.0 | 59.0 | 31.5 | 0.80 |
| 47G | | 100yr_3hr_Chicago_Climate_Change | MHST-147-S | 0.0080 | 3.0 | 100.0 | 4.8 | 1.00 |
| 5 | | 100yr_3hr_Chicago_Climate_Change | preston | 0.0120 | 3.0 | 100.0 | 7.2 | 1.00 |
| 53 | | 100yr_3hr_Chicago_Climate_Change | MH-SA56-3 | 0.1516 | 2.0 | 61.5 | 83.2 | 0.81 |
| 54A | | 100yr_3hr_Chicago_Climate_Change | CB_54A | 0.2598 | 2.0 | 73.0 | 146.6 | 0.87 |
| 54B | | 100yr_3hr_Chicago_Climate_Change | CB_54B | 0.2799 | 2.0 | 77.1 | 159.9 | 0.89 |
| 55A | | 100yr_3hr_Chicago_Climate_Change | MH-SA56-1 | 0.0348 | 2.0 | 100.0 | 20.7 | 1.00 |
| 55B | | 100yr_3hr_Chicago_Climate_Change | MH-SA56-2 | 0.0244 | 2.0 | 100.0 | 14.5 | 1.00 |
| 55C | | 100yr_3hr_Chicago_Climate_Change | CB225-S | 0.0149 | 0.5 | 100.0 | 8.9 | 1.00 |
| 55d | | 100yr_3hr_Chicago_Climate_Change | CB209 | 0.0276 | 6.0 | 63.6 | 15.7 | 0.82 |
| 56A | | 100yr_3hr_Chicago_Climate_Change | MHST-120-S | 0.3601 | 5.0 | 31.2 | 132.0 | 0.63 |
| 56B | | 100yr_3hr_Chicago_Climate_Change | MHST-106-S | 0.0565 | 5.0 | 86.0 | 33.0 | 0.93 |
| 56C | | 100yr_3hr_Chicago_Climate_Change | MSHT-103-S | 0.1354 | 5.0 | 82.0 | 78.7 | 0.91 |
| 56D | | 100yr_3hr_Chicago_Climate_Change | MHST-102-S | 0.0761 | 5.0 | 84.7 | 44.4 | 0.93 |
| 56E | | 100yr_3hr_Chicago_Climate_Change | MHST-101-S | 0.0805 | 5.0 | 77.3 | 46.5 | 0.89 |
| 56F | | 100yr_3hr_Chicago_Climate_Change | Carling_OLFN3 | 0.0180 | 5.0 | 77.4 | 10.4 | 0.89 |
| 56G | | 100yr_3hr_Chicago_Climate_Change | CB225-S | 0.1673 | 5.0 | 50.1 | 86.4 | 0.76 |
| 57 | | 100yr_3hr_Chicago_Climate_Change | Carling_OLF1 | 0.1534 | 15.0 | 6.9 | 80.5 | 0.54 |
| 58 | | 100yr_3hr_Chicago_Climate_Change | 46 | 0.4475 | 16.0 | 10.2 | 177.0 | 0.55 |
| 59_D-G | | 100yr_3hr_Chicago_Climate_Change | Chamber201 | 0.4461 | 2.0 | 90.7 | 261.7 | 0.96 |
| 59A | | 100yr_3hr_Chicago_Climate_Change | TD_A | 0.0501 | 2.0 | 90.7 | 29.5 | 0.95 |
| 59B | | 100yr_3hr_Chicago_Climate_Change | TD_B | 0.1795 | 2.0 | 90.7 | 105.6 | 0.96 |
| 59G | | 100yr_3hr_Chicago_Climate_Change | CB130 | 0.0764 | 2.0 | 53.4 | 42.7 | 0.77 |
| 6 | | 100yr_3hr_Chicago_Climate_Change | 3 | 0.1396 | 3.0 | 2.1 | 64.7 | 0.52 |
| 60A | | 100yr_3hr_Chicago_Climate_Change | ST-60-S-B | 0.6561 | 25.0 | 22.7 | 285.5 | 0.61 |
| 60B | | 100yr_3hr_Chicago_Climate_Change | DICB8 | 0.4884 | 25.0 | 30.4 | 220.9 | 0.65 |
| 62 | External | 100yr_3hr_Chicago_Climate_Change | POW_D1 | 0.2744 | 5.0 | 61.7 | 117.6 | 0.79 |
| 62A | External | 100yr_3hr_Chicago_Climate_Change | POW_D1 | 0.6276 | 6.0 | 25.0 | 197.9 | 0.59 |
| 62B | | 100yr_3hr_Chicago_Climate_Change | MHST-136-S | 0.0620 | 3.0 | 0.0 | 18.1 | 0.47 |
| 62C | External | 100yr_3hr_Chicago_Climate_Change | POW_D1 | 1.1137 | 5.0 | 61.8 | 414.2 | 0.78 |
| 63 | | 100yr_3hr_Chicago_Climate_Change | S-63 | 0.6280 | 2.0 | 67.5 | 379.2 | 0.87 |
| 65A | | 100yr_3hr_Chicago_Climate_Change | MHST-153-S | 0.0894 | 3.6 | 63.3 | 49.7 | 0.82 |
| 65BEFC | | 100yr_3hr_Chicago_Climate_Change | MHST-137-S | 0.2015 | 3.6 | 37.9 | 83.8 | 0.68 |
| 65D | | 100yr_3hr_Chicago_Climate_Change | SW_65D | 0.1128 | 3.0 | 5.0 | 30.9 | 0.49 |
| 65GC | | 100yr_3hr_Chicago_Climate_Change | MHST-136-S | 0.1771 | 3.6 | 65.5 | 94.8 | 0.83 |
| 66A | | 100yr_3hr_Chicago_Climate_Change | CHAMBER-102 | 0.0642 | 6.0 | 53.8 | 35.9 | 0.78 |
| 66B | | 100yr_3hr_Chicago_Climate_Change | CBMHST105 | 0.1106 | 6.0 | 73.8 | 63.4 | 0.87 |
| 67 | | 100yr_3hr_Chicago_Climate_Change | CB95 | 0.6208 | 3.0 | 59.8 | 324.6 | 0.80 |
| 7 | | 100yr_3hr_Chicago_Climate_Change | 2 | 0.0165 | 3.0 | 100.0 | 9.8 | 1.00 |
| 8 | | 100yr_3hr_Chicago_Climate_Change | 2 | 0.0188 | 3.0 | 100.0 | 11.2 | 1.00 |
| 9 | | 100yr_3hr_Chicago_Climate_Change | 1 | 0.0192 | 3.0 | 100.0 | 11.4 | 1.00 |
| S-10 | | 100yr_3hr_Chicago_Climate_Change | MHST-211 | 0.2975 | 2.0 | 100.0 | 175.2 | 1.01 |
| S-11 | | 100yr_3hr_Chicago_Climate_Change | MHST-213 | 0.4008 | 2.0 | 100.0 | 233.0 | 1.01 |
| S11-A | | 100yr_3hr_Chicago_Climate_Change | MHST-213 | 0.0107 | 2.0 | 100.0 | 6.4 | 1.00 |
| S11-B | | 100yr_3hr_Chicago_Climate_Change | MHST-213 | 0.0153 | 2.0 | 69.2 | 8.8 | 0.85 |
| S-12 | | 100yr_3hr_Chicago_Climate_Change | MH-SA51-1 | 0.0933 | 2.0 | 74.5 | 53.7 | 0.88 |
| S-3 | | 100yr_3hr_Chicago_Climate_Change | MH-SA50 | 0.3456 | 2.0 | 99.9 | 202.4 | 1.01 |
| S-4 | | 100yr_3hr_Chicago_Climate_Change | MH-SA49 | 0.2910 | 2.0 | 99.8 | 171.5 | 1.01 |
| S-5 | | 100yr_3hr_Chicago_Climate_Change | MH-SA51-2 | 0.2767 | 2.0 | 64.2 | 150.5 | 0.83 |
| S-6 | | 100yr_3hr_Chicago_Climate_Change | MH-SA51-1 | 0.2932 | 2.0 | 65.3 | 159.6 | 0.83 |
| S-7 | | 100yr_3hr_Chicago_Climate_Change | MH-SA56-1 | 0.2899 | 2.0 | 77.2 | 164.8 | 0.89 |
| S-8 | | 100yr_3hr_Chicago_Climate_Change | MH-SA56-2 | 0.2768 | 2.0 | 75.4 | 157.4 | 0.88 |
| S-9 | | 100yr_3hr_Chicago_Climate_Change | MH-SA56-3 | 0.2599 | 2.0 | 71.4 | 141.5 | 0.86 |

# CONDUITS 1/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
| 10 | CBMHST105 | CBMHST103 | | 17.6 | 72.40 | 72.13 | CIRCULAR | 0.38 | | 0.01534 | 237.8 |
| 11 | CB_54A | CB225-S | Major_System | 29.9 | 79.69 | 77.71 | RECT_OPEN | 0.15 | | 0.06634 | 54.9 |
| 12 | CB_54B | CB209 | major_system | 33.4 | 79.67 | 77.64 | RECT_OPEN | 0.15 | | 0.06086 | 144.1 |
| 15 | SW_42I | DICB9 | major_system | 41.1 | 75.31 | 74.28 | TRAPEZOIDAL | 1.00 | | 0.02509 | 0.0 |
| 16 | MH207 | Chamber-204 | | 25.3 | 73.98 | 73.88 | CIRCULAR | 0.38 | | 0.00395 | 149.4 |
| 17 | D-Chamber-204 | MHST-141 | | 21.1 | 73.03 | 72.98 | CIRCULAR | 0.30 | | 0.00237 | 72.5 |
| 19 | DICB9 | CBMHST-103-S | major_system | 21.8 | 74.28 | 74.26 | TRAPEZOIDAL | 0.50 | | 0.00092 | 97.9 |
| 2 | MHST-105-S | Wales-OLF-N03 | Major_System | 17.0 | 68.69 | 68.20 | IRREGULAR | 0.00 | Road-B | 0.02884 | 33.0 |
| 21 | MHST-157-S | CB65 | Major_System | 36.2 | 74.22 | 73.54 | IRREGULAR | 0.00 | Road-D | 0.01881 | 0.0 |
| 23 | CBMHST-103-S | ST-60-S-B | major_system | 22.5 | 74.26 | 74.11 | TRAPEZOIDAL | 0.50 | | 0.00667 | 80.1 |
| 25 | CB91 | CB94 | major_system | 29.3 | 75.14 | 75.03 | RECT_OPEN | 0.30 | | 0.00375 | 81.9 |
| 27 | TD_A | MHST-221 | | 75.5 | 67.42 | 66.62 | CIRCULAR | 0.20 | | 0.01060 | 28.0 |
| 28 | MHST-221 | PS | | 26.8 | 66.63 | 66.42 | CIRCULAR | 0.30 | | 0.00765 | 118.0 |
| 3 | Preston | Preston_Street | | 10.0 | 61.03 | 60.90 | CIRCULAR | 0.30 | | 0.01300 | 123.8 |
| 30 | TD_B | MHST-221 | | 25.5 | 67.88 | 67.60 | CIRCULAR | 0.30 | | 0.01084 | 104.7 |
| 32 | CB225-S | CB26 | Major_System | 28.5 | 77.71 | 75.96 | RECT_OPEN | 0.15 | | 0.06143 | 142.4 |
| 34 | CB26 | MHST-120-S | Major_System | 33.4 | 75.96 | 74.46 | RECT_OPEN | 0.15 | | 0.04502 | 128.6 |
| 4 | OGS-3 | MHST62528 | | 10.0 | 67.62 | 67.60 | CIRCULAR | 1.20 | | 0.00200 | 2989.2 |
| 41 | CB209 | MHST-120-S | Major_System | 34.7 | 77.64 | 74.46 | RECT_OPEN | 0.15 | | 0.09199 | 155.7 |
| 5 | MHST62528 | MHST62545 | | 91.8 | 67.56 | 66.71 | CIRCULAR | 1.20 | | 0.00929 | 2991.5 |
| 6 | MHST62545 | MHST62547 | | 129.6 | 66.69 | 64.45 | CIRCULAR | 1.20 | | 0.01726 | 2991.0 |
| 7 | MHST62547 | Dows-Lake | | 171.0 | 64.17 | 63.75 | CIRCULAR | 1.20 | | 0.00249 | 3018.9 |
| 8 | POW_D1 | OGS-3 | | 180.0 | 78.70 | 69.70 | TRAPEZOIDAL | 0.55 | | 0.05006 | 687.2 |
| 8_1 | CHAMBER-103 | D-MHST-155 | | 3.1 | 74.08 | 74.06 | CIRCULAR | 0.90 | | 0.00645 | 1672.4 |
| 8_1-S | CHAMBER-103 | MHST-155 | Major_System | 14.7 | 79.00 | 78.70 | RECT_OPEN | 0.30 | | 0.02037 | 0.0 |
| 9 | CBMHST103 | CHAMBER-102 | | 2.6 | 72.10 | 72.07 | CIRCULAR | 0.38 | | 0.01154 | 307.0 |
| CA-OLF_2 | Carling_OLF1 | Carling_OLFN1 | Major_System | 120.4 | 66.50 | 65.41 | IRREGULAR | 0.00 | CarlingAve | 0.00907 | 74.2 |
| CA-OLF_3 | Carling_OLFN3 | Carling_OLF | Major_System | 66.5 | 64.80 | 64.60 | IRREGULAR | 0.00 | CarlingAve | 0.00301 | 241.7 |
| CA-OLF_4 | Carling_OLFN1 | Carling_OLFN3 | Major_System | 67.1 | 65.41 | 64.80 | IRREGULAR | 0.00 | CarlingAve | 0.00906 | 180.3 |
| CA-STM | IN119607 | D-MHST-100 | | 86.0 | 63.10 | 62.80 | CIRCULAR | 0.30 | | 0.00349 | 6.0 |
| ST-100_2 | D-MHST-100 | Nepean-Bay-Trunk | | 6.0 | 63.06 | 63.04 | CIRCULAR | 0.90 | | 0.00333 | 306.8 |
| ST-100-S | MHST-100-S | Carling_OLFN3 | Major_System | 11.0 | 65.42 | 64.80 | IRREGULAR | 0.00 | Road-A | 0.05645 | 71.3 |
| ST-101I | MHST-101 | MHST-100 | | 27.4 | 63.12 | 63.09 | CIRCULAR | 0.90 | | 0.00109 | 303.1 |
| ST-101I-S | MHST-101-S | MHST-100-S | Major_System | 27.4 | 66.07 | 65.42 | IRREGULAR | 0.00 | Road-A | 0.02371 | 71.9 |
| ST-102 | CBMHST-101 | CBMHST105 | | 47.9 | 73.63 | 72.43 | CIRCULAR | 0.38 | | 0.02505 | 177.2 |

## CONDUITS 2/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-102I | MHST-102 | MHST-101 | | 27.2 | 63.15 | 63.12 | CIRCULAR | 1.50 | | 0.00110 | 283.4 |
| ST-102I-S | MHST-102-S | MHST-101-S | Major_System | 27.2 | 66.28 | 66.07 | IRREGULAR | 0.00 | Road-A | 0.00773 | 34.2 |
| ST-103I | MSHT-103 | MHST-102 | | 52.9 | 63.20 | 63.15 | CIRCULAR | 1.50 | | 0.00100 | 297.3 |
| ST-103I-S | MSHT-103-S | MHST-102-S | Major_System | 52.9 | 66.13 | 66.28 | IRREGULAR | 0.00 | Road-A | -0.00283 | 20.7 |
| ST-104 | CBMHST-104 | CBMHST-101 | | 15.1 | 74.14 | 73.84 | CIRCULAR | 0.38 | | 0.01983 | 150.6 |
| ST-104_1 | BI-SA1 | MHST-104 | | 38.3 | 63.67 | 63.63 | CIRCULAR | 1.20 | | 0.00102 | 227.4 |
| ST-104_2 | MHST-105 | BI-SA1 | | 87.8 | 63.79 | 63.70 | CIRCULAR | 1.20 | | 0.00100 | 193.1 |
| ST-104I | MHST-104 | MSHT-103 | | 32.8 | 63.53 | 63.50 | CIRCULAR | 1.20 | | 0.00101 | 210.4 |
| ST-105I_1-S | BI-SA1-S | MHST-105-S | Major_System | 87.8 | 70.15 | 68.64 | IRREGULAR | 0.00 | Road-B | 0.01719 | 130.6 |
| ST-105I_2-S | MHST-104-S | BI-SA1-S | Major_System | 37.7 | 70.80 | 70.15 | IRREGULAR | 0.00 | Road-B | 0.01723 | 48.1 |
| ST-106I | MHST-106 | MSHT-103 | | 44.7 | 63.23 | 63.20 | CIRCULAR | 1.50 | | 0.00067 | 79.8 |
| ST-106I-S | MHST-106-S | MSHT-103-S | Major_System | 29.6 | 71.87 | 66.13 | IRREGULAR | 0.00 | Road-A | 0.19783 | 235.6 |
| ST-107 | D-MHST-170 | MHST-158 | | 13.3 | 71.93 | 71.80 | CIRCULAR | 0.30 | | 0.00977 | 185.8 |
| ST-120-S_1 | MHST-120-S | CB68 | Major_System | 33.8 | 74.46 | 72.63 | IRREGULAR | 0.00 | Road-A | 0.05427 | 384.7 |
| ST-120-S_2 | CB68 | MHST-106-S | Major_System | 11.0 | 72.63 | 71.87 | IRREGULAR | 0.00 | Road-A | 0.06909 | 223.8 |
| ST-130 | MHST-130 | OGS-3 | | 35.6 | 67.69 | 67.62 | CIRCULAR | 1.00 | | 0.00197 | 2520.6 |
| ST-131_1 | MHST-212 | 13 | | 25.4 | 67.95 | 67.93 | CIRCULAR | 0.83 | | 0.00094 | 152.9 |
| ST-131_2 | 13 | MHST-130 | | 49.1 | 67.93 | 67.88 | CIRCULAR | 0.83 | | 0.00096 | 189.6 |
| ST-132 | MHST-132 | MHST-156 | | 41.9 | 73.25 | 72.62 | CIRCULAR | 0.45 | | 0.01505 | 333.6 |
| ST-133 | Chamber201S | MHST-212 | | 2.9 | 67.95 | 67.95 | CIRCULAR | 0.83 | | -0.00034 | 156.0 |
| ST-134 | MHST-134 | MHST-138 | | 17.5 | 76.62 | 76.18 | CIRCULAR | 0.38 | | 0.02515 | 145.0 |
| ST-135 | MHST-135 | MHST-148 | | 28.3 | 70.62 | 70.60 | CIRCULAR | 1.35 | | 0.00071 | 1142.5 |
| ST-136 | MHST-136 | MHST-137 | | 57.8 | 78.65 | 77.30 | CIRCULAR | 0.30 | | 0.02338 | 86.7 |
| ST-136-S | MHST-136-S | MHST-137-S | Major_System | 59.7 | 81.70 | 79.79 | IRREGULAR | 0.00 | Road-E_S | 0.03201 | 24.7 |
| ST-137 | MHST-137 | MHST-134 | | 22.4 | 77.24 | 76.68 | CIRCULAR | 0.38 | | 0.02501 | 144.8 |
| ST-137-S | MHST-137-S | MHST-153-S | Major_System | 85.8 | 79.79 | 76.52 | IRREGULAR | 0.00 | Road-E_S | 0.03813 | 47.1 |
| ST-138 | MHST-138 | MHST-153 | | 38.9 | 75.17 | 74.20 | CIRCULAR | 0.38 | | 0.02494 | 145.0 |
| ST-141 | MHST-141 | MHST-160 | | 47.1 | 71.42 | 71.30 | CIRCULAR | 0.90 | | 0.00255 | 1036.5 |
| ST-141-S | MHST-151-S | MHST-141-S | Major_System | 61.2 | 77.12 | 75.21 | IRREGULAR | 0.00 | Road-E_S | 0.03122 | 16.3 |
| ST-142 | D-MHST-142 | MHST-130 | | 29.3 | 67.74 | 67.69 | CIRCULAR | 1.20 | | 0.00171 | 2499.5 |
| ST-143 | MHST-143 | MHST-159 | | 38.2 | 69.45 | 69.41 | CIRCULAR | 1.35 | | 0.00105 | 2499.5 |
| ST-144A | MHST-144 | CONNECT | | 56.7 | 69.68 | 69.56 | CIRCULAR | 1.35 | | 0.00212 | 2353.9 |
| ST-144B | CONNECT | MHST-143 | | 37.1 | 69.56 | 69.48 | CIRCULAR | 1.35 | | 0.00216 | 2499.4 |
| ST-145_1 | D-MHST-145 | MHST-144 | | 71.4 | 69.90 | 69.83 | CIRCULAR | 1.20 | | 0.00098 | 2351.2 |
| ST-146_1-S | MHST-146-S | BI-SA49-S | Major_System | 5.7 | 75.38 | 75.35 | IRREGULAR | 0.00 | Road-D | 0.00509 | 14.2 |

## CONDUITS 3/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-148-S | MHST-148-S | MHST-147-S | Major_System | 93.3 | 80.37 | 76.00 | IRREGULAR | 0.00 | Road-D | 0.04688 | 128.3 |
| ST-149 | MHST-149 | MHST-135 | | 33.9 | 70.69 | 70.65 | CIRCULAR | 1.35 | | 0.00118 | 1146.1 |
| ST-149-S | MHST-135-S | MHST-149-S | Major_System | 44.3 | 79.68 | 77.93 | IRREGULAR | 0.00 | Road-E_C | 0.03950 | 36.6 |
| ST-150 | MHST-150 | MHST-149 | | 18.1 | 70.76 | 70.72 | CIRCULAR | 1.35 | | 0.00220 | 1080.6 |
| ST-150-S | MHST-149-S | MHST-150-S1 | Major_System | 36.4 | 77.93 | 77.24 | IRREGULAR | 0.00 | Road-E_C | 0.01895 | 32.0 |
| ST-151 | MHST-151 | MHST-150 | | 30.3 | 71.23 | 71.21 | CIRCULAR | 0.90 | | 0.00066 | 1038.8 |
| ST-151-S | MHST-150-S1 | MHST-151-S | Major_System | 14.8 | 77.24 | 77.12 | IRREGULAR | 0.00 | Road-E_S | 0.00808 | 4.6 |
| ST-153_2 | MHST-153 | MHST-158 | | 67.4 | 72.86 | 72.19 | CIRCULAR | 0.38 | | 0.00995 | 272.7 |
| ST-153-S | MHST-153-S | DICB9 | Major_System | 77.3 | 76.52 | 74.80 | IRREGULAR | 0.00 | Road-E_S | 0.02224 | 41.4 |
| ST-154 | MHST-154 | CHAMBER-103 | | 16.0 | 75.80 | 75.72 | CIRCULAR | 0.90 | | 0.00500 | 3811.2 |
| ST-154A | MHST-154A | MHST-154B | | 15.5 | 76.18 | 76.10 | CIRCULAR | 0.90 | | 0.00516 | 3810.4 |
| ST-154B | MHST-154B | MHST-154 | | 35.9 | 76.04 | 75.86 | CIRCULAR | 0.90 | | 0.00501 | 3811.0 |
| ST-155_3 | MHST-155 | MHST-148 | | 22.3 | 74.03 | 73.82 | CIRCULAR | 0.90 | | 0.00942 | 1690.8 |
| ST-156 | MHST-156 | MHST_156B | | 16.0 | 70.13 | 70.12 | CIRCULAR | 1.50 | | 0.00062 | 847.1 |
| ST-156B | MHST_156B | MHST-157 | | 18.8 | 70.09 | 70.08 | CIRCULAR | 1.50 | | 0.00053 | 825.1 |
| ST-157_1 | MHST-157 | D-MHST-157B | | 13.5 | 70.02 | 70.00 | CIRCULAR | 1.50 | | 0.00148 | 2523.9 |
| ST-157_2 | D-MHST-157B | MHST-145 | | 14.7 | 69.97 | 69.96 | CIRCULAR | 1.50 | | 0.00068 | 1955.5 |
| ST-157_3 | D-MHST-157B | CHAMBER-104B | | 9.4 | 69.97 | 69.91 | CIRCULAR | 0.90 | | 0.00638 | 1409.5 |
| ST-158 | MHST-158 | MHST-141 | | 82.5 | 71.74 | 71.57 | CIRCULAR | 0.75 | | 0.00206 | 515.8 |
| ST-158-S_1 | MHST-141-S | CB94 | Major_System | 8.2 | 75.21 | 75.03 | IRREGULAR | 0.00 | Road-E_S | 0.02183 | 11.5 |
| ST-158-S_2 | CB94 | MHST-158-S | Major_System | 76.3 | 75.03 | 74.57 | IRREGULAR | 0.00 | Road-E_S | 0.00603 | 86.0 |
| ST-159 | MHST-159 | MHST-142 | | 44.6 | 69.41 | 69.32 | CIRCULAR | 1.35 | | 0.00202 | 2499.4 |
| ST-160 | MHST-160 | MHST-151 | | 22.3 | 71.27 | 71.23 | CIRCULAR | 0.90 | | 0.00179 | 1036.7 |
| ST-161_2-S | D-MHST-161-S | MHST-148-S | Major_System | 52.7 | 81.44 | 80.37 | IRREGULAR | 0.00 | Road-D | 0.02031 | 27.9 |
| ST-162 | CBMHST-162 | MHST-154A | | 5.4 | 76.27 | 76.24 | CIRCULAR | 0.90 | | 0.00561 | 3711.7 |
| ST-200_1 | MHST-200 | MHST-201 | | 42.9 | 70.11 | 70.05 | CIRCULAR | 1.50 | | 0.00140 | 1782.9 |
| ST-200_2 | MHST-200 | CHAMBER-104-A | | 8.4 | 70.17 | 70.13 | CIRCULAR | 0.90 | | 0.00476 | 1123.0 |
| ST-201 | MHST-201 | MHST-157 | | 6.5 | 70.07 | 70.05 | CIRCULAR | 1.50 | | 0.00308 | 2135.5 |
| ST-202 | Chamber202-S | CONNECT | | 5.2 | 70.84 | 70.80 | CIRCULAR | 0.45 | | 0.00769 | 129.6 |
| ST-203 | MHST-203 | MHST-205 | | 8.6 | 73.11 | 73.09 | CIRCULAR | 0.68 | | 0.00232 | 274.5 |
| ST-204 | MHST-204 | MHST-205 | | 12.7 | 73.11 | 73.09 | CIRCULAR | 0.53 | | 0.00158 | 185.6 |
| ST-205 | MHST-205 | MHST-206 | | 28.9 | 72.94 | 72.91 | CIRCULAR | 0.68 | | 0.00104 | 459.1 |
| ST-206 | MHST-206 | Chamber202 | | 10.3 | 72.91 | 72.88 | CIRCULAR | 0.68 | | 0.00341 | 684.1 |
| ST-208 | MHST-208 | MHST-209 | | 19.4 | 73.41 | 73.35 | CIRCULAR | 0.38 | | 0.00309 | 224.7 |

# CONDUITS 4/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-209 | MHST-209 | MHST-206 | | 28.6 | 73.32 | 73.21 | CIRCULAR | 0.38 | | 0.00385 | 227.4 |
| ST-211 | MHST-211 | Chamber201 | | 43.1 | 68.31 | 68.24 | CIRCULAR | 0.53 | | 0.00162 | 167.8 |
| ST-214 | MHST-214 | MHST-215 | | 38.3 | 68.23 | 68.27 | CIRCULAR | 0.75 | | -0.00104 | 234.8 |
| ST-215 | MHST-215 | Chamber201 | | 1.7 | 68.27 | 68.27 | CIRCULAR | 0.75 | | 0.00000 | 218.9 |
| ST-225 | CB225 | Chamber202 | | 29.0 | 73.46 | 73.17 | CIRCULAR | 0.20 | | 0.00997 | 5.7 |
| ST-42I | MHST-158-S | DICB9 | major_system | 9.7 | 74.58 | 74.28 | IRREGULAR | 0.00 | Road-E_S | 0.03109 | 45.3 |
| ST-60-S_1 | ST-60-S-B | DICB8 | Major_System | 125.5 | 74.11 | 69.82 | TRAPEZOIDAL | 1.00 | | 0.03419 | 348.6 |
| ST-62534 | MHST-62534 | CBMHST-162 | | 7.2 | 76.90 | 76.27 | CIRCULAR | 0.90 | | 0.08833 | 3710.6 |
| ST-62538 | MHST-161 | MHST-155 | | 13.4 | 78.96 | 78.70 | CIRCULAR | 0.53 | | 0.01941 | 37.2 |
| St-C104 | CHAMBER-104-A | MHST-201 | | 13.1 | 70.13 | 70.07 | CIRCULAR | 0.90 | | 0.00458 | 557.7 |
| ST-C203 | D-Chamber-203 | MHST-146 | | 15.9 | 71.42 | 71.38 | CIRCULAR | 0.30 | | 0.00251 | 94.3 |
| ST-CB6-S | SW_65D | DICB6 | major_system | 104.0 | 77.94 | 76.09 | TRAPEZOIDAL | 0.50 | | 0.01779 | 29.0 |
| ST-G107 | MHST-107 | OGS1 | | 52.5 | 62.03 | 61.24 | CIRCULAR | 0.30 | | 0.01505 | 33.4 |
| ST-OGS1_2 | OGS1 | Preston | | 10.0 | 61.21 | 61.06 | CIRCULAR | 0.30 | | 0.01500 | 83.8 |
| ST-P3 | DICB3 | IN119608 | | 71.1 | 64.23 | 63.80 | CIRCULAR | 0.20 | | 0.00605 | 0.0 |
| ST-P46 | IN119608 | IN119607 | | 30.0 | 63.50 | 63.20 | CIRCULAR | 0.20 | | 0.01000 | 0.0 |
| ST-SA1 | MH-SA1 | BI-SA1 | | 24.7 | 69.45 | 69.08 | CIRCULAR | 0.30 | | 0.01501 | 60.1 |
| ST-SA49 | MH-SA49 | Chamber-203 | | 17.9 | 74.02 | 73.80 | CIRCULAR | 0.38 | | 0.01228 | 171.1 |
| ST-SA50 | MH-SA50 | Chamber-203 | | 13.2 | 74.07 | 73.67 | CIRCULAR | 0.38 | | 0.03032 | 202.4 |
| ST-SA51-1 | MH-SA51-1 | Chamber-204 | | 14.7 | 73.91 | 73.76 | CIRCULAR | 0.45 | | 0.01021 | 213.3 |
| ST-SA51-2 | MH-SA51-2 | MH207 | | 16.2 | 74.11 | 73.98 | CIRCULAR | 0.38 | | 0.00801 | 150.3 |
| ST-SA52_1 | MHST-213 | MHST-214 | | 51.8 | 68.54 | 68.45 | CIRCULAR | 0.53 | | 0.00174 | 243.1 |
| ST-SA56-1 | MH-SA56-1 | MHST-203 | | 5.0 | 73.24 | 73.19 | CIRCULAR | 0.53 | | 0.00994 | 275.9 |
| ST-SA56-2 | MH-SA56-2 | MHST-204 | | 4.866 | 73.24 | 73.19 | CIRCULAR | 0.45 | | 0.01028 | 186.48 |
| ST-SA56-3 | MH-SA56-3 | MHST-208 | | 8.906 | 73.8 | 73.44 | CIRCULAR | 0.375 | | 0.04046 | 224.6 |
| ST-UGS6B | CHAMBER-102 | MHST-170 | | 16.625 | 72.03 | 71.96 | CIRCULAR | 0.375 | | 0.00421 | 185.23 |
| ST-UGS-Z1 | CHAMBER-104B | MHST-145 | | 8.4 | 69.91 | 69.9 | CIRCULAR | 0.9 | | 0.00119 | 485.73 |
| ST-xx | MH-SAxx | MHST-107 | | 10.7 | 62.45 | 62.15 | CIRCULAR | 0.2 | | 0.02805 | 7.01 |
| WD-OLF_3 | Wales-OLF-N03 | Wales-OLF-N04 | Major_System | 81.193 | 68.2 | 66.75 | IRREGULAR | 0 | P_Wales_Dr | 0.01786 | 32.29 |
| WD-OLF_4 | Wales-OLF-N04 | Wales-OLF-N05 | Major_System | 94.991 | 66.75 | 65.5 | IRREGULAR | 0 | P_Wales_Dr | 0.01316 | 30.48 |
| WD-OLF_4 | Wales-OLF-N04 | Wales-OLF-N05 | Major_System | 94.991 | 66.75 | 65.5 | IRREGULAR | 0 | P_Wales_Dr | 0.01316 | 25.81 |

# Junctions 1/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| 13 | | NO | 67.93 | 70.22 | 2.29 | 1.03 | 68.95 | 10/04/2022 01:25 AM |
| BI-SA1 | | NO | 63.50 | 70.48 | 6.98 | 1.92 | 65.42 | 10/04/2022 01:23 AM |
| BI-SA1-S | Major_System | NO | 70.15 | 70.30 | 0.15 | 0.07 | 70.22 | 10/04/2022 01:10 AM |
| BI-SA49-S | Major_System | NO | 75.35 | 75.51 | 0.16 | 0.05 | 75.40 | 10/04/2022 01:11 AM |
| Carling_OLF1 | | NO | 66.50 | 66.70 | 0.20 | 0.08 | 66.58 | 10/04/2022 01:11 AM |
| Carling_OLFN1 | | NO | 65.41 | 65.61 | 0.20 | 0.11 | 65.52 | 10/04/2022 01:11 AM |
| Carling_OLFN3 | | NO | 64.80 | 65.00 | 0.20 | 0.16 | 64.96 | 10/04/2022 01:13 AM |
| CB_54A | | NO | 79.65 | 79.95 | 0.30 | 0.05 | 79.70 | 10/04/2022 01:10 AM |
| CB_54B | | NO | 79.67 | 79.97 | 0.30 | 0.02 | 79.69 | 10/04/2022 01:10 AM |
| CB209 | | NO | 77.64 | 77.79 | 0.15 | 0.02 | 77.66 | 10/04/2022 01:10 AM |
| CB225 | | NO | 73.46 | 77.72 | 4.26 | 0.06 | 73.51 | 10/04/2022 01:10 AM |
| CB225-S | | NO | 77.71 | 77.86 | 0.15 | 0.02 | 77.73 | 10/04/2022 01:10 AM |
| CB26 | | NO | 75.96 | 76.11 | 0.15 | 0.02 | 75.98 | 10/04/2022 01:10 AM |
| CB68 | | NO | 72.63 | 72.79 | 0.16 | 0.06 | 72.69 | 10/04/2022 01:10 AM |
| CB91 | | NO | 75.14 | 75.44 | 0.30 | 0.03 | 75.17 | 10/04/2022 01:10 AM |
| CB94 | | NO | 75.03 | 75.20 | 0.17 | 0.08 | 75.11 | 10/04/2022 01:11 AM |
| CBMHST-101 | | NO | 73.63 | 76.41 | 2.78 | 0.45 | 74.08 | 10/04/2022 01:26 AM |
| CBMHST103 | | NO | 72.10 | 74.28 | 2.18 | 1.40 | 73.50 | 10/04/2022 01:33 AM |
| CBMHST-103-S | | NO | 74.26 | 74.56 | 0.30 | 0.06 | 74.32 | 10/04/2022 01:11 AM |
| CBMHST-104 | | NO | 74.14 | 76.59 | 2.45 | 0.21 | 74.35 | 10/04/2022 01:26 AM |
| CBMHST105 | | NO | 72.40 | 74.73 | 2.33 | 1.27 | 73.67 | 10/04/2022 01:32 AM |
| CBMHST-162 | | NO | 76.10 | 82.72 | 6.62 | 3.79 | 79.89 | 10/04/2022 01:10 AM |
| Chamber201S | | NO | 67.95 | 68.95 | 1.00 | 1.00 | 68.95 | 10/04/2022 01:23 AM |
| Chamber202-S | | NO | 70.84 | 73.59 | 2.75 | 0.84 | 71.68 | 10/04/2022 01:34 AM |
| CONNECT | | NO | 69.56 | 74.02 | 4.46 | 2.11 | 71.67 | 10/04/2022 01:34 AM |
| D-Chamber-203 | | NO | 71.42 | 75.05 | 3.63 | 1.23 | 72.65 | 10/04/2022 01:31 AM |
| D-Chamber-204 | | NO | 73.03 | 74.63 | 1.60 | 0.30 | 73.33 | 10/04/2022 01:26 AM |
| DICB3 | | NO | 64.00 | 66.43 | 2.43 | 0.00 | 64.00 | 10/04/2022 00:00 AM |
| DICB6 | | NO | 74.70 | 76.59 | 1.89 | 0.03 | 74.73 | 10/04/2022 01:11 AM |
| DICB9 | | NO | 74.28 | 74.48 | 0.20 | 0.10 | 74.38 | 10/04/2022 01:10 AM |
| D-MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 0.78 | 63.38 | 10/04/2022 01:23 AM |
| D-MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 1.27 | 69.07 | 10/04/2022 01:32 AM |
| D-MHST-145 | | NO | 69.90 | 74.34 | 4.44 | 2.14 | 72.04 | 10/04/2022 01:34 AM |
| D-MHST-146_1 | | NO | 70.17 | 75.39 | 5.22 | 2.24 | 72.41 | 10/04/2022 01:33 AM |
| D-MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 2.72 | 76.75 | 10/04/2022 01:18 AM |
| D-MHST-157B | | NO | 69.97 | 74.44 | 4.47 | 2.37 | 72.34 | 10/04/2022 01:34 AM |
| D-MHST-161-S | Major_System | NO | 81.44 | 81.60 | 0.16 | 0.03 | 81.47 | 10/04/2022 01:10 AM |
| D-MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 1.34 | 73.27 | 10/04/2022 01:31 AM |
| IN119607 | | NO | 63.00 | 65.62 | 2.62 | 0.38 | 63.38 | 10/04/2022 01:24 AM |
| IN119608 | | NO | 63.50 | 66.14 | 2.64 | 0.00 | 63.50 | 10/04/2022 00:00 AM |
| MH207 | | NO | 73.95 | 75.43 | 1.48 | 0.42 | 74.37 | 10/04/2022 01:10 AM |
| MH-SA1 | | NO | 69.45 | 70.55 | 1.10 | 0.15 | 69.60 | 10/04/2022 00:53 AM |
| MH-SA49 | | NO | 73.97 | 75.45 | 1.48 | 0.32 | 74.29 | 10/04/2022 01:10 AM |
| MH-SA50 | | NO | 74.07 | 75.83 | 1.76 | 0.22 | 74.29 | 10/04/2022 01:10 AM |

## Junctions 2/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MH-SA51-1 | | NO | 74.08 | 76.53 | 2.45 | 0.23 | 74.31 | 10/04/2022 01:10 AM |
| MH-SA51-2 | | NO | 74.84 | 76.50 | 1.66 | 0.16 | 75.00 | 10/04/2022 01:10 AM |
| MH-SA56-1 | | NO | 73.24 | 74.54 | 1.30 | 0.36 | 73.60 | 10/04/2022 01:10 AM |
| MH-SA56-2 | | NO | 73.24 | 74.54 | 1.30 | 0.36 | 73.60 | 10/04/2022 01:10 AM |
| MH-SA56-3 | | NO | 73.80 | 75.80 | 2.00 | 0.70 | 74.50 | 10/04/2022 01:10 AM |
| MH-SAxx | | NO | 62.00 | 64.50 | 2.50 | 0.50 | 62.50 | 10/04/2022 00:16 AM |
| MHST_156B | | NO | 70.09 | 74.24 | 4.15 | 2.27 | 72.36 | 10/04/2022 01:34 AM |
| MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 2.81 | 65.41 | 10/04/2022 01:23 AM |
| MHST-100-S | Major_System | NO | 65.42 | 65.72 | 0.30 | 0.04 | 65.46 | 10/04/2022 01:10 AM |
| MHST-101 | | NO | 63.00 | 66.07 | 3.07 | 2.42 | 65.42 | 10/04/2022 01:23 AM |
| MHST-101-S | Major_System | NO | 66.07 | 66.23 | 0.16 | 0.05 | 66.12 | 10/04/2022 01:10 AM |
| MHST-102 | | NO | 63.00 | 66.28 | 3.28 | 2.42 | 65.42 | 10/04/2022 01:23 AM |
| MHST-102-S | Major_System | NO | 66.28 | 66.44 | 0.16 | 0.04 | 66.32 | 10/04/2022 01:10 AM |
| MHST-104 | | NO | 63.30 | 70.80 | 7.50 | 2.12 | 65.42 | 10/04/2022 01:23 AM |
| MHST-104-S | Major_System | NO | 70.80 | 70.95 | 0.15 | 0.05 | 70.85 | 10/04/2022 01:10 AM |
| MHST-105 | | NO | 63.60 | 69.13 | 5.53 | 4.34 | 67.94 | 10/04/2022 01:19 AM |
| MHST-105-S | Major_System | NO | 68.64 | 68.79 | 0.15 | 0.09 | 68.73 | 10/04/2022 01:11 AM |
| MHST-106 | | NO | 63.00 | 71.87 | 8.87 | 2.42 | 65.42 | 10/04/2022 01:23 AM |
| MHST-106-S | Major_System | NO | 71.87 | 72.03 | 0.16 | 0.05 | 71.92 | 10/04/2022 01:10 AM |
| MHST-107 | | NO | 62.00 | 64.32 | 2.32 | 0.14 | 62.14 | 10/04/2022 01:10 AM |
| MHST-120-S | Major_System | NO | 74.46 | 74.62 | 0.16 | 0.08 | 74.54 | 10/04/2022 01:10 AM |
| MHST-130 | | NO | 67.69 | 70.21 | 2.52 | 1.27 | 68.96 | 10/04/2022 01:25 AM |
| MHST-132 | | NO | 73.25 | 75.96 | 2.71 | 0.35 | 73.60 | 10/04/2022 01:10 AM |
| MHST-134 | | NO | 76.62 | 79.19 | 2.57 | 0.19 | 76.81 | 10/04/2022 01:10 AM |
| MHST-135 | | NO | 70.62 | 79.31 | 8.69 | 2.10 | 72.72 | 10/04/2022 01:29 AM |
| MHST-135-S | Major_System | NO | 79.68 | 79.83 | 0.15 | 0.03 | 79.71 | 10/04/2022 01:10 AM |
| MHST-136 | | NO | 78.65 | 81.94 | 3.29 | 0.17 | 78.82 | 10/04/2022 01:10 AM |
| MHST-136-S | | NO | 81.70 | 82.00 | 0.30 | 0.03 | 81.73 | 10/04/2022 01:10 AM |
| MHST-137 | | NO | 77.24 | 80.00 | 2.76 | 0.19 | 77.43 | 10/04/2022 01:10 AM |
| MHST-137-S | | NO | 79.79 | 80.09 | 0.30 | 0.04 | 79.83 | 10/04/2022 01:10 AM |
| MHST-138 | | NO | 75.17 | 78.56 | 3.39 | 0.19 | 75.36 | 10/04/2022 01:10 AM |
| MHST-141 | | NO | 71.42 | 75.17 | 3.75 | 1.36 | 72.78 | 10/04/2022 01:28 AM |
| MHST-141-S | Major_System | NO | 75.21 | 75.36 | 0.15 | 0.03 | 75.24 | 10/04/2022 01:10 AM |
| MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 3.61 | 71.41 | 10/04/2022 01:34 AM |
| MHST-143 | | NO | 69.45 | 74.02 | 4.57 | 2.14 | 71.59 | 10/04/2022 01:34 AM |
| MHST-144 | | NO | 69.68 | 75.30 | 5.62 | 2.10 | 71.78 | 10/04/2022 01:34 AM |
| MHST-145 | | NO | 69.90 | 73.97 | 4.07 | 2.43 | 72.33 | 10/04/2022 01:34 AM |
| MHST-146 | | NO | 70.17 | 75.39 | 5.22 | 2.43 | 72.60 | 10/04/2022 01:30 AM |

## Junctions 3/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-146-S | Major_System | NO | 75.38 | 75.58 | 0.20 | 0.03 | 75.41 | 10/04/2022 01:11 AM |
| MHST-147 | | NO | 70.25 | 75.92 | 5.67 | 2.39 | 72.64 | 10/04/2022 01:29 AM |
| MHST-147-S | Major_System | NO | 76.00 | 76.20 | 0.20 | 0.04 | 76.04 | 10/04/2022 01:11 AM |
| MHST-148 | | NO | 70.45 | 80.13 | 9.68 | 2.26 | 72.71 | 10/04/2022 01:29 AM |
| MHST-148-S | Major_System | NO | 80.37 | 80.53 | 0.16 | 0.05 | 80.42 | 10/04/2022 01:10 AM |
| MHST-149 | | NO | 70.69 | 78.30 | 7.61 | 2.03 | 72.72 | 10/04/2022 01:29 AM |
| MHST-149-S | Major_System | NO | 77.93 | 78.08 | 0.15 | 0.04 | 77.97 | 10/04/2022 01:10 AM |
| MHST-150 | | NO | 70.76 | 77.32 | 6.56 | 1.96 | 72.72 | 10/04/2022 01:28 AM |
| MHST-150-S1 | Major_System | NO | 77.24 | 77.39 | 0.15 | 0.02 | 77.26 | 10/04/2022 01:10 AM |
| MHST-151 | | NO | 71.23 | 77.10 | 5.87 | 1.51 | 72.74 | 10/04/2022 01:28 AM |
| MHST-151-S | Major_System | NO | 77.12 | 77.27 | 0.15 | 0.03 | 77.15 | 10/04/2022 01:10 AM |
| MHST-153 | | NO | 72.86 | 77.00 | 4.14 | 1.26 | 74.12 | 10/04/2022 01:12 AM |
| MHST-153-S | TGCB102 | NO | 76.52 | 76.82 | 0.30 | 0.05 | 76.57 | 10/04/2022 01:10 AM |
| MHST-154 | | NO | 75.60 | 81.92 | 6.32 | 1.74 | 77.34 | 10/04/2022 01:10 AM |
| MHST-154A | | NO | 76.00 | 82.52 | 6.52 | 3.66 | 79.66 | 10/04/2022 01:10 AM |
| MHST-154B | | NO | 75.90 | 81.89 | 5.99 | 3.06 | 78.96 | 10/04/2022 01:10 AM |
| MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 0.71 | 74.74 | 10/04/2022 01:18 AM |
| MHST-156 | | NO | 70.13 | 74.49 | 4.36 | 2.23 | 72.36 | 10/04/2022 01:34 AM |
| MHST-157 | | NO | 70.02 | 74.65 | 4.63 | 2.34 | 72.36 | 10/04/2022 01:34 AM |
| MHST-158 | | YES | 71.74 | 74.80 | 3.06 | 2.01 | 73.75 | 10/04/2022 01:17 AM |
| MHST-158-S | Major_System | NO | 74.58 | 74.88 | 0.30 | 0.04 | 74.62 | 10/04/2022 01:10 AM |
| MHST-159 | | NO | 69.38 | 74.96 | 5.58 | 2.13 | 71.51 | 10/04/2022 01:34 AM |
| MHST-160 | | NO | 71.27 | 76.79 | 5.52 | 1.48 | 72.75 | 10/04/2022 01:28 AM |
| MHST-161 | | NO | 78.96 | 81.88 | 2.92 | 0.09 | 79.05 | 10/04/2022 01:10 AM |
| MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 1.37 | 73.30 | 10/04/2022 01:31 AM |
| MHST-200 | | NO | 70.10 | 74.81 | 4.71 | 2.28 | 72.38 | 10/04/2022 01:33 AM |
| MHST-201 | | NO | 69.96 | 74.74 | 4.78 | 2.40 | 72.36 | 10/04/2022 01:34 AM |
| MHST-203 | | NO | 73.11 | 78.83 | 5.72 | 0.47 | 73.58 | 10/04/2022 01:10 AM |
| MHST-204 | | NO | 73.11 | 78.79 | 5.68 | 0.48 | 73.59 | 10/04/2022 01:10 AM |
| MHST-205 | | NO | 72.94 | 78.20 | 5.26 | 0.63 | 73.57 | 10/04/2022 01:10 AM |
| MHST-206 | | NO | 72.91 | 75.77 | 2.86 | 0.56 | 73.47 | 10/04/2022 01:10 AM |
| MHST-208 | | NO | 73.41 | 77.80 | 4.39 | 0.94 | 74.35 | 10/04/2022 01:10 AM |
| MHST-209 | | NO | 73.35 | 75.76 | 2.41 | 0.67 | 74.02 | 10/04/2022 01:10 AM |
| MHST-211 | | NO | 68.31 | 70.38 | 2.07 | 0.83 | 69.14 | 10/04/2022 01:30 AM |
| MHST-212 | | NO | 67.95 | 70.22 | 2.27 | 1.00 | 68.95 | 10/04/2022 01:25 AM |
| MHST-213 | | NO | 68.54 | 70.24 | 1.70 | 0.60 | 69.14 | 10/04/2022 01:30 AM |

## Junctions 4/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-214 | | NO | 68.23 | 70.31 | 2.08 | 0.90 | 69.13 | 10/04/2022 01:30 AM |
| MHST-215 | | NO | 68.27 | 70.25 | 1.98 | 0.86 | 69.13 | 10/04/2022 01:30 AM |
| MHST-221 | | NO | 66.62 | 69.70 | 3.08 | 3.08 | 69.70 | 10/04/2022 01:11 AM |
| MHST62528 | | NO | 67.34 | 70.08 | 2.74 | 1.03 | 68.37 | 10/04/2022 01:24 AM |
| MHST-62534 | | NO | 76.90 | 82.80 | 5.90 | 3.29 | 80.19 | 10/04/2022 01:10 AM |
| MHST62545 | | NO | 66.53 | 69.90 | 3.37 | 0.82 | 67.35 | 10/04/2022 01:25 AM |
| MHST62547 | | NO | 64.00 | 71.80 | 7.80 | 1.84 | 65.84 | 10/04/2022 01:24 AM |
| MSHT-103 | | NO | 63.00 | 66.13 | 3.13 | 2.42 | 65.42 | 10/04/2022 01:23 AM |
| MSHT-103-S | Major_System | NO | 66.13 | 66.29 | 0.16 | 0.09 | 66.22 | 10/04/2022 01:11 AM |
| OGS1 | | NO | 61.00 | 63.82 | 2.82 | 0.41 | 61.41 | 10/04/2022 01:10 AM |
| OGS-3 | | NO | 67.62 | 70.34 | 2.72 | 0.99 | 68.61 | 10/04/2022 01:24 AM |
| POW_D1 | | NO | 78.70 | 79.30 | 0.60 | 0.21 | 78.91 | 10/04/2022 01:11 AM |
| Preston | | NO | 61.00 | 63.00 | 2.00 | 0.36 | 61.36 | 10/04/2022 01:14 AM |
| ST-60-S-B | | NO | 74.11 | 74.41 | 0.30 | 0.09 | 74.20 | 10/04/2022 01:10 AM |
| SW_42I | | NO | 75.31 | 75.51 | 0.20 | 0.00 | 75.31 | 10/04/2022 00:00 AM |
| SW_65D | | NO | 77.94 | 78.44 | 0.50 | 0.03 | 77.97 | 10/04/2022 01:11 AM |
| TD_A | | NO | 67.42 | 69.10 | 1.68 | 1.68 | 69.10 | 10/04/2022 01:10 AM |
| TD_B | | NO | 67.88 | 69.13 | 1.25 | 1.25 | 69.12 | 10/04/2022 01:12 AM |
| Wales-OLF-N03 | | NO | 68.20 | 68.40 | 0.20 | 0.05 | 68.25 | 10/04/2022 01:11 AM |
| Wales-OLF-N04 | | NO | 66.75 | 66.95 | 0.20 | 0.05 | 66.80 | 10/04/2022 01:13 AM |
| Wales-OLF-N05 | | NO | 65.50 | 65.70 | 0.20 | 0.07 | 65.57 | 10/04/2022 01:15 AM |

## Storage 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Storage Curve | Curve Name | Avg. Depth (m) | Max. Depth (m) | Max. HGL (m) | Max. Volume (1000 m³) | Max. Percent Full (%) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CB130 | 69.90 | 70.10 | 0.20 | TABULAR | CB(600x600) | 0.01 | 0.07 | 69.97 | 0 | 33 | 0.0760 |
| CB65 | 72.16 | 73.70 | 1.54 | TABULAR | CB65 | 0.02 | 0.04 | 72.20 | 0 | 0 | 1.5700 |
| CB95 | 75.52 | 75.82 | 0.30 | TABULAR | CB95-ponding | 0.02 | 0.29 | 75.81 | 0.08 | 96 | 0.6210 |
| CHAMBER-102 | 72.03 | 74.24 | 2.21 | TABULAR | Chamber102 | 0.37 | 1.44 | 73.47 | 0.309 | 65 | 2.7210 |
| CHAMBER-103 | 74.08 | 76.78 | 2.70 | TABULAR | Chamber103 | 0.40 | 2.70 | 76.78 | 2.127 | 100 | 13.6620 |
| CHAMBER-104-A | 70.13 | 72.43 | 2.30 | TABULAR | Chamber104A | 0.45 | 2.24 | 72.37 | 1.278 | 98 | 19.5370 |
| CHAMBER-104B | 69.91 | 72.61 | 2.70 | TABULAR | Chamber104B | 0.56 | 2.43 | 72.34 | 1.532 | 90 | 22.8040 |
| Chamber201 | 67.95 | 69.19 | 1.24 | TABULAR | Chamber201 | 0.26 | 1.18 | 69.13 | 0.487 | 96 | 1.1700 |
| Chamber202 | 70.84 | 72.43 | 1.59 | TABULAR | Chamber202 | 0.30 | 1.42 | 72.26 | 0.557 | 89 | 1.7870 |
| Chamber-203 | 71.42 | 72.90 | 1.48 | TABULAR | Chamber203 | 0.28 | 1.48 | 72.90 | 0.27 | 100 | 0.64 |
| Chamber-204 | 73.03 | 74.36 | 1.33 | TABULAR | Chamber204 | 0.22 | 1.17 | 74.20 | 0.26 | 88 | 0.66 |
| DICB8 | 68.11 | 69.83 | 1.72 | TABULAR | swale | 0.14 | 1.44 | 69.55 | 0.08 | 38 | 2.96 |
| MHST-157-S | 73.80 | 74.23 | 0.43 | TABULAR | CB98-ponding | 0.04 | 0.25 | 74.05 | 0.01 | 24 | 1.53 |
| PS | 64.92 | 70.03 | 5.11 | CYLINDRI | * | 3.86 | 4.38 | 69.30 | 0.01 | 86 | 0.23 |
| S-14B | 61.65 | 63.30 | 1.65 | TABULAR | S-14B | 0.57 | 1.65 | 63.30 | 0.01 | 100 | 0.13 |
| S-15 | 62.10 | 63.90 | 1.80 | TABULAR | S-15 | 1.66 | 1.80 | 63.90 | 0.11 | 100 | 0.36 |
| S-19 | 64.00 | 66.00 | 2.00 | TABULAR | S-19 | 0.77 | 1.69 | 65.69 | 0.08 | 30 | 0.21 |
| S-21B | 63.54 | 65.70 | 2.16 | TABULAR | S-21B | 1.80 | 1.98 | 65.52 | 0.82 | 63 | 1.81 |
| S-26B | 67.11 | 69.51 | 2.40 | TABULAR | DICB2ponding | 0.95 | 2.40 | 69.51 | 0.19 | 100 | 0.65 |
| S-26D | 67.19 | 69.25 | 2.06 | TABULAR | DICB1 | 0.54 | 1.98 | 69.17 | 0.02 | 60 | 0.08 |
| S-3Store | 62.20 | 64.24 | 2.04 | TABULAR | S-3 | 1.90 | 2.04 | 64.24 | 0.08 | 100 | 0.39 |
| S-63 | 79.80 | 84.02 | 4.22 | TABULAR | S-63 | 0.95 | 4.21 | 84.01 | 0.26 | 96 | 0.92 |
| SA-1 | 69.50 | 72.50 | 3.00 | TABULAR | S-1 | 0.85 | 2.89 | 72.39 | 0.64 | 96 | 1.24 |
| SA-2 | 62.60 | 65.60 | 3.00 | TABULAR | S-2 | 1.46 | 2.22 | 64.82 | 0.67 | 74 | 0.87 |

# Outlets 1/1

| Name | Inlet Node | Outlet Node | Inlet Elev. (m) | Rating Curve | Curve Name | Control Rules | Max. \|Flow\| (L/s) | Contributing Imp. Area (ha) |
|---|---|---|---|---|---|---|---|---|
| 1 | DICB6 | CBMHST-101 | 74.70 | TABULAR/DEPTH | 2CB | NO | 28.97 | 0.01 |
| 13 | CB_54B | MH-SA56-2 | 79.67 | TABULAR/DEPTH | 3CB | NO | 15.07 | 0.22 |
| 14 | CB95 | CBMHST-104 | 75.52 | TABULAR/DEPTH | 3CB | NO | 150.00 | 0.37 |
| 18 | MHST-141-S | MHST-141 | 75.21 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 60.37 | 0.30 |
| 20 | CB65 | MHST-144 | 72.16 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 21.75 | 0.93 |
| 22 | CB225-S | CB225 | 77.71 | TABULAR/DEPTH | S19_SL2_5 | NO | 5.82 | 0.29 |
| 24 | CBMHST-103-S | CBMHST103 | 74.26 | TABULAR/DEPTH | S28_SL4_0.5 | NO | 17.36 | 1.00 |
| 26 | CB91 | MHST-141 | 75.14 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 30.34 | 0.17 |
| 31 | CB26 | Chamber202 | 75.96 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 12.65 | 0.29 |
| BI-SA1-IC | BI-SA1-S | BI-SA1 | 70.15 | TABULAR/DEPTH | 6@R-B@S=1.5% | NO | 116.38 | 0.37 |
| BI-SA49-IC | BI-SA49-S | D-MHST-146_1 | 75.35 | TABULAR/DEPTH | S19_SL2_1x4 | NO | 116.07 | 0.54 |
| CB101_103_105 | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S22_SL2_5x3 | NO | 21.18 | 0.28 |
| CB102_106_DIC | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 124.73 | 0.28 |
| CB130OUT | CB130 | MHST-130 | 69.90 | TABULAR/DEPTH | S19_SL2_1 | NO | 42.64 | 0.04 |
| CB40,66-68 | CB68 | CONNECT | 72.63 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 160.33 | 0.63 |
| CB42-43 | D-MHST-161-S | MHST-161 | 81.44 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 37.21 | 0.08 |
| CB44-45 | MHST-148-S | MHST-148 | 80.37 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 66.40 | 0.26 |
| CB46_57 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 61.82 | 0.34 |
| CB47-55 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S22_SL2_5x8 | NO | 55.86 | 0.34 |
| CB56_58 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S22_SL2_1x2 | NO | 6.74 | 0.34 |
| CB61_104 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S19_SL2_1x2 | NO | 31.89 | 0.34 |
| CB63,64 | MHST-120-S | CONNECT | 74.46 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 26.23 | 0.63 |
| CB69_75 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 8.78 | 0.13 |
| CB74_76_77 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 91.10 | 0.13 |
| CB79-81 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S19_SL2_5x5 | NO | 54.97 | 0.18 |
| CB82 | MHST-151-S | MHST-151 | 77.12 | TABULAR/DEPTH | DB_S22_SL2_5 | NO | 2.18 | 0.21 |
| CB83 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S22_SL2_5 | NO | 1.86 | 0.18 |
| CB84-85_90 | MHST-136-S | MHST-136 | 81.70 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 87.30 | 0.12 |
| CB88_96 | MHST-137-S | MHST-137 | 79.79 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 57.96 | 0.19 |
| DICB2 | S-26B | BI-SA1 | 67.11 | TABULAR/DEPTH | 100VHV-1 | NO | 15.98 | 0.08 |
| DICB9_OL | DICB9 | CBMHST103 | 74.28 | TABULAR/DEPTH | S19_SL2_5 | NO | 53.00 | 1.00 |
| MHST-100-IC | MHST-100-S | MHST-100 | 66.30 | TABULAR/DEPTH | 1@R-A@S=5.0% | NO | 0.00 | 1.02 |
| MHST-101-IC | MHST-101-S | MHST-101 | 66.07 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 37.41 | 1.02 |
| MHST-102-IC | MHST-102-S | MHST-102 | 66.28 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 33.77 | 0.91 |
| MHST-104-IC | MHST-104-S | MHST-104 | 70.80 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 21.43 | 0.10 |
| MHST-105-IC | MHST-105-S | MHST-105 | 68.64 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 112.34 | 0.40 |
| MHST-106-IC | MHST-106-S | MHST-106 | 71.87 | TABULAR/DEPTH | 2@R-E@S=5.0% | NO | 18.96 | 0.68 |
| MHST-135-IC | MHST-135-S | MHST-135 | 79.68 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 35.78 | 0.03 |
| MHST-157-IC | MHST-157-S | MHST-157 | 73.80 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 311.23 | 0.89 |
| MHST-158-IC | MHST-158-S | MHST-158 | 74.58 | TABULAR/DEPTH | S19_SL2_5x8 | NO | 149.93 | 0.63 |
| MSHT-103-IC | MSHT-103-S | MSHT-103 | 66.13 | TABULAR/DEPTH | 7@R-A@S=5.0% | NO | 321.45 | 0.79 |
| O-1 | SA-1 | MH-SA1 | 69.50 | TABULAR/HEAD | O-1 | NO | 60.00 | 1.24 |
| O-15 | S-15 | MHST-107 | 62.10 | TABULAR/DEPTH | O-15 | NO | 7.86 | 0.01 |
| O-19 | S-19 | MHST-101 | 64.00 | TABULAR/DEPTH | 50VHV-1 | NO | 3.82 | 0.02 |
| O-2 | SA-2 | MH-SAxx | 62.60 | TABULAR/HEAD | O-2 | NO | 7.00 | 0.86 |
| O-21B | S-21B | IN119607 | 63.54 | TABULAR/DEPTH | 50VHV-1 | NO | 4.17 | 0.23 |
| O-26D | S-26D | MHST-105 | 67.19 | TABULAR/DEPTH | 50VHV-1 | NO | 4.17 | 0.00 |
| O-3 | S-3Store | OGS1 | 62.20 | TABULAR/HEAD | 125VHV-2 | NO | 26.69 | 0.11 |
| O-4 | S-14B | Preston | 62.15 | TABULAR/HEAD | 125VHV-2 | NO | 20.15 | 0.00 |
| O-63 | S-63 | MHST-154A | 78.20 | TABULAR/DEPTH | O-63 | NO | 100.92 | 0.59 |
| O-CB209 | CB209 | MHST-209 | 77.64 | TABULAR/DEPTH | S28_SL2_5x2 | NO | 2.74 | 0.23 |
| OL_CB_54A | CB_54A | MH-SA56-1 | 79.65 | TABULAR/DEPTH | 3CB | NO | 90.73 | 0.19 |
| WD-OLF_5 | Wales-OLF-N05 | Preston | 65.50 | TABULAR/DEPTH | 2@R-E@S=1.0% | NO | 27.56 | 0.40 |

# Orifices 1/1

| Name | Inlet Node | Outlet Node | Type | Cross-Section | Height (m) | Width (m) | Inlet Elev. (m) | Discharge Coeff. | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|
| 33 | Chamber201 | Chamber201S | | CIRCULAR | 0.35 | 0 | 67.95 | 0.62 | 156.58 |
| 35 | Chamber-204 | D-Chamber-204 | | CIRCULAR | 0.19 | 0 | 73.03 | 0.62 | 72.46 |
| 36 | Chamber-203 | D-Chamber-203 | | CIRCULAR | 0.225 | 0 | 71.42 | 0.62 | 94.28 |
| 43 | Chamber202 | Chamber202-S | | CIRCULAR | 0.245 | 0 | 70.84 | 0.62 | 129.8 |
| ICD-100-1 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.3 | 0 | 63.06 | 0.62 | 276.59 |
| ICD-100-2 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.1 | 0 | 63.85 | 0.62 | 26.52 |
| ICD111 | DICB8 | OGS-3 | | CIRCULAR | 0.4 | 0 | 68.11 | 0.62 | 356.68 |
| ICD-142 | MHST-142 | D-MHST-142 | | CIRCULAR | 0.7 | 0 | 69.32 | 0.62 | 1393.74 |
| OR-145 | MHST-145 | D-MHST-145 | | RECT_CLO | 0.75 | 0.75 | 69.9 | 0.62 | 1213.82 |
| OR-155 | D-MHST-155 | MHST-155 | | CIRCULAR | 0.675 | 0 | 74.06 | 0.62 | 1396.44 |
| OR-170 | MHST-170 | D-MHST-170 | | CIRCULAR | 0.1 | 0 | 71.93 | 0.62 | 21.34 |

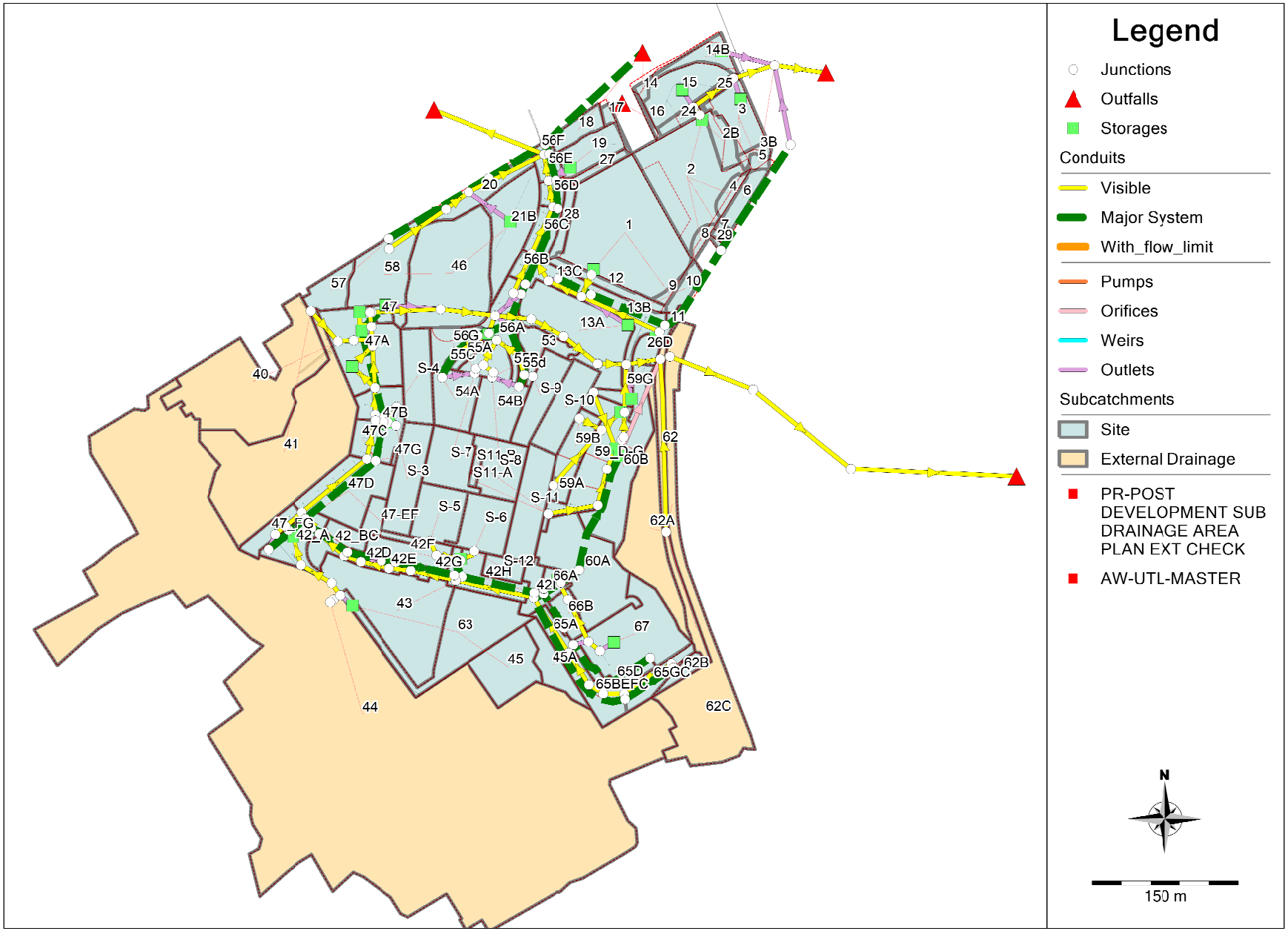
# Weirs 1/1

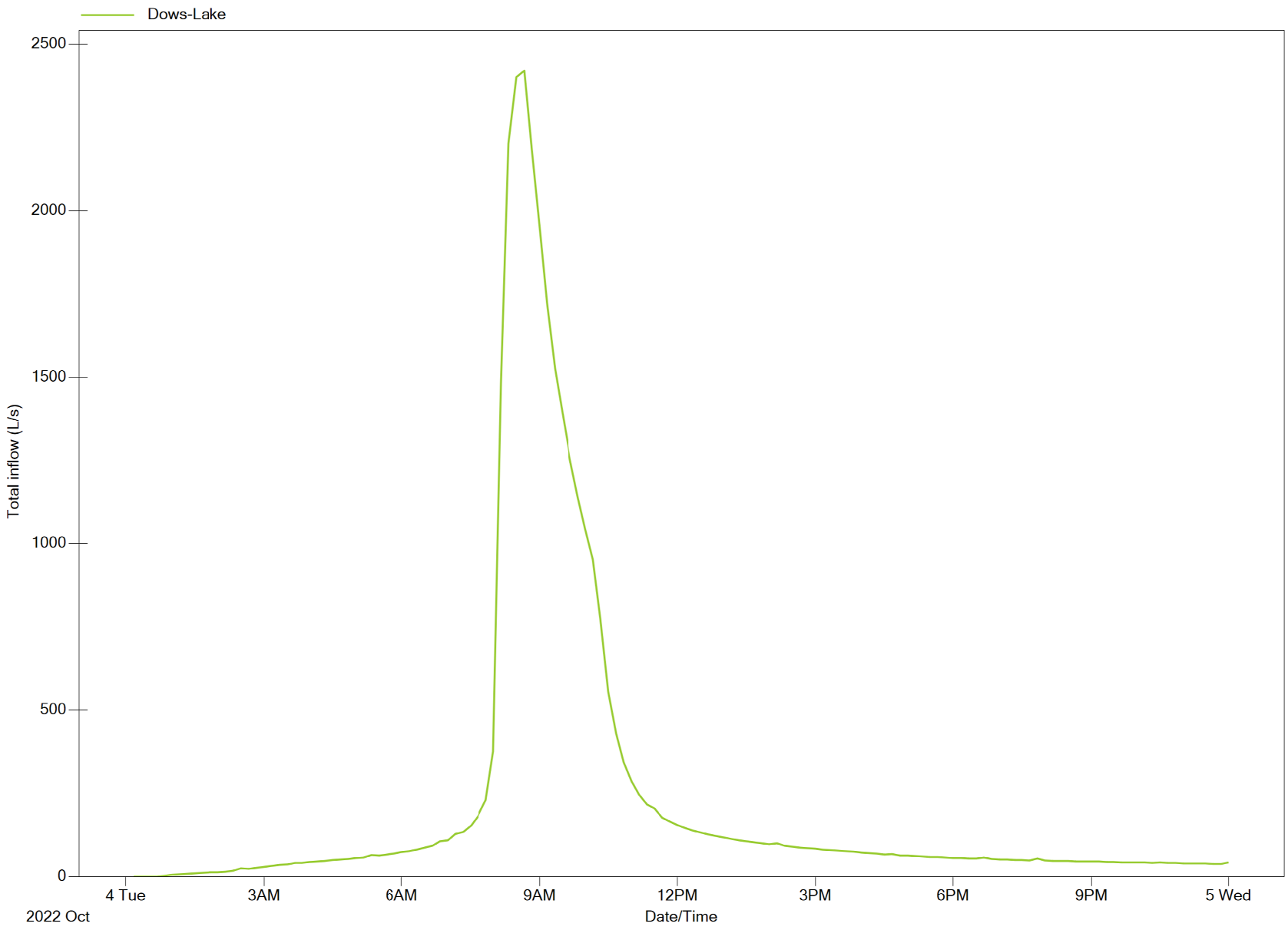
| Name | Inlet Node | Outlet Node | Type | Height (m) | Length (m) | Inlet Elev. (m) | Max. \|Flow\| (L/s) | Time Max. Flow (M/D/Y) | Max/Full Depth | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_1 | MHST-146 | D-MHST-146_1 | SIDEFLOW | 1.4 | 1.5 | 70.17 | 2693.83 | 10/04/2022 01:18 AM | 1 | 19.249 |
| Weir-142 | MHST-142 | D-MHST-142 | TRANSVERSE | 0.5 | 1.4 | 70.7 | 1105.69 | 10/04/2022 01:34 AM | 1 | 24.988 |
| Weir-145 | MHST-145 | D-MHST-145 | TRANSVERSE | 1 | 2 | 71.64 | 1517.49 | 10/04/2022 01:34 AM | 0.69 | 22.804 |
| Weir-155 | D-MHST-155 | MHST-155 | TRANSVERSE | 1 | 1 | 76.45 | 276.13 | 10/04/2022 01:18 AM | 0.3 | 13.662 |
| Weir-170 | MHST-170 | D-MHST-170 | TRANSVERSE | 0.3 | 1.5 | 73 | 181.9 | 10/04/2022 01:35 AM | 0.99 | 2.721 |

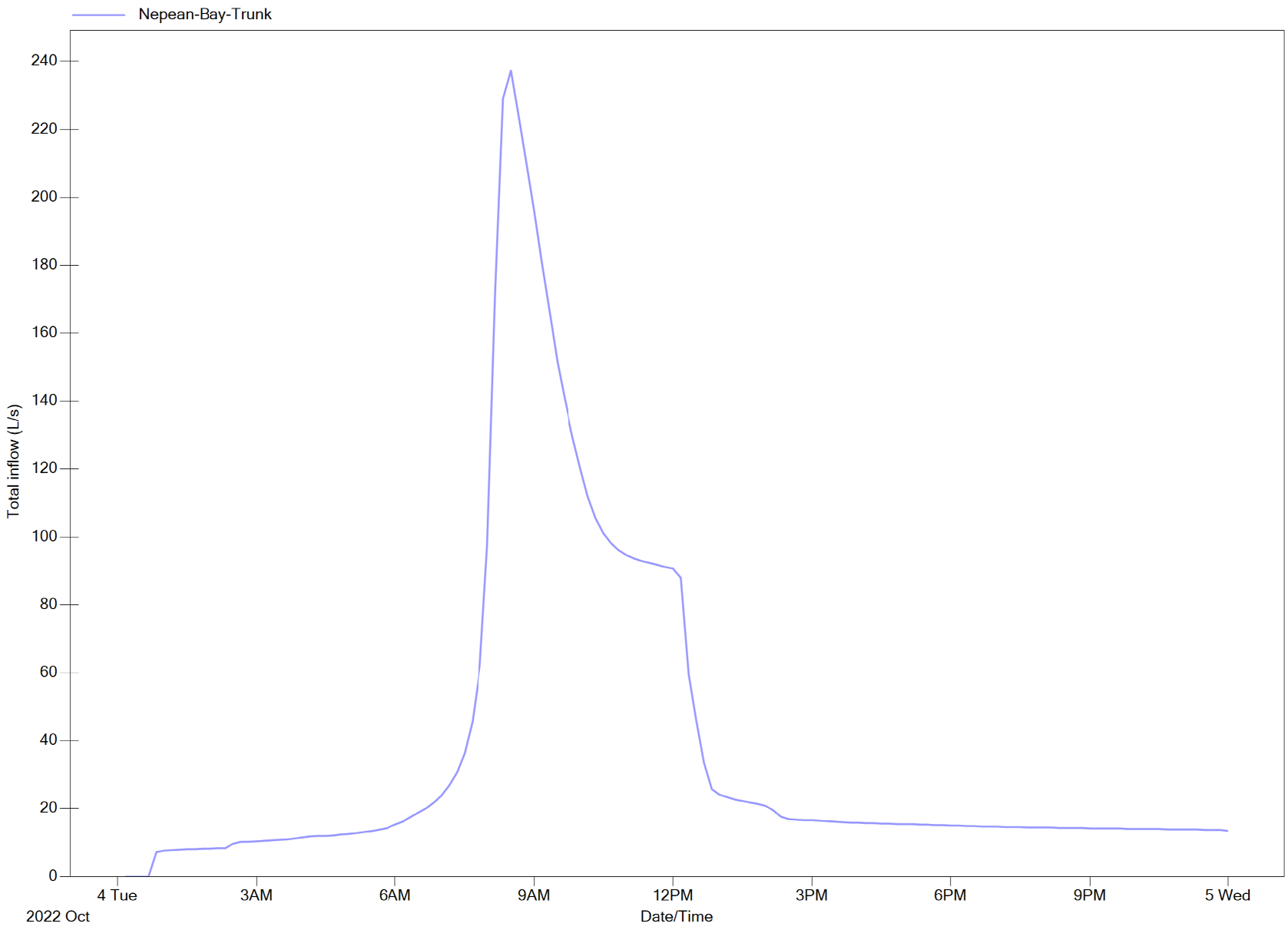
## Outfalls 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Type | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) | Max. Flow (L/s) | Total Flow (ML) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|
| Carling_OLF | 64.6 | 64.8 | FREE | 0.13 | 64.73 | 10/04/2022 01:13 AM | 310.27 | 0.34 | 2.187 |
| Dows-Lake | 63.745 | 66.5 | FREE | 0.95 | 64.7 | 10/04/2022 01:24 AM | 3018.86 | 17.741 | 29.625 |
| LRT-Corridor | 56 | 57 | FREE | 0 | 56 | 10/04/2022 00:00 AM | 30.61 | 0.026 | 0.059 |
| Nepean-Bay-Trunk | 62.8 | 65.21 | NORMAL | 0 | 62.8 | 10/04/2022 00:00 AM | 306.76 | 2.783 | 6.163 |
| Preston_Street | 60.9 | 63.76 | NORMAL | 0.3 | 61.2 | 10/04/2022 01:09 AM | 123.76 | 3.603 | 2.435 |

# PCSWMM OUTPUT
# 24-HOUR SCS -100-YEAR STORM


Legend
Junctions
Outfalls
Storages
Conduits
Visible
Major System
With_flow_limit
Pumps
Orifices
Weirs
Outlets
Subcatchments
Site
External Drainage
PR-POST DEVELOPMENT SUB DRAINAGE AREA PLAN EXT CHECK
AW-UTL-MASTER
N
150 m


Dows-Lake
2500
2000
1500
1000
500
0
Total inflow (L/s)
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time


Nepean-Bay-Trunk
Total inflow (L/s)
240
220
200
180
160
140
120
100
80
60
40
20
0
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time

# SUBCATCHMENTS 1/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 1 | | 24hr-100yr | SA-1 | 1.2161 | 3.0 | 100.0 | 599.4 | 1.00 |
| 10 | | 24hr-100yr | 13B | 0.0822 | 3.0 | 8.1 | 35.4 | 0.41 |
| 11 | | 24hr-100yr | MHST-105-S | 0.0302 | 3.0 | 89.3 | 14.8 | 0.93 |
| 12 | | 24hr-100yr | BI-SA1-S | 0.1276 | 5.0 | 56.5 | 60.7 | 0.72 |
| 13A | | 24hr-100yr | S-26B | 0.6503 | 9.6 | 12.5 | 161.1 | 0.40 |
| 13B | | 24hr-100yr | BI-SA1-S | 0.2248 | 5.0 | 87.8 | 110.3 | 0.93 |
| 13C | | 24hr-100yr | MHST-104-S | 0.1227 | 5.0 | 78.7 | 59.4 | 0.86 |
| 14 | | 24hr-100yr | Carling_OLF | 0.0580 | 3.0 | 60.3 | 26.2 | 0.74 |
| 14B | | 24hr-100yr | S-14B | 0.1272 | 3.0 | 0.0 | 56.0 | 0.35 |
| 15 | | 24hr-100yr | S-15 | 0.3643 | 3.0 | 3.6 | 116.0 | 0.36 |
| 16 | | 24hr-100yr | LRT-Corridor | 0.0229 | 3.0 | 0.0 | 10.3 | 0.35 |
| 17 | | 24hr-100yr | LRT-Corridor | 0.0361 | 3.0 | 0.0 | 16.1 | 0.35 |
| 18 | | 24hr-100yr | Carling_OLF | 0.1189 | 3.0 | 3.4 | 46.5 | 0.38 |
| 19 | | 24hr-100yr | S-19 | 0.2056 | 3.0 | 7.1 | 77.3 | 0.40 |
| 2 | | 24hr-100yr | SA-2 | 0.7114 | 3.0 | 100.0 | 358.2 | 1.00 |
| 20 | | 24hr-100yr | Carling_OLFN1 | 0.2434 | 8.0 | 0.0 | 105.8 | 0.36 |
| 21B | | 24hr-100yr | S-21B | 0.4325 | 10.0 | 9.2 | 360.1 | 0.68 |
| 24 | | 24hr-100yr | MHST-107 | 0.0348 | 3.0 | 55.8 | 16.2 | 0.72 |
| 25 | | 24hr-100yr | OGS1 | 0.0465 | 3.0 | 80.6 | 22.5 | 0.88 |
| 26D | | 24hr-100yr | S-26D | 0.0774 | 25.0 | 0.0 | 34.2 | 0.35 |
| 27 | | 24hr-100yr | MHST-101-S | 0.0531 | 3.0 | 84.5 | 26.0 | 0.90 |
| 28 | | 24hr-100yr | MHST-102-S | 0.0844 | 5.0 | 62.6 | 40.4 | 0.76 |
| 29 | | 24hr-100yr | 7 | 0.0113 | 3.0 | 0.0 | 4.4 | 0.35 |
| 2B | | 24hr-100yr | SA-2 | 0.0908 | 3.0 | 100.0 | 45.0 | 1.00 |
| 3 | | 24hr-100yr | S-3Store | 0.2154 | 3.0 | 31.8 | 101.7 | 0.65 |
| 3B | | 24hr-100yr | 3 | 0.0393 | 3.0 | 100.0 | 19.5 | 1.00 |
| 4 | | 24hr-100yr | 2 | 0.0196 | 3.0 | 100.0 | 9.7 | 1.00 |
| 40 | External | 24hr-100yr | MHST-156 | 1.1965 | 6.8 | 46.2 | 450.3 | 0.64 |
| 41 | External | 24hr-100yr | MHST-132 | 1.5292 | 3.0 | 14.6 | 284.6 | 0.39 |
| 42_A | | 24hr-100yr | MHST-135-S | 0.2148 | 5.0 | 12.8 | 62.7 | 0.41 |
| 42_BC | | 24hr-100yr | MHST-149-S | 0.1753 | 5.0 | 60.5 | 82.6 | 0.75 |
| 42D | | 24hr-100yr | MHST-150-S1 | 0.0509 | 2.0 | 99.0 | 25.2 | 0.99 |
| 42E | | 24hr-100yr | MHST-151-S | 0.0245 | 2.0 | 99.0 | 12.1 | 0.99 |
| 42F | | 24hr-100yr | CB91 | 0.1997 | 2.0 | 83.0 | 94.9 | 0.89 |
| 42G | | 24hr-100yr | MHST-141-S | 0.0958 | 2.0 | 91.0 | 47.1 | 0.94 |
| 42H | | 24hr-100yr | MHST-158-S | 0.1983 | 2.0 | 87.4 | 97.2 | 0.92 |
| 42I | | 24hr-100yr | DICB9 | 0.1177 | 6.0 | 79.0 | 57.2 | 0.86 |
| 43 | | 24hr-100yr | MHST-141 | 0.8632 | 2.0 | 100.0 | 426.0 | 1.00 |
| 44 | External | 24hr-100yr | MHST-62534 | 12.7451 | 1.0 | 32.0 | 3125.2 | 0.51 |
| 45 | | 24hr-100yr | 63 | 0.2888 | 4.0 | 58.8 | 131.4 | 0.73 |
| 45A | | 24hr-100yr | MHST-153-S | 0.2052 | 4.0 | 12.6 | 84.9 | 0.44 |
| 46 | | 24hr-100yr | 21B | 0.9308 | 10.0 | 15.6 | 324.8 | 0.52 |

# SUBCATCHMENTS 2/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 47 | | 24hr-100yr | CB65 | 0.0374 | 3.0 | 90.6 | 18.4 | 0.94 |
| 47_FG | | 24hr-100yr | D-MHST-161-S | 0.1159 | 3.0 | 72.2 | 55.8 | 0.82 |
| 47A | | 24hr-100yr | MHST-157-S | 0.5412 | 3.0 | 65.0 | 230.3 | 0.77 |
| 47B | | 24hr-100yr | BI-SA49-S | 0.2880 | 3.0 | 69.3 | 133.8 | 0.80 |
| 47C | | 24hr-100yr | MHST-147-S | 0.0737 | 3.0 | 100.0 | 36.6 | 1.00 |
| 47D | | 24hr-100yr | MHST-148-S | 0.4496 | 3.0 | 32.0 | 146.0 | 0.56 |
| 47-EF | | 24hr-100yr | 47D | 0.0559 | 3.0 | 59.0 | 26.6 | 0.73 |
| 47G | | 24hr-100yr | MHST-147-S | 0.0080 | 3.0 | 100.0 | 4.0 | 1.00 |
| 5 | | 24hr-100yr | preston | 0.0120 | 3.0 | 100.0 | 6.0 | 1.00 |
| 53 | | 24hr-100yr | MH-SA56-3 | 0.1516 | 2.0 | 61.5 | 70.1 | 0.75 |
| 54A | | 24hr-100yr | CB_54A | 0.2598 | 2.0 | 73.0 | 123.1 | 0.83 |
| 54B | | 24hr-100yr | CB_54B | 0.2799 | 2.0 | 77.1 | 134.1 | 0.85 |
| 55A | | 24hr-100yr | MH-SA56-1 | 0.0348 | 2.0 | 100.0 | 17.3 | 1.00 |
| 55B | | 24hr-100yr | MH-SA56-2 | 0.0244 | 2.0 | 100.0 | 12.1 | 1.00 |
| 55C | | 24hr-100yr | CB225-S | 0.0149 | 0.5 | 100.0 | 7.4 | 1.00 |
| 55d | | 24hr-100yr | CB209 | 0.0276 | 6.0 | 63.6 | 13.2 | 0.76 |
| 56A | | 24hr-100yr | MHST-120-S | 0.3601 | 5.0 | 31.2 | 111.8 | 0.53 |
| 56B | | 24hr-100yr | MHST-106-S | 0.0565 | 5.0 | 86.0 | 27.7 | 0.91 |
| 56C | | 24hr-100yr | MSHT-103-S | 0.1354 | 5.0 | 82.0 | 65.9 | 0.88 |
| 56D | | 24hr-100yr | MHST-102-S | 0.0761 | 5.0 | 84.7 | 37.2 | 0.90 |
| 56E | | 24hr-100yr | MHST-101-S | 0.0805 | 5.0 | 77.3 | 39.1 | 0.85 |
| 56F | | 24hr-100yr | Carling_OLFN3 | 0.0180 | 5.0 | 77.4 | 8.7 | 0.85 |
| 56G | | 24hr-100yr | CB225-S | 0.1673 | 5.0 | 50.1 | 73.1 | 0.68 |
| 57 | | 24hr-100yr | Carling_OLF1 | 0.1534 | 15.0 | 6.9 | 69.2 | 0.39 |
| 58 | | 24hr-100yr | 46 | 0.4475 | 16.0 | 10.2 | 151.7 | 0.41 |
| 59_D-G | | 24hr-100yr | Chamber201 | 0.4461 | 2.0 | 90.7 | 218.4 | 0.94 |
| 59A | | 24hr-100yr | TD_A | 0.0501 | 2.0 | 90.7 | 24.6 | 0.94 |
| 59B | | 24hr-100yr | TD_B | 0.1795 | 2.0 | 90.7 | 88.3 | 0.94 |
| 59G | | 24hr-100yr | CB130 | 0.0764 | 2.0 | 53.4 | 36.1 | 0.70 |
| 6 | | 24hr-100yr | 3 | 0.1396 | 3.0 | 2.1 | 55.7 | 0.37 |
| 60A | | 24hr-100yr | ST-60-S-B | 0.6561 | 25.0 | 22.7 | 243.5 | 0.49 |
| 60B | | 24hr-100yr | DICB8 | 0.4884 | 25.0 | 30.4 | 187.8 | 0.54 |
| 62 | External | 24hr-100yr | POW_D1 | 0.2744 | 5.0 | 61.7 | 97.8 | 0.73 |
| 62A | External | 24hr-100yr | POW_D1 | 0.6276 | 6.0 | 25.0 | 167.8 | 0.48 |
| 62B | | 24hr-100yr | MHST-136-S | 0.0620 | 3.0 | 0.0 | 15.6 | 0.33 |
| 62C | External | 24hr-100yr | POW_D1 | 1.1137 | 5.0 | 61.8 | 339.4 | 0.72 |
| 63 | | 24hr-100yr | S-63 | 0.6280 | 2.0 | 67.5 | 319.5 | 0.81 |
| 65A | | 24hr-100yr | MHST-153-S | 0.0894 | 3.6 | 63.3 | 41.9 | 0.76 |
| 65BEFC | | 24hr-100yr | MHST-137-S | 0.2015 | 3.6 | 37.9 | 70.9 | 0.58 |
| 65D | | 24hr-100yr | SW_65D | 0.1128 | 3.0 | 5.0 | 26.5 | 0.35 |
| 65GC | | 24hr-100yr | MHST-136-S | 0.1771 | 3.6 | 65.5 | 79.7 | 0.78 |
| 66A | | 24hr-100yr | CHAMBER-102 | 0.0642 | 6.0 | 53.8 | 30.3 | 0.70 |
| 66B | | 24hr-100yr | CBMHST105 | 0.1106 | 6.0 | 73.8 | 53.3 | 0.83 |
| 67 | | 24hr-100yr | CB95 | 0.6208 | 3.0 | 59.8 | 273.4 | 0.74 |
| 7 | | 24hr-100yr | 2 | 0.0165 | 3.0 | 100.0 | 8.2 | 1.00 |
| 8 | | 24hr-100yr | 2 | 0.0188 | 3.0 | 100.0 | 9.3 | 1.00 |
| 9 | | 24hr-100yr | 1 | 0.0192 | 3.0 | 100.0 | 9.5 | 1.00 |
| S-10 | | 24hr-100yr | MHST-211 | 0.2975 | 2.0 | 100.0 | 145.4 | 1.00 |
| S-11 | | 24hr-100yr | MHST-213 | 0.4008 | 2.0 | 100.0 | 192.6 | 1.01 |
| S11-A | | 24hr-100yr | MHST-213 | 0.0107 | 2.0 | 100.0 | 5.3 | 1.00 |
| S11-B | | 24hr-100yr | MHST-213 | 0.0153 | 2.0 | 69.2 | 7.4 | 0.80 |
| S-12 | | 24hr-100yr | MH-SA51-1 | 0.0933 | 2.0 | 74.5 | 45.1 | 0.83 |
| S-3 | | 24hr-100yr | MH-SA50 | 0.3456 | 2.0 | 99.9 | 167.7 | 1.00 |
| S-4 | | 24hr-100yr | MH-SA49 | 0.2910 | 2.0 | 99.8 | 142.3 | 1.00 |
| S-5 | | 24hr-100yr | MH-SA51-2 | 0.2767 | 2.0 | 64.2 | 126.7 | 0.77 |
| S-6 | | 24hr-100yr | MH-SA51-1 | 0.2932 | 2.0 | 65.3 | 134.3 | 0.78 |
| S-7 | | 24hr-100yr | MH-SA56-1 | 0.2899 | 2.0 | 77.2 | 138.2 | 0.85 |
| S-8 | | 24hr-100yr | MH-SA56-2 | 0.2768 | 2.0 | 75.4 | 132.1 | 0.84 |
| S-9 | | 24hr-100yr | MH-SA56-3 | 0.2599 | 2.0 | 71.4 | 118.7 | 0.82 |

# CONDUITS 1/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | CBMHST105 | CBMHST103 | | 17.6 | 72.40 | 72.13 | CIRCULAR | 0.38 | | 0.01534 | 223.7 |
| 11 | CB_54A | CB225-S | Major_System | 29.9 | 79.69 | 77.71 | RECT_OPEN | 0.15 | | 0.06634 | 37.7 |
| 12 | CB_54B | CB209 | major_system | 33.4 | 79.67 | 77.64 | RECT_OPEN | 0.15 | | 0.06086 | 121.2 |
| 15 | SW_42I | DICB9 | major_system | 41.1 | 75.31 | 74.28 | TRAPEZOIDAL | 1.00 | | 0.02509 | 0.0 |
| 16 | MH207 | Chamber-204 | | 25.3 | 73.98 | 73.88 | CIRCULAR | 0.38 | | 0.00395 | 125.1 |
| 17 | D-Chamber-204 | MHST-141 | | 21.1 | 73.03 | 72.98 | CIRCULAR | 0.30 | | 0.00237 | 66.1 |
| 19 | DICB9 | CBMHST-103-S | major_system | 21.8 | 74.28 | 74.26 | TRAPEZOIDAL | 0.50 | | 0.00092 | 66.8 |
| 2 | MHST-105-S | Wales-OLF-N03 | Major_System | 17.0 | 68.69 | 68.20 | IRREGULAR | 0.00 | Road-B | 0.02884 | 25.1 |
| 21 | MHST-157-S | CB65 | Major_System | 36.2 | 74.22 | 73.54 | IRREGULAR | 0.00 | Road-D | 0.01881 | 0.0 |
| 23 | CBMHST-103-S | ST-60-S-B | major_system | 22.5 | 74.26 | 74.11 | TRAPEZOIDAL | 0.50 | | 0.00667 | 54.1 |
| 25 | CB91 | CB94 | major_system | 29.3 | 75.14 | 75.03 | RECT_OPEN | 0.30 | | 0.00375 | 68.9 |
| 27 | TD_A | MHST-221 | | 75.5 | 67.42 | 66.62 | CIRCULAR | 0.20 | | 0.01060 | 24.1 |
| 28 | MHST-221 | PS | | 26.8 | 66.63 | 66.42 | CIRCULAR | 0.30 | | 0.00765 | 107.9 |
| 3 | Preston | Preston_Street | | 10.0 | 61.03 | 60.90 | CIRCULAR | 0.30 | | 0.01300 | 106.9 |
| 30 | TD_B | MHST-221 | | 25.5 | 67.88 | 67.60 | CIRCULAR | 0.30 | | 0.01084 | 87.7 |
| 32 | CB225-S | CB26 | Major_System | 28.5 | 77.71 | 75.96 | RECT_OPEN | 0.15 | | 0.06143 | 112.6 |
| 34 | CB26 | MHST-120-S | Major_System | 33.4 | 75.96 | 74.46 | RECT_OPEN | 0.15 | | 0.04502 | 103.0 |
| 4 | OGS-3 | MHST62528 | | 10.0 | 67.62 | 67.60 | CIRCULAR | 1.20 | | 0.00200 | 2534.3 |
| 41 | CB209 | MHST-120-S | Major_System | 34.7 | 77.64 | 74.46 | RECT_OPEN | 0.15 | | 0.09199 | 131.4 |
| 5 | MHST62528 | MHST62545 | | 91.8 | 67.56 | 66.71 | CIRCULAR | 1.20 | | 0.00929 | 2515.3 |
| 6 | MHST62545 | MHST62547 | | 129.6 | 66.69 | 64.45 | CIRCULAR | 1.20 | | 0.01726 | 2509.5 |
| 7 | MHST62547 | Dows-Lake | | 171.0 | 64.17 | 63.75 | CIRCULAR | 1.20 | | 0.00249 | 2467.2 |
| 8 | POW_D1 | OGS-3 | | 180.0 | 78.70 | 69.70 | TRAPEZOIDAL | 0.55 | | 0.05006 | 568.0 |
| 8_1 | CHAMBER-103 | D-MHST-155 | | 3.1 | 74.08 | 74.06 | CIRCULAR | 0.90 | | 0.00645 | 1379.5 |
| 8_1-S | CHAMBER-103 | MHST-155 | Major_System | 14.7 | 79.00 | 78.70 | RECT_OPEN | 0.30 | | 0.02037 | 0.0 |
| 9 | CBMHST103 | CHAMBER-102 | | 2.6 | 72.10 | 72.07 | CIRCULAR | 0.38 | | 0.01154 | 288.2 |
| CA-OLF_2 | Carling_OLF1 | Carling_OLFN1 | Major_System | 120.4 | 66.50 | 65.41 | IRREGULAR | 0.00 | CarlingAve | 0.00907 | 63.6 |
| CA-OLF_3 | Carling_OLFN3 | Carling_OLF | Major_System | 66.5 | 64.80 | 64.60 | IRREGULAR | 0.00 | CarlingAve | 0.00301 | 201.4 |
| CA-OLF_4 | Carling_OLFN1 | Carling_OLFN3 | Major_System | 67.1 | 65.41 | 64.80 | IRREGULAR | 0.00 | CarlingAve | 0.00906 | 154.5 |
| CA-STM | IN119607 | D-MHST-100 | | 86.0 | 63.10 | 62.80 | CIRCULAR | 0.30 | | 0.00349 | 6.0 |
| ST-100_2 | D-MHST-100 | Nepean-Bay-Trunk | | 6.0 | 63.06 | 63.04 | CIRCULAR | 0.90 | | 0.00333 | 239.1 |
| ST-100-S | MHST-100-S | Carling_OLFN3 | Major_System | 11.0 | 65.42 | 64.80 | IRREGULAR | 0.00 | Road-A | 0.05645 | 55.4 |
| ST-101I | MHST-101 | MHST-100 | | 27.4 | 63.12 | 63.09 | CIRCULAR | 0.90 | | 0.00109 | 235.2 |
| ST-101I-S | MHST-101-S | MHST-100-S | Major_System | 27.4 | 66.07 | 65.42 | IRREGULAR | 0.00 | Road-A | 0.02371 | 55.9 |
| ST-102 | CBMHST-101 | CBMHST105 | | 47.9 | 73.63 | 72.43 | CIRCULAR | 0.38 | | 0.02505 | 173.7 |

# CONDUITS 2/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-102I | MHST-102 | MHST-101 | | 27.2 | 63.15 | 63.12 | CIRCULAR | 1.50 | | 0.00110 | 233.1 |
| ST-102I-S | MHST-102-S | MHST-101-S | Major_System | 27.2 | 66.28 | 66.07 | IRREGULAR | 0.00 | Road-A | 0.00773 | 27.0 |
| ST-103I | MSHT-103 | MHST-102 | | 52.9 | 63.20 | 63.15 | CIRCULAR | 1.50 | | 0.00100 | 264.9 |
| ST-103I-S | MSHT-103-S | MHST-102-S | Major_System | 52.9 | 66.13 | 66.28 | IRREGULAR | 0.00 | Road-A | -0.00283 | 16.4 |
| ST-104 | CBMHST-104 | CBMHST-101 | | 15.1 | 74.14 | 73.84 | CIRCULAR | 0.38 | | 0.01983 | 150.6 |
| ST-104_1 | BI-SA1 | MHST-104 | | 38.3 | 63.67 | 63.63 | CIRCULAR | 1.20 | | 0.00102 | 221.7 |
| ST-104_2 | MHST-105 | BI-SA1 | | 87.8 | 63.79 | 63.70 | CIRCULAR | 1.20 | | 0.00100 | 107.8 |
| ST-104I | MHST-104 | MSHT-103 | | 32.8 | 63.53 | 63.50 | CIRCULAR | 1.20 | | 0.00101 | 220.7 |
| ST-105I_1-S | BI-SA1-S | MHST-105-S | Major_System | 87.8 | 70.15 | 68.64 | IRREGULAR | 0.00 | Road-B | 0.01719 | 111.1 |
| ST-105I_2-S | MHST-104-S | BI-SA1-S | Major_System | 37.7 | 70.80 | 70.15 | IRREGULAR | 0.00 | Road-B | 0.01723 | 38.6 |
| ST-106I | MHST-106 | MSHT-103 | | 44.7 | 63.23 | 63.20 | CIRCULAR | 1.50 | | 0.00067 | 53.3 |
| ST-106I-S | MHST-106-S | MSHT-103-S | Major_System | 29.6 | 71.87 | 66.13 | IRREGULAR | 0.00 | Road-A | 0.19783 | 179.6 |
| ST-107 | D-MHST-170 | MHST-158 | | 13.3 | 71.93 | 71.80 | CIRCULAR | 0.30 | | 0.00977 | 186.7 |
| ST-120-S_1 | MHST-120-S | CB68 | Major_System | 33.8 | 74.46 | 72.63 | IRREGULAR | 0.00 | Road-A | 0.05427 | 316.8 |
| ST-120-S_2 | CB68 | MHST-106-S | Major_System | 11.0 | 72.63 | 71.87 | IRREGULAR | 0.00 | Road-A | 0.06909 | 171.1 |
| ST-130 | MHST-130 | OGS-3 | | 35.6 | 67.69 | 67.62 | CIRCULAR | 1.00 | | 0.00197 | 2295.3 |
| ST-131_1 | MHST-212 | 13 | | 25.4 | 67.95 | 67.93 | CIRCULAR | 0.83 | | 0.00094 | 185.5 |
| ST-131_2 | 13 | MHST-130 | | 49.1 | 67.93 | 67.88 | CIRCULAR | 0.83 | | 0.00096 | 259.0 |
| ST-132 | MHST-132 | MHST-156 | | 41.9 | 73.25 | 72.62 | CIRCULAR | 0.45 | | 0.01505 | 283.8 |
| ST-133 | Chamber201S | MHST-212 | | 2.9 | 67.95 | 67.95 | CIRCULAR | 0.83 | | -0.00034 | 151.3 |
| ST-134 | MHST-134 | MHST-138 | | 17.5 | 76.62 | 76.18 | CIRCULAR | 0.38 | | 0.02515 | 125.4 |
| ST-135 | MHST-135 | MHST-148 | | 28.3 | 70.62 | 70.60 | CIRCULAR | 1.35 | | 0.00071 | 989.4 |
| ST-136 | MHST-136 | MHST-137 | | 57.8 | 78.65 | 77.30 | CIRCULAR | 0.30 | | 0.02338 | 74.7 |
| ST-136-S | MHST-136-S | MHST-137-S | Major_System | 59.7 | 81.70 | 79.79 | IRREGULAR | 0.00 | Road-E_S | 0.03201 | 19.4 |
| ST-137 | MHST-137 | MHST-134 | | 22.4 | 77.24 | 76.68 | CIRCULAR | 0.38 | | 0.02501 | 125.3 |
| ST-137-S | MHST-137-S | MHST-153-S | Major_System | 85.8 | 79.79 | 76.52 | IRREGULAR | 0.00 | Road-E_S | 0.03813 | 36.6 |
| ST-138 | MHST-138 | MHST-153 | | 38.9 | 75.17 | 74.20 | CIRCULAR | 0.38 | | 0.02494 | 125.4 |
| ST-141 | MHST-141 | MHST-160 | | 47.1 | 71.42 | 71.30 | CIRCULAR | 0.90 | | 0.00255 | 883.7 |
| ST-141-S | MHST-151-S | MHST-141-S | Major_System | 61.2 | 77.12 | 75.21 | IRREGULAR | 0.00 | Road-E_S | 0.03122 | 13.8 |
| ST-142 | D-MHST-142 | MHST-130 | | 29.3 | 67.74 | 67.69 | CIRCULAR | 1.20 | | 0.00171 | 2158.7 |
| ST-143 | MHST-143 | MHST-159 | | 38.2 | 69.45 | 69.41 | CIRCULAR | 1.35 | | 0.00105 | 2128.9 |
| ST-144A | MHST-144 | CONNECT | | 56.7 | 69.68 | 69.56 | CIRCULAR | 1.35 | | 0.00212 | 1991.3 |
| ST-144B | CONNECT | MHST-143 | | 37.1 | 69.56 | 69.48 | CIRCULAR | 1.35 | | 0.00216 | 2128.9 |
| ST-145_1 | D-MHST-145 | MHST-144 | | 71.4 | 69.90 | 69.83 | CIRCULAR | 1.20 | | 0.00098 | 1989.3 |
| ST-146_1-S | MHST-146-S | BI-SA49-S | Major_System | 5.7 | 75.38 | 75.35 | IRREGULAR | 0.00 | Road-D | 0.00509 | 10.7 |

## CONDUITS 3/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_2 | D-MHST-146_1 | MHST-200 | | 27.7 | 70.17 | 70.13 | CIRCULAR | 1.50 | | 0.00144 | 2331.2 |
| ST-146_2-S | BI-SA49-S | MHST-157-S | Major_System | 91.1 | 75.35 | 74.63 | IRREGULAR | 0.00 | Road-D | 0.00791 | 32.0 |
| ST-147 | MHST-147 | MHST-146 | | 40.9 | 70.25 | 70.20 | CIRCULAR | 1.50 | | 0.00122 | 2163.3 |
| ST-147-S | MHST-147-S | MHST-146-S | Major_System | 40.8 | 76.00 | 75.38 | IRREGULAR | 0.00 | Road-D | 0.01521 | 39.0 |
| ST-148 | MHST-148 | MHST-147 | | 86.4 | 70.45 | 70.28 | CIRCULAR | 1.50 | | 0.00197 | 2116.4 |
| ST-148-S | MHST-148-S | MHST-147-S | Major_System | 93.3 | 80.37 | 76.00 | IRREGULAR | 0.00 | Road-D | 0.04688 | 102.1 |
| ST-149 | MHST-149 | MHST-135 | | 33.9 | 70.69 | 70.65 | CIRCULAR | 1.35 | | 0.00118 | 985.7 |
| ST-149-S | MHST-135-S | MHST-149-S | Major_System | 44.3 | 79.68 | 77.93 | IRREGULAR | 0.00 | Road-E_C | 0.03950 | 30.3 |
| ST-150 | MHST-150 | MHST-149 | | 18.1 | 70.76 | 70.72 | CIRCULAR | 1.35 | | 0.00220 | 923.8 |
| ST-150-S | MHST-149-S | MHST-150-S1 | Major_System | 36.4 | 77.93 | 77.24 | IRREGULAR | 0.00 | Road-E_C | 0.01895 | 24.9 |
| ST-151 | MHST-151 | MHST-150 | | 30.3 | 71.23 | 71.21 | CIRCULAR | 0.90 | | 0.00066 | 887.4 |
| ST-151-S | MHST-150-S1 | MHST-151-S | Major_System | 14.8 | 77.24 | 77.12 | IRREGULAR | 0.00 | Road-E_S | 0.00808 | 3.6 |
| ST-153_2 | MHST-153 | MHST-158 | | 67.4 | 72.86 | 72.19 | CIRCULAR | 0.38 | | 0.00995 | 236.8 |
| ST-153-S | MHST-153-S | DICB9 | Major_System | 77.3 | 76.52 | 74.80 | IRREGULAR | 0.00 | Road-E_S | 0.02224 | 31.2 |
| ST-154 | MHST-154 | CHAMBER-103 | | 16.0 | 75.80 | 75.72 | CIRCULAR | 0.90 | | 0.00500 | 3224.7 |
| ST-154A | MHST-154A | MHST-154B | | 15.5 | 76.18 | 76.10 | CIRCULAR | 0.90 | | 0.00516 | 3224.0 |
| ST-154B | MHST-154B | MHST-154 | | 35.9 | 76.04 | 75.86 | CIRCULAR | 0.90 | | 0.00501 | 3224.5 |
| ST-155_3 | MHST-155 | MHST-148 | | 22.3 | 74.03 | 73.82 | CIRCULAR | 0.90 | | 0.00942 | 1386.2 |
| ST-156 | MHST-156 | MHST_156B | | 16.0 | 70.13 | 70.12 | CIRCULAR | 1.50 | | 0.00062 | 717.1 |
| ST-156B | MHST_156B | MHST-157 | | 18.8 | 70.09 | 70.08 | CIRCULAR | 1.50 | | 0.00053 | 687.7 |
| ST-157_1 | MHST-157 | D-MHST-157B | | 13.5 | 70.02 | 70.00 | CIRCULAR | 1.50 | | 0.00148 | 2169.6 |
| ST-157_2 | D-MHST-157B | MHST-145 | | 14.7 | 69.97 | 69.96 | CIRCULAR | 1.50 | | 0.00068 | 1628.2 |
| ST-157_3 | D-MHST-157B | CHAMBER-104B | | 9.4 | 69.97 | 69.91 | CIRCULAR | 0.90 | | 0.00638 | 1081.1 |
| ST-158 | MHST-158 | MHST-141 | | 82.5 | 71.74 | 71.57 | CIRCULAR | 0.75 | | 0.00206 | 424.6 |
| ST-158-S_1 | MHST-141-S | CB94 | Major_System | 8.2 | 75.21 | 75.03 | IRREGULAR | 0.00 | Road-E_S | 0.02183 | 9.1 |
| ST-158-S_2 | CB94 | MHST-158-S | Major_System | 76.3 | 75.03 | 74.57 | IRREGULAR | 0.00 | Road-E_S | 0.00603 | 71.4 |
| ST-159 | MHST-159 | MHST-142 | | 44.6 | 69.41 | 69.32 | CIRCULAR | 1.35 | | 0.00202 | 2128.9 |
| ST-160 | MHST-160 | MHST-151 | | 22.3 | 71.27 | 71.23 | CIRCULAR | 0.90 | | 0.00179 | 884.4 |
| ST-161_2-S | D-MHST-161-S | MHST-148-S | Major_System | 52.7 | 81.44 | 80.37 | IRREGULAR | 0.00 | Road-D | 0.02031 | 22.5 |
| ST-162 | CBMHST-162 | MHST-154A | | 5.4 | 76.27 | 76.24 | CIRCULAR | 0.90 | | 0.00561 | 3126.2 |
| ST-200_1 | MHST-200 | MHST-201 | | 42.9 | 70.11 | 70.05 | CIRCULAR | 1.50 | | 0.00140 | 1491.3 |
| ST-200_2 | MHST-200 | CHAMBER-104-A | | 8.4 | 70.17 | 70.13 | CIRCULAR | 0.90 | | 0.00476 | 1024.7 |
| ST-201 | MHST-201 | MHST-157 | | 6.5 | 70.07 | 70.05 | CIRCULAR | 1.50 | | 0.00308 | 1794.6 |
| ST-202 | Chamber202-S | CONNECT | | 5.2 | 70.84 | 70.80 | CIRCULAR | 0.45 | | 0.00769 | 123.5 |
| ST-203 | MHST-203 | MHST-205 | | 8.6 | 73.11 | 73.09 | CIRCULAR | 0.68 | | 0.00232 | 239.1 |

# CONDUITS 4/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-204 | MHST-204 | MHST-205 | | 12.7 | 73.11 | 73.09 | CIRCULAR | 0.53 | | 0.00158 | 155.3 |
| ST-205 | MHST-205 | MHST-206 | | 28.9 | 72.94 | 72.91 | CIRCULAR | 0.68 | | 0.00104 | 392.3 |
| ST-206 | MHST-206 | Chamber202 | | 10.3 | 72.91 | 72.88 | CIRCULAR | 0.68 | | 0.00341 | 581.4 |
| ST-208 | MHST-208 | MHST-209 | | 19.4 | 73.41 | 73.35 | CIRCULAR | 0.38 | | 0.00309 | 186.8 |
| ST-209 | MHST-209 | MHST-206 | | 28.6 | 73.32 | 73.21 | CIRCULAR | 0.38 | | 0.00385 | 188.7 |
| ST-211 | MHST-211 | Chamber201 | | 43.1 | 68.31 | 68.24 | CIRCULAR | 0.53 | | 0.00162 | 141.4 |
| ST-214 | MHST-214 | MHST-215 | | 38.3 | 68.23 | 68.27 | CIRCULAR | 0.75 | | -0.00104 | 195.4 |
| ST-215 | MHST-215 | Chamber201 | | 1.7 | 68.27 | 68.27 | CIRCULAR | 0.75 | | 0.00000 | 183.9 |
| ST-225 | CB225 | Chamber202 | | 29.0 | 73.46 | 73.17 | CIRCULAR | 0.20 | | 0.00997 | 3.6 |
| ST-42I | MHST-158-S | DICB9 | major_system | 9.7 | 74.58 | 74.28 | IRREGULAR | 0.00 | Road-E_S | 0.03109 | 34.1 |
| ST-60-S_1 | ST-60-S-B | DICB8 | Major_System | 125.5 | 74.11 | 69.82 | TRAPEZOIDAL | 1.00 | | 0.03419 | 283.4 |
| ST-62534 | MHST-62534 | CBMHST-162 | | 7.2 | 76.90 | 76.27 | CIRCULAR | 0.90 | | 0.08833 | 3124.9 |
| ST-62538 | MHST-161 | MHST-155 | | 13.4 | 78.96 | 78.70 | CIRCULAR | 0.53 | | 0.01941 | 32.3 |
| St-C104 | CHAMBER-104-A | MHST-201 | | 13.1 | 70.13 | 70.07 | CIRCULAR | 0.90 | | 0.00458 | 474.1 |
| ST-C203 | D-Chamber-203 | MHST-146 | | 15.9 | 71.42 | 71.38 | CIRCULAR | 0.30 | | 0.00251 | 90.4 |
| ST-CB6-S | SW_65D | DICB6 | major_system | 104.0 | 77.94 | 76.09 | TRAPEZOIDAL | 0.50 | | 0.01779 | 24.8 |
| ST-G107 | MHST-107 | OGS1 | | 52.5 | 62.03 | 61.24 | CIRCULAR | 0.30 | | 0.01505 | 30.4 |
| ST-OGS1_2 | OGS1 | Preston | | 10.0 | 61.21 | 61.06 | CIRCULAR | 0.30 | | 0.01500 | 76.5 |
| ST-P3 | DICB3 | IN119608 | | 71.1 | 64.23 | 63.80 | CIRCULAR | 0.20 | | 0.00605 | 0.0 |
| ST-P46 | IN119608 | IN119607 | | 30.0 | 63.50 | 63.20 | CIRCULAR | 0.20 | | 0.01000 | 0.0 |
| ST-SA1 | MH-SA1 | BI-SA1 | | 24.7 | 69.45 | 69.08 | CIRCULAR | 0.30 | | 0.01501 | 60.1 |
| ST-SA49 | MH-SA49 | Chamber-203 | | 17.9 | 74.02 | 73.80 | CIRCULAR | 0.38 | | 0.01228 | 142.1 |
| ST-SA50 | MH-SA50 | Chamber-203 | | 13.2 | 74.07 | 73.67 | CIRCULAR | 0.375 | | 0.03032 | 167.65 |
| ST-SA51-1 | MH-SA51-1 | Chamber-204 | | 14.69 | 73.91 | 73.76 | CIRCULAR | 0.45 | | 0.01021 | 179.39 |
| ST-SA51-2 | MH-SA51-2 | MH207 | | 16.236 | 74.11 | 73.98 | CIRCULAR | 0.375 | | 0.00801 | 126.53 |
| ST-SA52_1 | MHST-213 | MHST-214 | | 51.841 | 68.54 | 68.45 | CIRCULAR | 0.525 | | 0.00174 | 201.26 |
| ST-SA56-1 | MH-SA56-1 | MHST-203 | | 5.031 | 73.24 | 73.19 | CIRCULAR | 0.525 | | 0.00994 | 239.76 |
| ST-SA56-2 | MH-SA56-2 | MHST-204 | | 4.866 | 73.24 | 73.19 | CIRCULAR | 0.45 | | 0.01028 | 156.25 |
| ST-SA56-3 | MH-SA56-3 | MHST-208 | | 8.906 | 73.8 | 73.44 | CIRCULAR | 0.375 | | 0.04046 | 186.78 |
| ST-UGS6B | CHAMBER-102 | MHST-170 | | 16.625 | 72.03 | 71.96 | CIRCULAR | 0.375 | | 0.00421 | 186.99 |
| ST-UGS-Z1 | CHAMBER-104B | MHST-145 | | 8.4 | 69.91 | 69.90 | CIRCULAR | 0.90 | | 0.00119 | 395.9 |
| ST-xx | MH-SAxx | MHST-107 | | 10.7 | 62.45 | 62.15 | CIRCULAR | 0.20 | | 0.02805 | 7.0 |
| WD-OLF_3 | Wales-OLF-N03 | Wales-OLF-N04 | Major_System | 81.2 | 68.20 | 66.75 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01786 | 25.0 |
| WD-OLF_4 | Wales-OLF-N04 | Wales-OLF-N05 | Major_System | 95.0 | 66.75 | 65.50 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01316 | 23.9 |

# Junctions 1/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| 13 | | NO | 67.93 | 70.22 | 2.29 | 1.85 | 69.78 | 10/04/2022 08:32 AM |
| BI-SA1 | | NO | 63.50 | 70.48 | 6.98 | 1.09 | 64.59 | 10/04/2022 08:26 AM |
| BI-SA1-S | Major_System | NO | 70.15 | 70.30 | 0.15 | 0.07 | 70.22 | 10/04/2022 08:10 AM |
| BI-SA49-S | Major_System | NO | 75.35 | 75.51 | 0.16 | 0.04 | 75.39 | 10/04/2022 08:11 AM |
| Carling_OLF1 | | NO | 66.50 | 66.70 | 0.20 | 0.08 | 66.58 | 10/04/2022 08:11 AM |
| Carling_OLFN1 | | NO | 65.41 | 65.61 | 0.20 | 0.11 | 65.51 | 10/04/2022 08:11 AM |
| Carling_OLFN3 | | NO | 64.80 | 65.00 | 0.20 | 0.15 | 64.95 | 10/04/2022 08:13 AM |
| CB_54A | | NO | 79.65 | 79.95 | 0.30 | 0.05 | 79.70 | 10/04/2022 08:10 AM |
| CB_54B | | NO | 79.67 | 79.97 | 0.30 | 0.02 | 79.69 | 10/04/2022 08:10 AM |
| CB209 | | NO | 77.64 | 77.79 | 0.15 | 0.02 | 77.66 | 10/04/2022 08:10 AM |
| CB225 | | NO | 73.46 | 77.72 | 4.26 | 0.04 | 73.50 | 10/04/2022 08:10 AM |
| CB225-S | | NO | 77.71 | 77.86 | 0.15 | 0.02 | 77.73 | 10/04/2022 08:10 AM |
| CB26 | | NO | 75.96 | 76.11 | 0.15 | 0.02 | 75.98 | 10/04/2022 08:10 AM |
| CB68 | | NO | 72.63 | 72.79 | 0.16 | 0.05 | 72.68 | 10/04/2022 08:10 AM |
| CB91 | | NO | 75.14 | 75.44 | 0.30 | 0.03 | 75.17 | 10/04/2022 08:10 AM |
| CB94 | | NO | 75.03 | 75.20 | 0.17 | 0.08 | 75.11 | 10/04/2022 08:11 AM |
| CBMHST-101 | | NO | 73.63 | 76.41 | 2.78 | 0.30 | 73.93 | 10/04/2022 08:23 AM |
| CBMHST103 | | NO | 72.10 | 74.28 | 2.18 | 1.29 | 73.39 | 10/04/2022 08:27 AM |
| CBMHST-103-S | | NO | 74.26 | 74.56 | 0.30 | 0.05 | 74.31 | 10/04/2022 08:11 AM |
| CBMHST-104 | | NO | 74.14 | 76.59 | 2.45 | 0.21 | 74.35 | 10/04/2022 08:06 AM |
| CBMHST105 | | NO | 72.40 | 74.73 | 2.33 | 1.16 | 73.56 | 10/04/2022 08:25 AM |
| CBMHST-162 | | NO | 76.10 | 82.72 | 6.62 | 2.87 | 78.97 | 10/04/2022 08:10 AM |
| Chamber201S | | NO | 67.95 | 68.95 | 1.00 | 0.97 | 68.92 | 10/04/2022 08:35 AM |
| Chamber202-S | | NO | 70.84 | 73.59 | 2.75 | 0.56 | 71.40 | 10/04/2022 08:35 AM |
| CONNECT | | NO | 69.56 | 74.02 | 4.46 | 1.83 | 71.39 | 10/04/2022 08:35 AM |
| D-Chamber-203 | | NO | 71.42 | 75.05 | 3.63 | 0.91 | 72.33 | 10/04/2022 08:33 AM |
| D-Chamber-204 | | NO | 73.03 | 74.63 | 1.60 | 0.27 | 73.30 | 10/04/2022 08:26 AM |
| DICB3 | | NO | 64.00 | 66.43 | 2.43 | 0.00 | 64.00 | 10/04/2022 00:00 AM |
| DICB6 | | NO | 74.70 | 76.59 | 1.89 | 0.03 | 74.73 | 10/04/2022 08:11 AM |
| DICB9 | | NO | 74.28 | 74.48 | 0.20 | 0.08 | 74.36 | 10/04/2022 08:10 AM |
| D-MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 0.74 | 63.34 | 10/04/2022 08:27 AM |
| D-MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 1.14 | 68.94 | 10/04/2022 08:36 AM |
| D-MHST-145 | | NO | 69.90 | 74.34 | 4.44 | 1.76 | 71.66 | 10/04/2022 08:36 AM |
| D-MHST-146_1 | | NO | 70.17 | 75.39 | 5.22 | 1.97 | 72.14 | 10/04/2022 08:35 AM |
| D-MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 2.49 | 76.52 | 10/04/2022 08:26 AM |
| D-MHST-157B | | NO | 69.97 | 74.44 | 4.47 | 2.12 | 72.09 | 10/04/2022 08:36 AM |
| D-MHST-161-S | Major_System | NO | 81.44 | 81.60 | 0.16 | 0.03 | 81.47 | 10/04/2022 08:10 AM |
| D-MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 1.00 | 72.93 | 10/04/2022 08:29 AM |
| IN119607 | | NO | 63.00 | 65.62 | 2.62 | 0.34 | 63.34 | 10/04/2022 08:25 AM |
| IN119608 | | NO | 63.50 | 66.14 | 2.64 | 0.00 | 63.50 | 10/04/2022 00:00 AM |
| MH207 | | NO | 73.95 | 75.43 | 1.48 | 0.34 | 74.29 | 10/04/2022 08:10 AM |
| MH-SA1 | | NO | 69.45 | 70.55 | 1.10 | 0.15 | 69.60 | 10/04/2022 07:55 AM |
| MH-SA49 | | NO | 73.97 | 75.45 | 1.48 | 0.29 | 74.26 | 10/04/2022 08:10 AM |
| MH-SA50 | | NO | 74.07 | 75.83 | 1.76 | 0.20 | 74.27 | 10/04/2022 08:10 AM |

## Junctions 2/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MH-SA51-1 | | NO | 74.08 | 76.53 | 2.45 | 0.21 | 74.29 | 10/04/2022 08:10 AM |
| MH-SA51-2 | | NO | 74.84 | 76.50 | 1.66 | 0.14 | 74.98 | 10/04/2022 08:10 AM |
| MH-SA56-1 | | NO | 73.24 | 74.54 | 1.30 | 0.31 | 73.55 | 10/04/2022 08:10 AM |
| MH-SA56-2 | | NO | 73.24 | 74.54 | 1.30 | 0.29 | 73.53 | 10/04/2022 08:10 AM |
| MH-SA56-3 | | NO | 73.80 | 75.80 | 2.00 | 0.39 | 74.19 | 10/04/2022 08:10 AM |
| MH-SAxx | | NO | 62.00 | 64.50 | 2.50 | 0.50 | 62.50 | 10/04/2022 06:21 AM |
| MHST_156B | | NO | 70.09 | 74.24 | 4.15 | 2.01 | 72.10 | 10/04/2022 08:36 AM |
| MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 2.00 | 64.60 | 10/04/2022 08:27 AM |
| MHST-100-S | Major_System | NO | 65.42 | 65.72 | 0.30 | 0.03 | 65.45 | 10/04/2022 08:10 AM |
| MHST-101 | | NO | 63.00 | 66.07 | 3.07 | 1.60 | 64.60 | 10/04/2022 08:27 AM |
| MHST-101-S | Major_System | NO | 66.07 | 66.23 | 0.16 | 0.04 | 66.11 | 10/04/2022 08:10 AM |
| MHST-102 | | NO | 63.00 | 66.28 | 3.28 | 1.60 | 64.60 | 10/04/2022 08:27 AM |
| MHST-102-S | Major_System | NO | 66.28 | 66.44 | 0.16 | 0.04 | 66.32 | 10/04/2022 08:10 AM |
| MHST-104 | | NO | 63.30 | 70.80 | 7.50 | 1.29 | 64.59 | 10/04/2022 08:27 AM |
| MHST-104-S | Major_System | NO | 70.80 | 70.95 | 0.15 | 0.05 | 70.85 | 10/04/2022 08:10 AM |
| MHST-105 | | NO | 63.60 | 69.13 | 5.53 | 1.00 | 64.60 | 10/04/2022 08:25 AM |
| MHST-105-S | Major_System | NO | 68.64 | 68.79 | 0.15 | 0.09 | 68.73 | 10/04/2022 08:11 AM |
| MHST-106 | | NO | 63.00 | 71.87 | 8.87 | 1.60 | 64.60 | 10/04/2022 08:26 AM |
| MHST-106-S | Major_System | NO | 71.87 | 72.03 | 0.16 | 0.04 | 71.91 | 10/04/2022 08:10 AM |
| MHST-107 | | NO | 62.00 | 64.32 | 2.32 | 0.13 | 62.13 | 10/04/2022 08:10 AM |
| MHST-120-S | Major_System | NO | 74.46 | 74.62 | 0.16 | 0.07 | 74.53 | 10/04/2022 08:10 AM |
| MHST-130 | | NO | 67.69 | 70.21 | 2.52 | 1.17 | 68.86 | 10/04/2022 08:36 AM |
| MHST-132 | | NO | 73.25 | 75.96 | 2.71 | 0.31 | 73.56 | 10/04/2022 08:10 AM |
| MHST-134 | | NO | 76.62 | 79.19 | 2.57 | 0.18 | 76.80 | 10/04/2022 08:10 AM |
| MHST-135 | | NO | 70.62 | 79.31 | 8.69 | 1.73 | 72.35 | 10/04/2022 08:32 AM |
| MHST-135-S | Major_System | NO | 79.68 | 79.83 | 0.15 | 0.03 | 79.71 | 10/04/2022 08:10 AM |
| MHST-136 | | NO | 78.65 | 81.94 | 3.29 | 0.15 | 78.80 | 10/04/2022 08:10 AM |
| MHST-136-S | | NO | 81.70 | 82.00 | 0.30 | 0.03 | 81.73 | 10/04/2022 08:10 AM |
| MHST-137 | | NO | 77.24 | 80.00 | 2.76 | 0.18 | 77.42 | 10/04/2022 08:10 AM |
| MHST-137-S | | NO | 79.79 | 80.09 | 0.30 | 0.04 | 79.83 | 10/04/2022 08:10 AM |
| MHST-138 | | NO | 75.17 | 78.56 | 3.39 | 0.18 | 75.35 | 10/04/2022 08:10 AM |
| MHST-141 | | NO | 71.42 | 75.17 | 3.75 | 0.98 | 72.40 | 10/04/2022 08:30 AM |
| MHST-141-S | Major_System | NO | 75.21 | 75.36 | 0.15 | 0.03 | 75.24 | 10/04/2022 08:10 AM |
| MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 3.40 | 71.20 | 10/04/2022 08:36 AM |
| MHST-143 | | NO | 69.45 | 74.02 | 4.57 | 1.88 | 71.33 | 10/04/2022 08:36 AM |
| MHST-144 | | NO | 69.68 | 75.30 | 5.62 | 1.79 | 71.47 | 10/04/2022 08:36 AM |
| MHST-145 | | NO | 69.90 | 73.97 | 4.07 | 2.19 | 72.09 | 10/04/2022 08:36 AM |
| MHST-146 | | NO | 70.17 | 75.39 | 5.22 | 2.11 | 72.28 | 10/04/2022 08:33 AM |

## Junctions 3/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-146-S | Major_System | NO | 75.38 | 75.58 | 0.20 | 0.03 | 75.41 | 10/04/2022 08:11 AM |
| MHST-147 | | NO | 70.25 | 75.92 | 5.67 | 2.05 | 72.30 | 10/04/2022 08:33 AM |
| MHST-147-S | Major_System | NO | 76.00 | 76.20 | 0.20 | 0.04 | 76.04 | 10/04/2022 08:11 AM |
| MHST-148 | | NO | 70.45 | 80.13 | 9.68 | 1.90 | 72.35 | 10/04/2022 08:32 AM |
| MHST-148-S | Major_System | NO | 80.37 | 80.53 | 0.16 | 0.04 | 80.41 | 10/04/2022 08:10 AM |
| MHST-149 | | NO | 70.69 | 78.30 | 7.61 | 1.66 | 72.35 | 10/04/2022 08:32 AM |
| MHST-149-S | Major_System | NO | 77.93 | 78.08 | 0.15 | 0.03 | 77.96 | 10/04/2022 08:10 AM |
| MHST-150 | | NO | 70.76 | 77.32 | 6.56 | 1.59 | 72.35 | 10/04/2022 08:32 AM |
| MHST-150-S1 | Major_System | NO | 77.24 | 77.39 | 0.15 | 0.02 | 77.26 | 10/04/2022 08:10 AM |
| MHST-151 | | NO | 71.23 | 77.10 | 5.87 | 1.14 | 72.37 | 10/04/2022 08:30 AM |
| MHST-151-S | Major_System | NO | 77.12 | 77.27 | 0.15 | 0.03 | 77.15 | 10/04/2022 08:10 AM |
| MHST-153 | | NO | 72.86 | 77.00 | 4.14 | 0.86 | 73.72 | 10/04/2022 08:12 AM |
| MHST-153-S | TGCB102 | NO | 76.52 | 76.82 | 0.30 | 0.04 | 76.56 | 10/04/2022 08:10 AM |
| MHST-154 | | NO | 75.60 | 81.92 | 6.32 | 1.54 | 77.14 | 10/04/2022 08:10 AM |
| MHST-154A | | NO | 76.00 | 82.52 | 6.52 | 2.81 | 78.81 | 10/04/2022 08:10 AM |
| MHST-154B | | NO | 75.90 | 81.89 | 5.99 | 2.41 | 78.31 | 10/04/2022 08:10 AM |
| MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 0.60 | 74.63 | 10/04/2022 08:26 AM |
| MHST-156 | | NO | 70.13 | 74.49 | 4.36 | 1.97 | 72.10 | 10/04/2022 08:36 AM |
| MHST-157 | | NO | 70.02 | 74.65 | 4.63 | 2.08 | 72.10 | 10/04/2022 08:36 AM |
| MHST-158 | | YES | 71.74 | 74.80 | 3.06 | 0.70 | 72.44 | 10/04/2022 08:29 AM |
| MHST-158-S | Major_System | NO | 74.58 | 74.88 | 0.30 | 0.04 | 74.62 | 10/04/2022 08:10 AM |
| MHST-159 | | NO | 69.38 | 74.96 | 5.58 | 1.89 | 71.27 | 10/04/2022 08:35 AM |
| MHST-160 | | NO | 71.27 | 76.79 | 5.52 | 1.11 | 72.38 | 10/04/2022 08:30 AM |
| MHST-161 | | NO | 78.96 | 81.88 | 2.92 | 0.08 | 79.04 | 10/04/2022 08:10 AM |
| MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 1.24 | 73.17 | 10/04/2022 08:28 AM |
| MHST-200 | | NO | 70.10 | 74.81 | 4.71 | 2.02 | 72.12 | 10/04/2022 08:36 AM |
| MHST-201 | | NO | 69.96 | 74.74 | 4.78 | 2.15 | 72.11 | 10/04/2022 08:36 AM |
| MHST-203 | | NO | 73.11 | 78.83 | 5.72 | 0.40 | 73.51 | 10/04/2022 08:10 AM |
| MHST-204 | | NO | 73.11 | 78.79 | 5.68 | 0.41 | 73.52 | 10/04/2022 08:10 AM |
| MHST-205 | | NO | 72.94 | 78.20 | 5.26 | 0.56 | 73.50 | 10/04/2022 08:10 AM |
| MHST-206 | | NO | 72.91 | 75.77 | 2.86 | 0.51 | 73.42 | 10/04/2022 08:10 AM |
| MHST-208 | | NO | 73.41 | 77.80 | 4.39 | 0.67 | 74.08 | 10/04/2022 08:10 AM |
| MHST-209 | | NO | 73.35 | 75.76 | 2.41 | 0.51 | 73.86 | 10/04/2022 08:10 AM |
| MHST-211 | | NO | 68.31 | 70.38 | 2.07 | 0.63 | 68.94 | 10/04/2022 08:33 AM |
| MHST-212 | | NO | 67.95 | 70.22 | 2.27 | 1.01 | 68.96 | 10/04/2022 08:35 AM |
| MHST-213 | | NO | 68.54 | 70.24 | 1.70 | 0.40 | 68.94 | 10/04/2022 08:10 AM |

## Junctions 4/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-214 | | NO | 68.23 | 70.31 | 2.08 | 0.71 | 68.94 | 10/04/2022 08:33 AM |
| MHST-215 | | NO | 68.27 | 70.25 | 1.98 | 0.67 | 68.94 | 10/04/2022 08:33 AM |
| MHST-221 | | NO | 66.62 | 69.70 | 3.08 | 0.38 | 67.00 | 10/04/2022 08:10 AM |
| MHST62528 | | NO | 67.34 | 70.08 | 2.74 | 0.94 | 68.28 | 10/04/2022 08:33 AM |
| MHST-62534 | | NO | 76.90 | 82.80 | 5.90 | 2.29 | 79.19 | 10/04/2022 08:10 AM |
| MHST62545 | | NO | 66.53 | 69.90 | 3.37 | 0.75 | 67.28 | 10/04/2022 08:33 AM |
| MHST62547 | | NO | 64.00 | 71.80 | 7.80 | 1.35 | 65.35 | 10/04/2022 08:34 AM |
| MSHT-103 | | NO | 63.00 | 66.13 | 3.13 | 1.59 | 64.59 | 10/04/2022 08:26 AM |
| MSHT-103-S | Major_System | NO | 66.13 | 66.29 | 0.16 | 0.08 | 66.21 | 10/04/2022 08:11 AM |
| OGS1 | | NO | 61.00 | 63.82 | 2.82 | 0.39 | 61.39 | 10/04/2022 08:10 AM |
| OGS-3 | | NO | 67.62 | 70.34 | 2.72 | 0.91 | 68.53 | 10/04/2022 08:33 AM |
| POW_D1 | | NO | 78.70 | 79.30 | 0.60 | 0.19 | 78.89 | 10/04/2022 08:11 AM |
| Preston | | NO | 61.00 | 63.00 | 2.00 | 0.27 | 61.27 | 10/04/2022 08:10 AM |
| ST-60-S-B | | NO | 74.11 | 74.41 | 0.30 | 0.08 | 74.19 | 10/04/2022 08:10 AM |
| SW_42I | | NO | 75.31 | 75.51 | 0.20 | 0.00 | 75.31 | 10/04/2022 00:00 AM |
| SW_65D | | NO | 77.94 | 78.44 | 0.50 | 0.02 | 77.96 | 10/04/2022 08:11 AM |
| TD_A | | NO | 67.42 | 69.10 | 1.68 | 0.13 | 67.55 | 10/04/2022 08:10 AM |
| TD_B | | NO | 67.88 | 69.13 | 1.25 | 0.22 | 68.09 | 10/04/2022 08:10 AM |
| Wales-OLF-N03 | | NO | 68.20 | 68.40 | 0.20 | 0.05 | 68.25 | 10/04/2022 08:11 AM |
| Wales-OLF-N04 | | NO | 66.75 | 66.95 | 0.20 | 0.05 | 66.80 | 10/04/2022 08:13 AM |
| Wales-OLF-N05 | | NO | 65.50 | 65.70 | 0.20 | 0.06 | 65.56 | 10/04/2022 08:16 AM |

## Storage 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Storage Curve | Curve Name | Avg. Depth (m) | Max. Depth (m) | Max. HGL (m) | Max. Volume (1000 m³) | Max. Percent Full (%) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CB130 | 69.90 | 70.10 | 0.20 | TABULAR | CB(600x600) | 0.01 | 0.06 | 69.96 | 0 | 28 | 0.0760 |
| CB65 | 72.16 | 73.70 | 1.54 | TABULAR | CB65 | 0.02 | 0.04 | 72.20 | 0 | 0 | 1.5700 |
| CB95 | 75.52 | 75.82 | 0.30 | TABULAR | CB95-ponding | 0.02 | 0.23 | 75.75 | 0.05 | 59 | 0.6210 |
| CHAMBER-102 | 72.03 | 74.24 | 2.21 | TABULAR | Chamber102 | 0.31 | 1.33 | 73.36 | 0.285 | 60 | 2.7210 |
| CHAMBER-103 | 74.08 | 76.78 | 2.70 | TABULAR | Chamber103 | 0.33 | 2.46 | 76.54 | 1.935 | 91 | 13.6620 |
| CHAMBER-104-A | 70.13 | 72.43 | 2.30 | TABULAR | Chamber104A | 0.34 | 1.99 | 72.12 | 1.131 | 86 | 19.5370 |
| CHAMBER-104B | 69.91 | 72.61 | 2.70 | TABULAR | Chamber104B | 0.48 | 2.18 | 72.09 | 1.375 | 81 | 22.8040 |
| Chamber201 | 67.95 | 69.19 | 1.24 | TABULAR | Chamber201 | 0.22 | 0.99 | 68.94 | 0.405 | 80 | 1.1700 |
| Chamber202 | 70.84 | 72.43 | 1.59 | TABULAR | Chamber202 | 0.22 | 1.17 | 72.01 | 0.462 | 74 | 1.7870 |
| Chamber-203 | 71.42 | 72.90 | 1.48 | TABULAR | Chamber203 | 0.20 | 1.15 | 72.57 | 0.21 | 78 | 0.64 |
| Chamber-204 | 73.03 | 74.36 | 1.33 | TABULAR | Chamber204 | 0.17 | 0.99 | 74.02 | 0.22 | 75 | 0.66 |
| DICB8 | 68.11 | 69.83 | 1.72 | TABULAR | swale | 0.11 | 1.30 | 69.41 | 0.04 | 19 | 2.96 |
| MHST-157-S | 73.80 | 74.23 | 0.43 | TABULAR | CB98-ponding | 0.03 | 0.23 | 74.03 | 0.00 | 19 | 1.53 |
| PS | 64.92 | 70.03 | 5.11 | CYLINDRI | * | 0.95 | 1.52 | 66.44 | 0.00 | 30 | 0.23 |
| S-14B | 61.65 | 63.30 | 1.65 | TABULAR | S-14B | 0.44 | 1.65 | 63.30 | 0.01 | 100 | 0.13 |
| S-15 | 62.10 | 63.90 | 1.80 | TABULAR | S-15 | 0.56 | 1.79 | 63.89 | 0.11 | 95 | 0.36 |
| S-19 | 64.00 | 66.00 | 2.00 | TABULAR | S-19 | 0.60 | 1.66 | 65.66 | 0.07 | 25 | 0.21 |
| S-21B | 63.54 | 65.70 | 2.16 | TABULAR | S-21B | 1.35 | 1.92 | 65.46 | 0.68 | 53 | 1.81 |
| S-26B | 67.11 | 69.51 | 2.40 | TABULAR | DICB2ponding | 0.69 | 2.38 | 69.48 | 0.17 | 92 | 0.65 |
| S-26D | 67.19 | 69.25 | 2.06 | TABULAR | DICB1 | 0.35 | 1.95 | 69.15 | 0.02 | 50 | 0.08 |
| S-3Store | 62.20 | 64.24 | 2.04 | TABULAR | S-3 | 1.46 | 2.04 | 64.24 | 0.08 | 100 | 0.39 |
| S-63 | 79.80 | 84.02 | 4.22 | TABULAR | S-63 | 0.85 | 4.13 | 83.93 | 0.20 | 72 | 0.92 |
| SA-1 | 69.50 | 72.50 | 3.00 | TABULAR | S-1 | 0.45 | 2.27 | 71.77 | 0.50 | 76 | 1.24 |
| SA-2 | 62.60 | 65.60 | 3.00 | TABULAR | S-2 | 1.20 | 1.89 | 64.49 | 0.57 | 63 | 0.87 |

# Outlets 1/1

| Name | Inlet Node | Outlet Node | Inlet Elev. (m) | Rating Curve | Curve Name | Control Rules | Max. \|Flow\| (L/s) | Contributing Imp. Area (ha) |
|---|---|---|---|---|---|---|---|---|
| 1 | DICB6 | CBMHST-101 | 74.70 | TABULAR/DEPTH | 2CB | NO | 24.77 | 0.01 |
| 13 | CB_54B | MH-SA56-2 | 79.67 | TABULAR/DEPTH | 3CB | NO | 12.24 | 0.22 |
| 14 | CB95 | CBMHST-104 | 75.52 | TABULAR/DEPTH | 3CB | NO | 150.00 | 0.37 |
| 18 | MHST-141-S | MHST-141 | 75.21 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 51.07 | 0.30 |
| 20 | CB65 | MHST-144 | 72.16 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 18.29 | 0.93 |
| 22 | CB225-S | CB225 | 77.71 | TABULAR/DEPTH | S19_SL2_5 | NO | 3.76 | 0.29 |
| 24 | CBMHST-103-S | CBMHST103 | 74.26 | TABULAR/DEPTH | S28_SL4_0.5 | NO | 12.18 | 1.00 |
| 26 | CB91 | MHST-141 | 75.14 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 24.78 | 0.17 |
| 31 | CB26 | Chamber202 | 75.96 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 8.62 | 0.29 |
| BI-SA1-IC | BI-SA1-S | BI-SA1 | 70.15 | TABULAR/DEPTH | 6@R-B@S=1.5% | NO | 93.69 | 0.37 |
| BI-SA49-IC | BI-SA49-S | D-MHST-146_1 | 75.35 | TABULAR/DEPTH | S19_SL2_1x4 | NO | 102.69 | 0.54 |
| CB101_103_105 | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S22_SL2_5x3 | NO | 18.45 | 0.28 |
| CB102_106_DIC | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 107.00 | 0.28 |
| CB130OUT | CB130 | MHST-130 | 69.90 | TABULAR/DEPTH | S19_SL2_1 | NO | 36.07 | 0.04 |
| CB40,66-68 | CB68 | CONNECT | 72.63 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 145.25 | 0.63 |
| CB42-43 | D-MHST-161-S | MHST-161 | 81.44 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 32.29 | 0.08 |
| CB44-45 | MHST-148-S | MHST-148 | 80.37 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 61.90 | 0.26 |
| CB46_57 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 51.89 | 0.34 |
| CB47-55 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S22_SL2_5x8 | NO | 47.77 | 0.34 |
| CB56_58 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S22_SL2_1x2 | NO | 5.44 | 0.34 |
| CB61_104 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S19_SL2_1x2 | NO | 22.65 | 0.34 |
| CB63,64 | MHST-120-S | CONNECT | 74.46 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 24.25 | 0.63 |
| CB69_75 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 7.09 | 0.13 |
| CB74_76_77 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 78.87 | 0.13 |
| CB79-81 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S19_SL2_5x5 | NO | 44.32 | 0.18 |
| CB82 | MHST-151-S | MHST-151 | 77.12 | TABULAR/DEPTH | DB_S22_SL2_5 | NO | 1.47 | 0.21 |
| CB83 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S22_SL2_5 | NO | 1.56 | 0.18 |
| CB84-85_90 | MHST-136-S | MHST-136 | 81.70 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 75.19 | 0.12 |
| CB88_96 | MHST-137-S | MHST-137 | 79.79 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 50.59 | 0.19 |
| DICB2 | S-26B | BI-SA1 | 67.11 | TABULAR/DEPTH | 100VHV-1 | NO | 15.91 | 0.08 |
| DICB9_OL | DICB9 | CBMHST103 | 74.28 | TABULAR/DEPTH | S19_SL2_5 | NO | 52.99 | 1.00 |
| MHST-100-IC | MHST-100-S | MHST-100 | 66.30 | TABULAR/DEPTH | 1@R-A@S=5.0% | NO | 0.00 | 1.02 |
| MHST-101-IC | MHST-101-S | MHST-101 | 66.07 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 34.06 | 1.02 |
| MHST-102-IC | MHST-102-S | MHST-102 | 66.28 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 30.94 | 0.91 |
| MHST-104-IC | MHST-104-S | MHST-104 | 70.80 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 19.72 | 0.10 |
| MHST-105-IC | MHST-105-S | MHST-105 | 68.64 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 98.19 | 0.40 |
| MHST-106-IC | MHST-106-S | MHST-106 | 71.87 | TABULAR/DEPTH | 2@R-E@S=5.0% | NO | 17.13 | 0.68 |
| MHST-135-IC | MHST-135-S | MHST-135 | 79.68 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 31.60 | 0.03 |
| MHST-157-IC | MHST-157-S | MHST-157 | 73.80 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 255.86 | 0.89 |
| MHST-158-IC | MHST-158-S | MHST-158 | 74.58 | TABULAR/DEPTH | S19_SL2_5x8 | NO | 128.30 | 0.63 |
| MSHT-103-IC | MSHT-103-S | MSHT-103 | 66.13 | TABULAR/DEPTH | 7@R-A@S=5.0% | NO | 252.42 | 0.79 |
| O-1 | SA-1 | MH-SA1 | 69.50 | TABULAR/HEAD | O-1 | NO | 60.00 | 1.24 |
| O-15 | S-15 | MHST-107 | 62.10 | TABULAR/DEPTH | O-15 | NO | 7.84 | 0.01 |
| O-19 | S-19 | MHST-101 | 64.00 | TABULAR/DEPTH | 50VHV-1 | NO | 3.79 | 0.02 |
| O-2 | SA-2 | MH-SAxx | 62.60 | TABULAR/HEAD | O-2 | NO | 7.00 | 0.86 |
| O-21B | S-21B | IN119607 | 63.54 | TABULAR/DEPTH | 50VHV-1 | NO | 4.11 | 0.23 |
| O-26D | S-26D | MHST-105 | 67.19 | TABULAR/DEPTH | 50VHV-1 | NO | 4.15 | 0.00 |
| O-3 | S-3Store | OGS1 | 62.20 | TABULAR/HEAD | 125VHV-2 | NO | 26.69 | 0.11 |
| O-4 | S-14B | Preston | 62.15 | TABULAR/HEAD | 125VHV-2 | NO | 20.15 | 0.00 |
| O-63 | S-63 | MHST-154A | 78.20 | TABULAR/DEPTH | O-63 | NO | 99.84 | 0.59 |
| O-CB209 | CB209 | MHST-209 | 77.64 | TABULAR/DEPTH | S28_SL2_5x2 | NO | 1.93 | 0.23 |
| OL_CB_54A | CB_54A | MH-SA56-1 | 79.65 | TABULAR/DEPTH | 3CB | NO | 84.52 | 0.19 |
| WD-OLF_5 | Wales-OLF-N05 | Preston | 65.50 | TABULAR/DEPTH | 2@R-E@S=1.0% | NO | 20.00 | 0.40 |

# Orifices 1/1

| Name | Inlet Node | Outlet Node | Type | Cross-Section | Height (m) | Width (m) | Inlet Elev. (m) | Discharge Coeff. | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|
| ICD201 | Chamber201 | Chamber201S | | CIRCULAR | 0.35 | 0 | 67.95 | 0.62 | 150.61 |
| ICD204 | Chamber-204 | D-Chamber-204 | | CIRCULAR | 0.19 | 0 | 73.03 | 0.62 | 66.07 |
| ICD203 | Chamber-203 | D-Chamber-203 | | CIRCULAR | 0.225 | 0 | 71.42 | 0.62 | 90.42 |
| ICD202 | Chamber202 | Chamber202-S | | CIRCULAR | 0.245 | 0 | 70.84 | 0.62 | 123.56 |
| ICD-100-1 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.3 | 0 | 63.06 | 0.62 | 217.25 |
| ICD-100-2 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.1 | 0 | 63.85 | 0.62 | 17.99 |
| ICD111 | DICB8 | OGS-3 | | CIRCULAR | 0.4 | 0 | 68.11 | 0.62 | 340.79 |
| ICD-142 | MHST-142 | D-MHST-142 | | CIRCULAR | 0.7 | 0 | 69.32 | 0.62 | 1308.56 |
| OR-145 | MHST-145 | D-MHST-145 | | RECT_CLO | 0.75 | 0.75 | 69.9 | 0.62 | 1218.33 |
| OR-155 | D-MHST-155 | MHST-155 | | CIRCULAR | 0.675 | 0 | 74.06 | 0.62 | 1349.82 |
| OR-170 | MHST-170 | D-MHST-170 | | CIRCULAR | 0.1 | 0 | 71.93 | 0.62 | 21.34 |

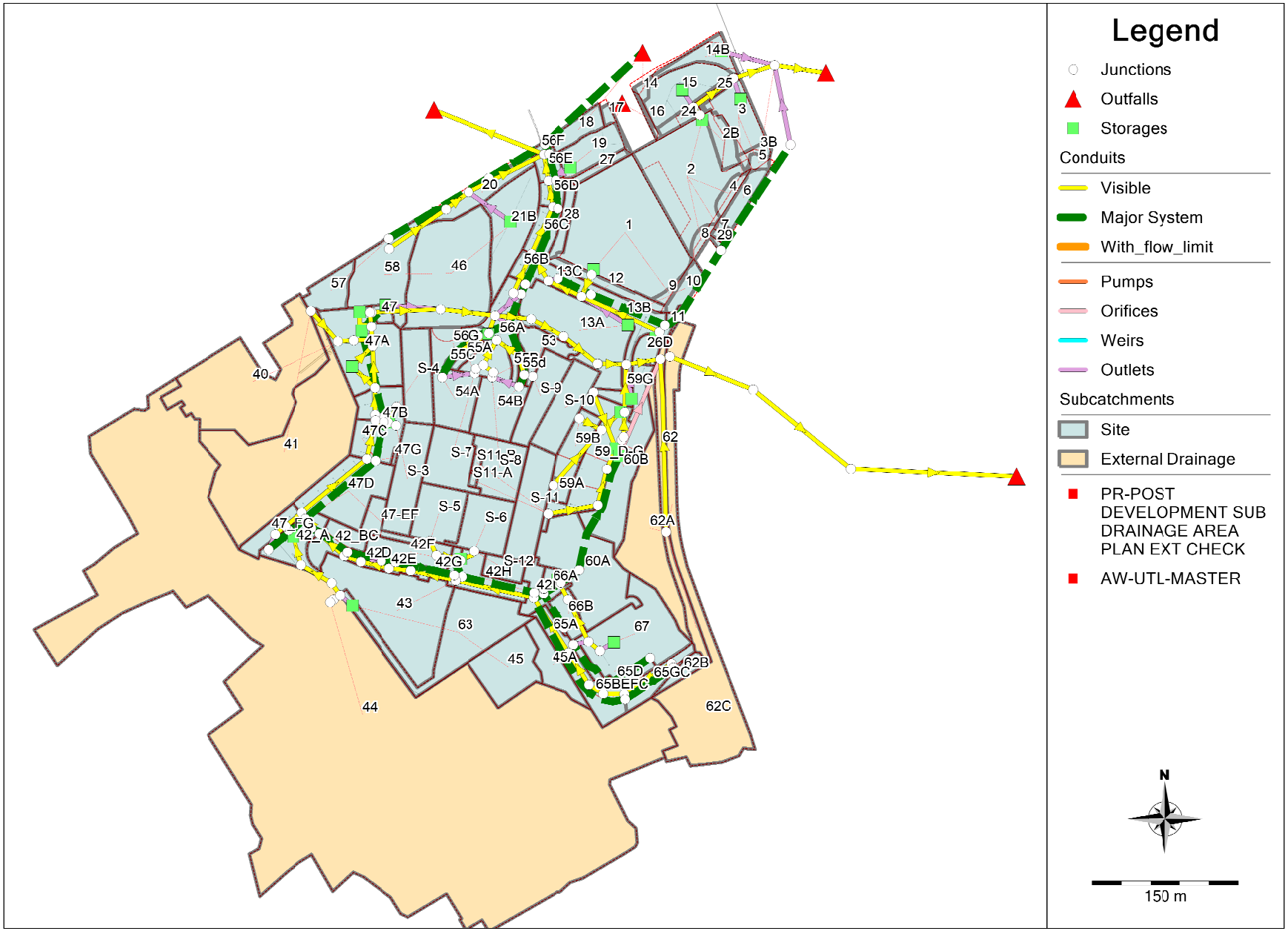
# Weirs 1/1

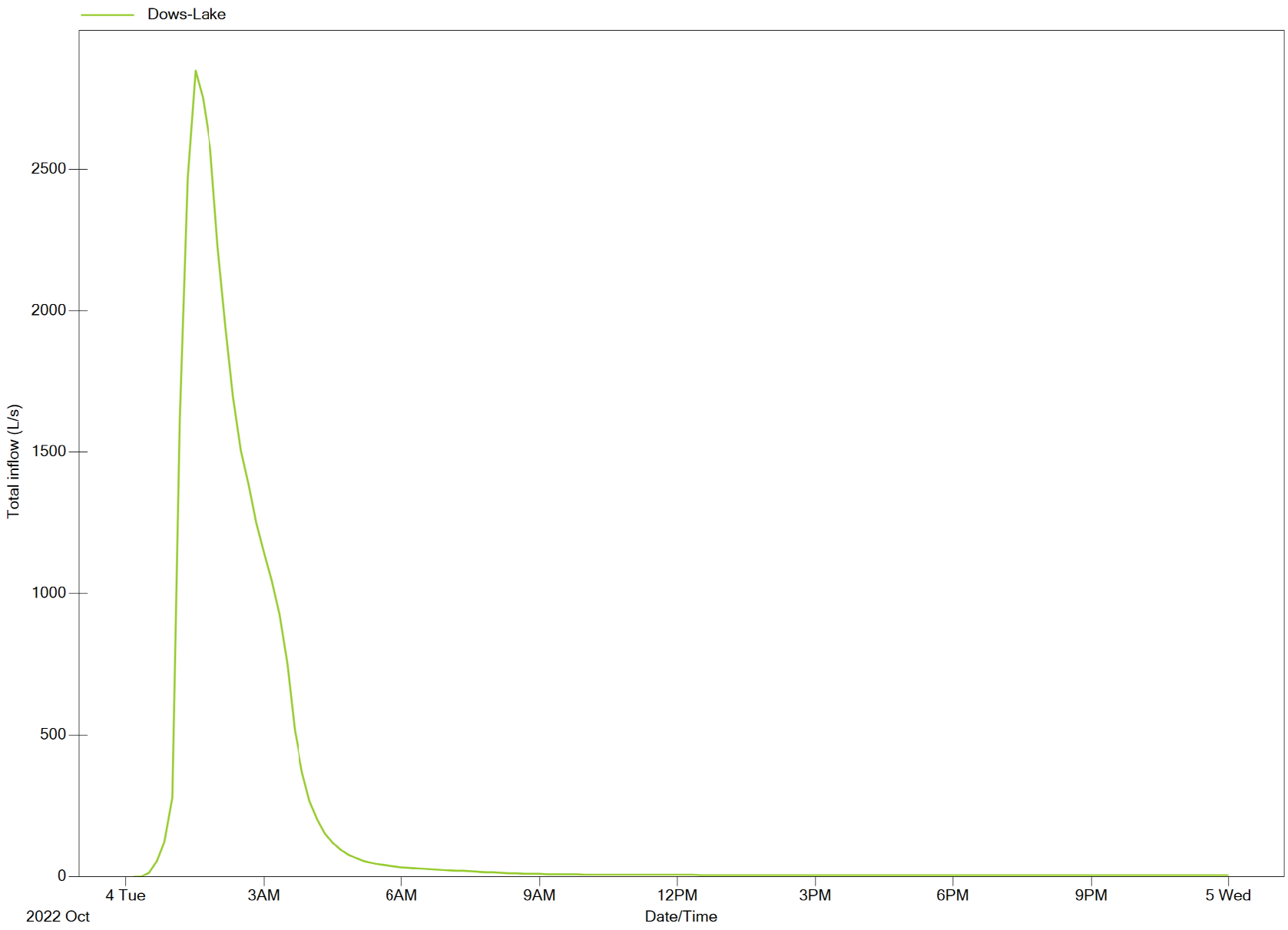
| Name | Inlet Node | Outlet Node | Type | Height (m) | Length (m) | Inlet Elev. (m) | Max. \|Flow\| (L/s) | Time Max. Flow (M/D/Y) | Max/Full Depth | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_1 | MHST-146 | D-MHST-146_1 | SIDEFLOW | 1.4 | 1.5 | 70.17 | 2255.18 | 10/04/2022 08:14 AM | 1 | 19.249 |
| Weir-142 | MHST-142 | D-MHST-142 | TRANSVERSE | 0.5 | 1.4 | 70.7 | 820.35 | 10/04/2022 08:36 AM | 1 | 24.988 |
| Weir-145 | MHST-145 | D-MHST-145 | TRANSVERSE | 1 | 2 | 71.64 | 978.27 | 10/04/2022 08:36 AM | 0.45 | 22.804 |
| Weir-155 | D-MHST-15 | MHST-155 | TRANSVERSE | 1 | 1 | 76.45 | 29.63 | 10/04/2022 08:26 AM | 0.07 | 13.662 |
| Weir-170 | MHST-170 | D-MHST-170 | TRANSVERSE | 0.3 | 1.5 | 73 | 176.3 | 10/04/2022 08:28 AM | 0.57 | 2.721 |

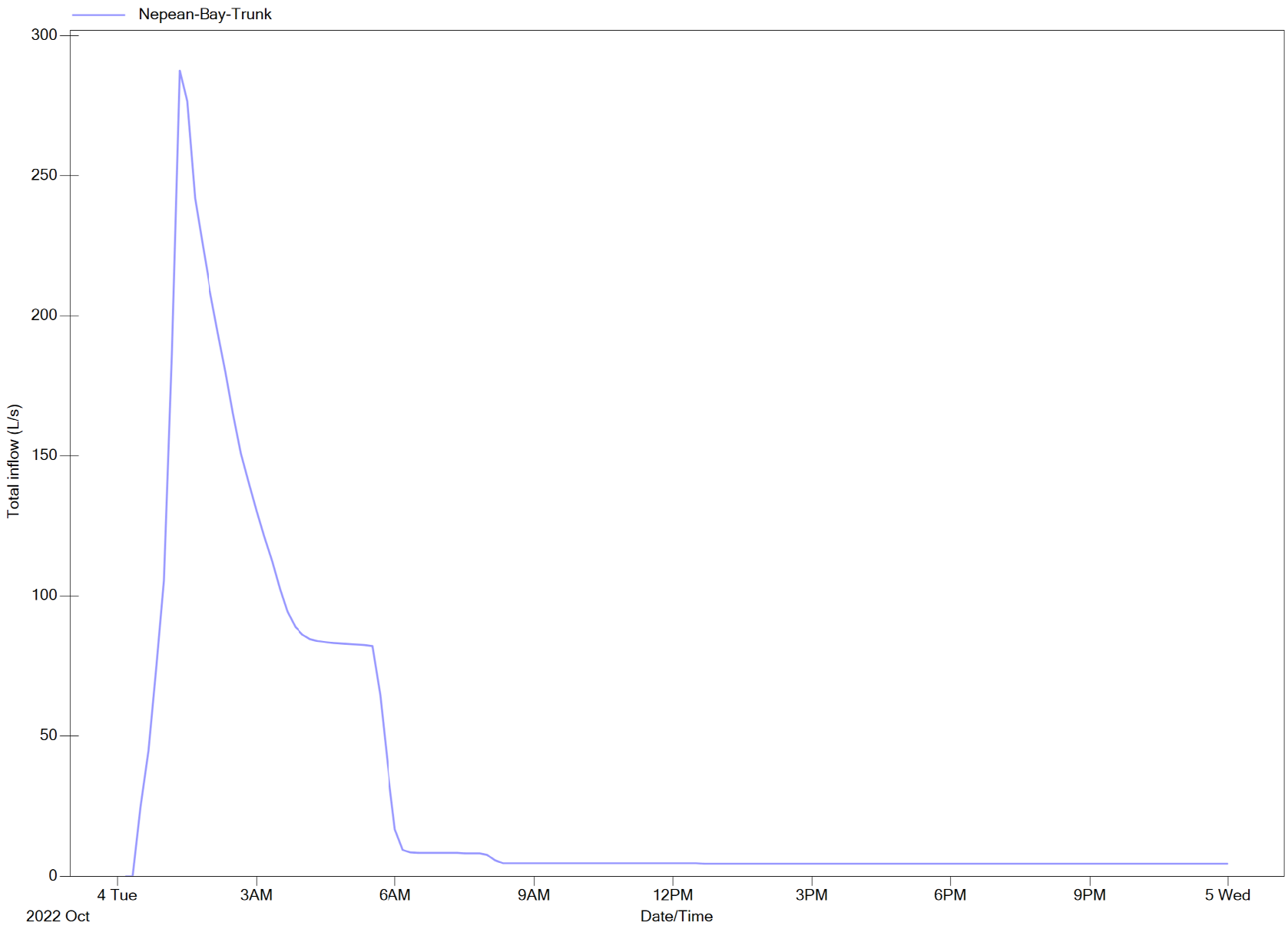
## Outfalls 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Type | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) | Max. Flow (L/s) | Total Flow (ML) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|
| Carling_OLF | 64.6 | 64.8 | FREE | 0.12 | 64.72 | 10/04/2022 08:13 AM | 259.45 | 0.306 | 2.187 |
| Dows-Lake | 63.745 | 66.5 | FREE | 0.87 | 64.61 | 10/04/2022 08:34 AM | 2467.24 | 19.702 | 29.625 |
| LRT-Corridor | 56 | 57 | FREE | 0 | 56 | 10/04/2022 00:00 AM | 26.39 | 0.022 | 0.059 |
| Nepean-Bay-Trunk | 62.8 | 65.21 | NORMAL | 0 | 62.8 | 10/04/2022 00:00 AM | 239.07 | 3.225 | 6.163 |
| Preston_Street | 60.9 | 63.76 | NORMAL | 0.24 | 61.14 | 10/04/2022 08:10 AM | 106.93 | 2.36 | 2.435 |

# PCSWMM OUTPUT
# 24-HOUR SCS -100-YEAR +20% STORM


Legend
Junctions
Outfalls
Storages
Conduits
Visible
Major System
With_flow_limit
Pumps
Orifices
Weirs
Outlets
Subcatchments
Site
External Drainage
PR-POST DEVELOPMENT SUB DRAINAGE AREA PLAN EXT CHECK
AW-UTL-MASTER
N
150 m


Dows-Lake
Total inflow (L/s)
2500
2000
1500
1000
500
0
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time


Nepean-Bay-Trunk
300
250
200
150
100
50
0
Total inflow (L/s)
4 Tue
2022 Oct
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
Date/Time

# SUBCATCHMENTS 1/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 1 | | 24hr-StressTest | SA-1 | 1.2161 | 3.0 | 100.0 | 721.5 | 1.00 |
| 10 | | 24hr-StressTest | 13B | 0.0822 | 3.0 | 8.1 | 44.6 | 0.43 |
| 11 | | 24hr-StressTest | MHST-105-S | 0.0302 | 3.0 | 89.3 | 17.8 | 0.93 |
| 12 | | 24hr-StressTest | BI-SA1-S | 0.1276 | 5.0 | 56.5 | 73.7 | 0.73 |
| 13A | | 24hr-StressTest | S-26B | 0.6503 | 9.6 | 12.5 | 223.8 | 0.44 |
| 13B | | 24hr-StressTest | BI-SA1-S | 0.2248 | 5.0 | 87.8 | 133.3 | 0.93 |
| 13C | | 24hr-StressTest | MHST-104-S | 0.1227 | 5.0 | 78.7 | 71.8 | 0.87 |
| 14 | | 24hr-StressTest | Carling_OLF | 0.0580 | 3.0 | 60.3 | 32.4 | 0.76 |
| 14B | | 24hr-StressTest | S-14B | 0.1272 | 3.0 | 0.0 | 69.9 | 0.38 |
| 15 | | 24hr-StressTest | S-15 | 0.3643 | 3.0 | 3.6 | 158.3 | 0.40 |
| 16 | | 24hr-StressTest | LRT-Corridor | 0.0229 | 3.0 | 0.0 | 12.7 | 0.37 |
| 17 | | 24hr-StressTest | LRT-Corridor | 0.0361 | 3.0 | 0.0 | 19.9 | 0.38 |
| 18 | | 24hr-StressTest | Carling_OLF | 0.1189 | 3.0 | 3.4 | 60.6 | 0.41 |
| 19 | | 24hr-StressTest | S-19 | 0.2056 | 3.0 | 7.1 | 101.6 | 0.43 |
| 2 | | 24hr-StressTest | SA-2 | 0.7114 | 3.0 | 100.0 | 430.2 | 1.00 |
| 20 | | 24hr-StressTest | Carling_OLFN1 | 0.2434 | 8.0 | 0.0 | 132.7 | 0.38 |
| 21B | | 24hr-StressTest | S-21B | 0.4325 | 10.0 | 9.2 | 481.7 | 0.72 |
| 24 | | 24hr-StressTest | MHST-107 | 0.0348 | 3.0 | 55.8 | 19.9 | 0.73 |
| 25 | | 24hr-StressTest | OGS1 | 0.0465 | 3.0 | 80.6 | 27.2 | 0.88 |
| 26D | | 24hr-StressTest | S-26D | 0.0774 | 25.0 | 0.0 | 42.6 | 0.38 |
| 27 | | 24hr-StressTest | MHST-101-S | 0.0531 | 3.0 | 84.5 | 31.3 | 0.90 |
| 28 | | 24hr-StressTest | MHST-102-S | 0.0844 | 5.0 | 62.6 | 48.9 | 0.77 |
| 29 | | 24hr-StressTest | 7 | 0.0113 | 3.0 | 0.0 | 5.7 | 0.39 |
| 2B | | 24hr-StressTest | SA-2 | 0.0908 | 3.0 | 100.0 | 54.0 | 1.00 |
| 3 | | 24hr-StressTest | S-3Store | 0.2154 | 3.0 | 31.8 | 128.7 | 0.67 |
| 3B | | 24hr-StressTest | 3 | 0.0393 | 3.0 | 100.0 | 23.4 | 1.00 |
| 4 | | 24hr-StressTest | 2 | 0.0196 | 3.0 | 100.0 | 11.7 | 1.00 |
| 40 | External | 24hr-StressTest | MHST-156 | 1.1965 | 6.8 | 46.2 | 576.5 | 0.66 |
| 41 | External | 24hr-StressTest | MHST-132 | 1.5292 | 3.0 | 14.6 | 395.3 | 0.43 |
| 42_A | | 24hr-StressTest | MHST-135-S | 0.2148 | 5.0 | 12.8 | 85.7 | 0.45 |
| 42_BC | | 24hr-StressTest | MHST-149-S | 0.1753 | 5.0 | 60.5 | 100.8 | 0.76 |
| 42D | | 24hr-StressTest | MHST-150-S1 | 0.0509 | 2.0 | 99.0 | 30.3 | 0.99 |
| 42E | | 24hr-StressTest | MHST-151-S | 0.0245 | 2.0 | 99.0 | 14.6 | 0.99 |
| 42F | | 24hr-StressTest | CB91 | 0.1997 | 2.0 | 83.0 | 115.5 | 0.90 |
| 42G | | 24hr-StressTest | MHST-141-S | 0.0958 | 2.0 | 91.0 | 56.7 | 0.94 |
| 42H | | 24hr-StressTest | MHST-158-S | 0.1983 | 2.0 | 87.4 | 117.0 | 0.92 |
| 42I | | 24hr-StressTest | DICB9 | 0.1177 | 6.0 | 79.0 | 69.0 | 0.87 |
| 43 | | 24hr-StressTest | MHST-141 | 0.8632 | 2.0 | 100.0 | 512.1 | 1.00 |
| 44 | External | 24hr-StressTest | MHST-62534 | 12.7451 | 1.0 | 32.0 | 4100.3 | 0.55 |
| 45 | | 24hr-StressTest | 63 | 0.2888 | 4.0 | 58.8 | 162.2 | 0.75 |
| 45A | | 24hr-StressTest | MHST-153-S | 0.2052 | 4.0 | 12.6 | 108.4 | 0.46 |
| 46 | | 24hr-StressTest | 21B | 0.9308 | 10.0 | 15.6 | 432.3 | 0.55 |

# SUBCATCHMENTS 2/2

| Name | Tag | Rain Gage | Outlet | Area (ha) | Slope (%) | Imperv. (%) | Peak Runoff (L/s) | Runoff Coefficient |
|---|---|---|---|---|---|---|---|---|
| 47 | | 24hr-StressTest | CB65 | 0.0374 | 3.0 | 90.6 | 22.1 | 0.94 |
| 47_FG | | 24hr-StressTest | D-MHST-161-S | 0.1159 | 3.0 | 72.2 | 67.6 | 0.83 |
| 47A | | 24hr-StressTest | MHST-157-S | 0.5412 | 3.0 | 65.0 | 287.2 | 0.78 |
| 47B | | 24hr-StressTest | BI-SA49-S | 0.2880 | 3.0 | 69.3 | 164.1 | 0.81 |
| 47C | | 24hr-StressTest | MHST-147-S | 0.0737 | 3.0 | 100.0 | 43.9 | 1.00 |
| 47D | | 24hr-StressTest | MHST-148-S | 0.4496 | 3.0 | 32.0 | 192.3 | 0.59 |
| 47-EF | | 24hr-StressTest | 47D | 0.0559 | 3.0 | 59.0 | 32.3 | 0.74 |
| 47G | | 24hr-StressTest | MHST-147-S | 0.0080 | 3.0 | 100.0 | 4.8 | 1.00 |
| 5 | | 24hr-StressTest | preston | 0.0120 | 3.0 | 100.0 | 7.2 | 1.00 |
| 53 | | 24hr-StressTest | MH-SA56-3 | 0.1516 | 2.0 | 61.5 | 86.1 | 0.76 |
| 54A | | 24hr-StressTest | CB_54A | 0.2598 | 2.0 | 73.0 | 150.0 | 0.83 |
| 54B | | 24hr-StressTest | CB_54B | 0.2799 | 2.0 | 77.1 | 162.8 | 0.86 |
| 55A | | 24hr-StressTest | MH-SA56-1 | 0.0348 | 2.0 | 100.0 | 20.7 | 1.00 |
| 55B | | 24hr-StressTest | MH-SA56-2 | 0.0244 | 2.0 | 100.0 | 14.5 | 1.00 |
| 55C | | 24hr-StressTest | CB225-S | 0.0149 | 0.5 | 100.0 | 8.9 | 1.00 |
| 55d | | 24hr-StressTest | CB209 | 0.0276 | 6.0 | 63.6 | 16.0 | 0.77 |
| 56A | | 24hr-StressTest | MHST-120-S | 0.3601 | 5.0 | 31.2 | 147.8 | 0.56 |
| 56B | | 24hr-StressTest | MHST-106-S | 0.0565 | 5.0 | 86.0 | 33.3 | 0.91 |
| 56C | | 24hr-StressTest | MSHT-103-S | 0.1354 | 5.0 | 82.0 | 79.5 | 0.89 |
| 56D | | 24hr-StressTest | MHST-102-S | 0.0761 | 5.0 | 84.7 | 44.8 | 0.90 |
| 56E | | 24hr-StressTest | MHST-101-S | 0.0805 | 5.0 | 77.3 | 47.2 | 0.86 |
| 56F | | 24hr-StressTest | Carling_OLFN3 | 0.0180 | 5.0 | 77.4 | 10.5 | 0.86 |
| 56G | | 24hr-StressTest | CB225-S | 0.1673 | 5.0 | 50.1 | 91.3 | 0.69 |
| 57 | | 24hr-StressTest | Carling_OLF1 | 0.1534 | 15.0 | 6.9 | 85.3 | 0.42 |
| 58 | | 24hr-StressTest | 46 | 0.4475 | 16.0 | 10.2 | 203.5 | 0.45 |
| 59_D-G | | 24hr-StressTest | Chamber201 | 0.4461 | 2.0 | 90.7 | 263.2 | 0.94 |
| 59A | | 24hr-StressTest | TD_A | 0.0501 | 2.0 | 90.7 | 29.6 | 0.94 |
| 59B | | 24hr-StressTest | TD_B | 0.1795 | 2.0 | 90.7 | 106.2 | 0.94 |
| 59G | | 24hr-StressTest | CB130 | 0.0764 | 2.0 | 53.4 | 44.0 | 0.71 |
| 6 | | 24hr-StressTest | 3 | 0.1396 | 3.0 | 2.1 | 72.1 | 0.40 |
| 60A | | 24hr-StressTest | ST-60-S-B | 0.6561 | 25.0 | 22.7 | 318.5 | 0.52 |
| 60B | | 24hr-StressTest | DICB8 | 0.4884 | 25.0 | 30.4 | 242.8 | 0.57 |
| 62 | External | 24hr-StressTest | POW_D1 | 0.2744 | 5.0 | 61.7 | 123.3 | 0.75 |
| 62A | External | 24hr-StressTest | POW_D1 | 0.6276 | 6.0 | 25.0 | 225.4 | 0.52 |
| 62B | | 24hr-StressTest | MHST-136-S | 0.0620 | 3.0 | 0.0 | 22.2 | 0.37 |
| 62C | External | 24hr-StressTest | POW_D1 | 1.1137 | 5.0 | 61.8 | 430.1 | 0.74 |
| 63 | | 24hr-StressTest | S-63 | 0.6280 | 2.0 | 67.5 | 387.4 | 0.82 |
| 65A | | 24hr-StressTest | MHST-153-S | 0.0894 | 3.6 | 63.3 | 51.2 | 0.77 |
| 65BEFC | | 24hr-StressTest | MHST-137-S | 0.2015 | 3.6 | 37.9 | 92.2 | 0.61 |
| 65D | | 24hr-StressTest | SW_65D | 0.1128 | 3.0 | 5.0 | 37.6 | 0.40 |
| 65GC | | 24hr-StressTest | MHST-136-S | 0.1771 | 3.6 | 65.5 | 98.6 | 0.79 |
| 66A | | 24hr-StressTest | CHAMBER-102 | 0.0642 | 6.0 | 53.8 | 36.9 | 0.71 |
| 66B | | 24hr-StressTest | CBMHST105 | 0.1106 | 6.0 | 73.8 | 64.5 | 0.84 |
| 67 | | 24hr-StressTest | CB95 | 0.6208 | 3.0 | 59.8 | 340.1 | 0.75 |
| 7 | | 24hr-StressTest | 2 | 0.0165 | 3.0 | 100.0 | 9.8 | 1.00 |
| 8 | | 24hr-StressTest | 2 | 0.0188 | 3.0 | 100.0 | 11.2 | 1.00 |
| 9 | | 24hr-StressTest | 1 | 0.0192 | 3.0 | 100.0 | 11.4 | 1.00 |
| S-10 | | 24hr-StressTest | MHST-211 | 0.2975 | 2.0 | 100.0 | 175.2 | 1.00 |
| S-11 | | 24hr-StressTest | MHST-213 | 0.4008 | 2.0 | 100.0 | 233.0 | 1.01 |
| S11-A | | 24hr-StressTest | MHST-213 | 0.0107 | 2.0 | 100.0 | 6.4 | 1.00 |
| S11-B | | 24hr-StressTest | MHST-213 | 0.0153 | 2.0 | 69.2 | 8.9 | 0.81 |
| S-12 | | 24hr-StressTest | MH-SA51-1 | 0.0933 | 2.0 | 74.5 | 54.5 | 0.84 |
| S-3 | | 24hr-StressTest | MH-SA50 | 0.3456 | 2.0 | 99.9 | 202.4 | 1.00 |
| S-4 | | 24hr-StressTest | MH-SA49 | 0.2910 | 2.0 | 99.8 | 171.5 | 1.00 |
| S-5 | | 24hr-StressTest | MH-SA51-2 | 0.2767 | 2.0 | 64.2 | 156.1 | 0.78 |
| S-6 | | 24hr-StressTest | MH-SA51-1 | 0.2932 | 2.0 | 65.3 | 165.4 | 0.79 |
| S-7 | | 24hr-StressTest | MH-SA56-1 | 0.2899 | 2.0 | 77.2 | 168.1 | 0.86 |
| S-8 | | 24hr-StressTest | MH-SA56-2 | 0.2768 | 2.0 | 75.4 | 160.6 | 0.85 |
| S-9 | | 24hr-StressTest | MH-SA56-3 | 0.2599 | 2.0 | 71.4 | 146.0 | 0.83 |

# CONDUITS 1/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | CBMHST105 | CBMHST103 | | 17.6 | 72.40 | 72.13 | CIRCULAR | 0.38 | | 0.01534 | 244.4 |
| 11 | CB_54A | CB225-S | Major_System | 29.9 | 79.69 | 77.71 | RECT_OPEN | 0.15 | | 0.06634 | 57.5 |
| 12 | CB_54B | CB209 | major_system | 33.4 | 79.67 | 77.64 | RECT_OPEN | 0.15 | | 0.06086 | 146.7 |
| 15 | SW_42I | DICB9 | major_system | 41.1 | 75.31 | 74.28 | TRAPEZOIDAL | 1.00 | | 0.02509 | 0.0 |
| 16 | MH207 | Chamber-204 | | 25.3 | 73.98 | 73.88 | CIRCULAR | 0.38 | | 0.00395 | 156.5 |
| 17 | D-Chamber-204 | MHST-141 | | 21.1 | 73.03 | 72.98 | CIRCULAR | 0.30 | | 0.00237 | 74.4 |
| 19 | DICB9 | CBMHST-103-S | major_system | 21.8 | 74.28 | 74.26 | TRAPEZOIDAL | 0.50 | | 0.00092 | 105.6 |
| 2 | MHST-105-S | Wales-OLF-N03 | Major_System | 17.0 | 68.69 | 68.20 | IRREGULAR | 0.00 | Road-B | 0.02884 | 33.7 |
| 21 | MHST-157-S | CB65 | Major_System | 36.2 | 74.22 | 73.54 | IRREGULAR | 0.00 | Road-D | 0.01881 | 0.0 |
| 23 | CBMHST-103-S | ST-60-S-B | major_system | 22.5 | 74.26 | 74.11 | TRAPEZOIDAL | 0.50 | | 0.00667 | 86.6 |
| 25 | CB91 | CB94 | major_system | 29.3 | 75.14 | 75.03 | RECT_OPEN | 0.30 | | 0.00375 | 83.2 |
| 27 | TD_A | MHST-221 | | 75.5 | 67.42 | 66.62 | CIRCULAR | 0.20 | | 0.01060 | 28.2 |
| 28 | MHST-221 | PS | | 26.8 | 66.63 | 66.42 | CIRCULAR | 0.30 | | 0.00765 | 117.8 |
| 3 | Preston | Preston_Street | | 10.0 | 61.03 | 60.90 | CIRCULAR | 0.30 | | 0.01300 | 125.5 |
| 30 | TD_B | MHST-221 | | 25.5 | 67.88 | 67.60 | CIRCULAR | 0.30 | | 0.01084 | 105.3 |
| 32 | CB225-S | CB26 | Major_System | 28.5 | 77.71 | 75.96 | RECT_OPEN | 0.15 | | 0.06143 | 149.4 |
| 34 | CB26 | MHST-120-S | Major_System | 33.4 | 75.96 | 74.46 | RECT_OPEN | 0.15 | | 0.04502 | 134.7 |
| 4 | OGS-3 | MHST62528 | | 10.0 | 67.62 | 67.60 | CIRCULAR | 1.20 | | 0.00200 | 3072.0 |
| 41 | CB209 | MHST-120-S | Major_System | 34.7 | 77.64 | 74.46 | RECT_OPEN | 0.15 | | 0.09199 | 158.6 |
| 5 | MHST62528 | MHST62545 | | 91.8 | 67.56 | 66.71 | CIRCULAR | 1.20 | | 0.00929 | 3076.2 |
| 6 | MHST62545 | MHST62547 | | 129.6 | 66.69 | 64.45 | CIRCULAR | 1.20 | | 0.01726 | 3091.1 |
| 7 | MHST62547 | Dows-Lake | | 171.0 | 64.17 | 63.75 | CIRCULAR | 1.20 | | 0.00249 | 3090.9 |
| 8 | POW_D1 | OGS-3 | | 180.0 | 78.70 | 69.70 | TRAPEZOIDAL | 0.55 | | 0.05006 | 734.1 |
| 8_1 | CHAMBER-103 | D-MHST-155 | | 3.1 | 74.08 | 74.06 | CIRCULAR | 0.90 | | 0.00645 | 1672.6 |
| 8_1-S | CHAMBER-103 | MHST-155 | Major_System | 14.7 | 79.00 | 78.70 | RECT_OPEN | 0.30 | | 0.02037 | 0.0 |
| 9 | CBMHST103 | CHAMBER-102 | | 2.6 | 72.10 | 72.07 | CIRCULAR | 0.38 | | 0.01154 | 314.8 |
| CA-OLF_2 | Carling_OLF1 | Carling_OLFN1 | Major_System | 120.4 | 66.50 | 65.41 | IRREGULAR | 0.00 | CarlingAve | 0.00907 | 78.8 |
| CA-OLF_3 | Carling_OLFN3 | Carling_OLF | Major_System | 66.5 | 64.80 | 64.60 | IRREGULAR | 0.00 | CarlingAve | 0.00301 | 256.4 |
| CA-OLF_4 | Carling_OLFN1 | Carling_OLFN3 | Major_System | 67.1 | 65.41 | 64.80 | IRREGULAR | 0.00 | CarlingAve | 0.00906 | 194.1 |
| CA-STM | IN119607 | D-MHST-100 | | 86.0 | 63.10 | 62.80 | CIRCULAR | 0.30 | | 0.00349 | 6.1 |
| ST-100_2 | D-MHST-100 | Nepean-Bay-Trunk | | 6.0 | 63.06 | 63.04 | CIRCULAR | 0.90 | | 0.00333 | 320.1 |
| ST-100-S | MHST-100-S | Carling_OLFN3 | Major_System | 11.0 | 65.42 | 64.80 | IRREGULAR | 0.00 | Road-A | 0.05645 | 72.7 |
| ST-101I | MHST-101 | MHST-100 | | 27.4 | 63.12 | 63.09 | CIRCULAR | 0.90 | | 0.00109 | 396.1 |
| ST-101I-S | MHST-101-S | MHST-100-S | Major_System | 27.4 | 66.07 | 65.42 | IRREGULAR | 0.00 | Road-A | 0.02371 | 73.2 |
| ST-102 | CBMHST-101 | CBMHST105 | | 47.9 | 73.63 | 72.43 | CIRCULAR | 0.38 | | 0.02505 | 182.9 |

# CONDUITS 2/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-102I | MHST-102 | MHST-101 | | 27.2 | 63.15 | 63.12 | CIRCULAR | 1.50 | | 0.00110 | 373.7 |
| ST-102I-S | MHST-102-S | MHST-101-S | Major_System | 27.2 | 66.28 | 66.07 | IRREGULAR | 0.00 | Road-A | 0.00773 | 34.9 |
| ST-103I | MSHT-103 | MHST-102 | | 52.9 | 63.20 | 63.15 | CIRCULAR | 1.50 | | 0.00100 | 355.4 |
| ST-103I-S | MSHT-103-S | MHST-102-S | Major_System | 52.9 | 66.13 | 66.28 | IRREGULAR | 0.00 | Road-A | -0.00283 | 21.1 |
| ST-104 | CBMHST-104 | CBMHST-101 | | 15.1 | 74.14 | 73.84 | CIRCULAR | 0.38 | | 0.01983 | 150.7 |
| ST-104_1 | BI-SA1 | MHST-104 | | 38.3 | 63.67 | 63.63 | CIRCULAR | 1.20 | | 0.00102 | 244.9 |
| ST-104_2 | MHST-105 | BI-SA1 | | 87.8 | 63.79 | 63.70 | CIRCULAR | 1.20 | | 0.00100 | 157.7 |
| ST-104I | MHST-104 | MSHT-103 | | 32.8 | 63.53 | 63.50 | CIRCULAR | 1.20 | | 0.00101 | 256.6 |
| ST-105I_1-S | BI-SA1-S | MHST-105-S | Major_System | 87.8 | 70.15 | 68.64 | IRREGULAR | 0.00 | Road-B | 0.01719 | 132.4 |
| ST-105I_2-S | MHST-104-S | BI-SA1-S | Major_System | 37.7 | 70.80 | 70.15 | IRREGULAR | 0.00 | Road-B | 0.01723 | 49.0 |
| ST-106I | MHST-106 | MSHT-103 | | 44.7 | 63.23 | 63.20 | CIRCULAR | 1.50 | | 0.00067 | 83.8 |
| ST-106I-S | MHST-106-S | MSHT-103-S | Major_System | 29.6 | 71.87 | 66.13 | IRREGULAR | 0.00 | Road-A | 0.19783 | 254.5 |
| ST-107 | D-MHST-170 | MHST-158 | | 13.3 | 71.93 | 71.80 | CIRCULAR | 0.30 | | 0.00977 | 188.8 |
| ST-120-S_1 | MHST-120-S | CB68 | Major_System | 33.8 | 74.46 | 72.63 | IRREGULAR | 0.00 | Road-A | 0.05427 | 408.5 |
| ST-120-S_2 | CB68 | MHST-106-S | Major_System | 11.0 | 72.63 | 71.87 | IRREGULAR | 0.00 | Road-A | 0.06909 | 243.0 |
| ST-130 | MHST-130 | OGS-3 | | 35.6 | 67.69 | 67.62 | CIRCULAR | 1.00 | | 0.00197 | 2524.4 |
| ST-131_1 | MHST-212 | 13 | | 25.4 | 67.95 | 67.93 | CIRCULAR | 0.83 | | 0.00094 | 176.7 |
| ST-131_2 | 13 | MHST-130 | | 49.1 | 67.93 | 67.88 | CIRCULAR | 0.83 | | 0.00096 | 182.5 |
| ST-132 | MHST-132 | MHST-156 | | 41.9 | 73.25 | 72.62 | CIRCULAR | 0.45 | | 0.01505 | 394.8 |
| ST-133 | Chamber201S | MHST-212 | | 2.9 | 67.95 | 67.95 | CIRCULAR | 0.83 | | -0.00034 | 176.9 |
| ST-134 | MHST-134 | MHST-138 | | 17.5 | 76.62 | 76.18 | CIRCULAR | 0.38 | | 0.02515 | 153.9 |
| ST-135 | MHST-135 | MHST-148 | | 28.3 | 70.62 | 70.60 | CIRCULAR | 1.35 | | 0.00071 | 1150.3 |
| ST-136 | MHST-136 | MHST-137 | | 57.8 | 78.65 | 77.30 | CIRCULAR | 0.30 | | 0.02338 | 91.6 |
| ST-136-S | MHST-136-S | MHST-137-S | Major_System | 59.7 | 81.70 | 79.79 | IRREGULAR | 0.00 | Road-E_S | 0.03201 | 27.4 |
| ST-137 | MHST-137 | MHST-134 | | 22.4 | 77.24 | 76.68 | CIRCULAR | 0.38 | | 0.02501 | 153.8 |
| ST-137-S | MHST-137-S | MHST-153-S | Major_System | 85.8 | 79.79 | 76.52 | IRREGULAR | 0.00 | Road-E_S | 0.03813 | 53.5 |
| ST-138 | MHST-138 | MHST-153 | | 38.9 | 75.17 | 74.20 | CIRCULAR | 0.38 | | 0.02494 | 154.0 |
| ST-141 | MHST-141 | MHST-160 | | 47.1 | 71.42 | 71.30 | CIRCULAR | 0.90 | | 0.00255 | 1068.9 |
| ST-141-S | MHST-151-S | MHST-141-S | Major_System | 61.2 | 77.12 | 75.21 | IRREGULAR | 0.00 | Road-E_S | 0.03122 | 16.6 |
| ST-142 | D-MHST-142 | MHST-130 | | 29.3 | 67.74 | 67.69 | CIRCULAR | 1.20 | | 0.00171 | 2588.0 |
| ST-143 | MHST-143 | MHST-159 | | 38.2 | 69.45 | 69.41 | CIRCULAR | 1.35 | | 0.00105 | 2581.4 |
| ST-144A | MHST-144 | CONNECT | | 56.7 | 69.68 | 69.56 | CIRCULAR | 1.35 | | 0.00212 | 2418.2 |
| ST-144B | CONNECT | MHST-143 | | 37.1 | 69.56 | 69.48 | CIRCULAR | 1.35 | | 0.00216 | 2581.4 |
| ST-145_1 | D-MHST-145 | MHST-144 | | 71.4 | 69.90 | 69.83 | CIRCULAR | 1.20 | | 0.00098 | 2414.9 |
| ST-146_1-S | MHST-146-S | BI-SA49-S | Major_System | 5.7 | 75.38 | 75.35 | IRREGULAR | 0.00 | Road-D | 0.00509 | 16.6 |

## CONDUITS 3/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_2 | D-MHST-146_1 | MHST-200 | | 27.7 | 70.17 | 70.13 | CIRCULAR | 1.50 | | 0.00144 | 3037.0 |
| ST-146_2-S | BI-SA49-S | MHST-157-S | Major_System | 91.1 | 75.35 | 74.63 | IRREGULAR | 0.00 | Road-D | 0.00791 | 47.2 |
| ST-147 | MHST-147 | MHST-146 | | 40.9 | 70.25 | 70.20 | CIRCULAR | 1.50 | | 0.00122 | 2846.2 |
| ST-147-S | MHST-147-S | MHST-146-S | Major_System | 40.8 | 76.00 | 75.38 | IRREGULAR | 0.00 | Road-D | 0.01521 | 62.0 |
| ST-148 | MHST-148 | MHST-147 | | 86.4 | 70.45 | 70.28 | CIRCULAR | 1.50 | | 0.00197 | 2746.8 |
| ST-148-S | MHST-148-S | MHST-147-S | Major_System | 93.3 | 80.37 | 76.00 | IRREGULAR | 0.00 | Road-D | 0.04688 | 145.9 |
| ST-149 | MHST-149 | MHST-135 | | 33.9 | 70.69 | 70.65 | CIRCULAR | 1.35 | | 0.00118 | 1158.7 |
| ST-149-S | MHST-135-S | MHST-149-S | Major_System | 44.3 | 79.68 | 77.93 | IRREGULAR | 0.00 | Road-E_C | 0.03950 | 44.3 |
| ST-150 | MHST-150 | MHST-149 | | 18.1 | 70.76 | 70.72 | CIRCULAR | 1.35 | | 0.00220 | 1100.3 |
| ST-150-S | MHST-149-S | MHST-150-S1 | Major_System | 36.4 | 77.93 | 77.24 | IRREGULAR | 0.00 | Road-E_C | 0.01895 | 35.8 |
| ST-151 | MHST-151 | MHST-150 | | 30.3 | 71.23 | 71.21 | CIRCULAR | 0.90 | | 0.00066 | 1069.8 |
| ST-151-S | MHST-150-S1 | MHST-151-S | Major_System | 14.8 | 77.24 | 77.12 | IRREGULAR | 0.00 | Road-E_S | 0.00808 | 4.9 |
| ST-153_2 | MHST-153 | MHST-158 | | 67.4 | 72.86 | 72.19 | CIRCULAR | 0.38 | | 0.00995 | 289.4 |
| ST-153-S | MHST-153-S | DICB9 | Major_System | 77.3 | 76.52 | 74.80 | IRREGULAR | 0.00 | Road-E_S | 0.02224 | 48.4 |
| ST-154 | MHST-154 | CHAMBER-103 | | 16.0 | 75.80 | 75.72 | CIRCULAR | 0.90 | | 0.00500 | 4201.4 |
| ST-154A | MHST-154A | MHST-154B | | 15.5 | 76.18 | 76.10 | CIRCULAR | 0.90 | | 0.00516 | 4200.4 |
| ST-154B | MHST-154B | MHST-154 | | 35.9 | 76.04 | 75.86 | CIRCULAR | 0.90 | | 0.00501 | 4201.2 |
| ST-155_3 | MHST-155 | MHST-148 | | 22.3 | 74.03 | 73.82 | CIRCULAR | 0.90 | | 0.00942 | 1701.4 |
| ST-156 | MHST-156 | MHST_156B | | 16.0 | 70.13 | 70.12 | CIRCULAR | 1.50 | | 0.00062 | 943.0 |
| ST-156B | MHST_156B | MHST-157 | | 18.8 | 70.09 | 70.08 | CIRCULAR | 1.50 | | 0.00053 | 894.0 |
| ST-157_1 | MHST-157 | D-MHST-157B | | 13.5 | 70.02 | 70.00 | CIRCULAR | 1.50 | | 0.00148 | 2770.8 |
| ST-157_2 | D-MHST-157B | MHST-145 | | 14.7 | 69.97 | 69.96 | CIRCULAR | 1.50 | | 0.00068 | 2043.0 |
| ST-157_3 | D-MHST-157B | CHAMBER-104B | | 9.4 | 69.97 | 69.91 | CIRCULAR | 0.90 | | 0.00638 | 1367.8 |
| ST-158 | MHST-158 | MHST-141 | | 82.5 | 71.74 | 71.57 | CIRCULAR | 0.75 | | 0.00206 | 550.1 |
| ST-158-S_1 | MHST-141-S | CB94 | Major_System | 8.2 | 75.21 | 75.03 | IRREGULAR | 0.00 | Road-E_S | 0.02183 | 11.6 |
| ST-158-S_2 | CB94 | MHST-158-S | Major_System | 76.3 | 75.03 | 74.57 | IRREGULAR | 0.00 | Road-E_S | 0.00603 | 87.3 |
| ST-159 | MHST-159 | MHST-142 | | 44.6 | 69.41 | 69.32 | CIRCULAR | 1.35 | | 0.00202 | 2581.4 |
| ST-160 | MHST-160 | MHST-151 | | 22.3 | 71.27 | 71.23 | CIRCULAR | 0.90 | | 0.00179 | 1068.8 |
| ST-161_2-S | D-MHST-161-S | MHST-148-S | Major_System | 52.7 | 81.44 | 80.37 | IRREGULAR | 0.00 | Road-D | 0.02031 | 28.5 |
| ST-162 | CBMHST-162 | MHST-154A | | 5.4 | 76.27 | 76.24 | CIRCULAR | 0.90 | | 0.00561 | 4101.4 |
| ST-200_1 | MHST-200 | MHST-201 | | 42.9 | 70.11 | 70.05 | CIRCULAR | 1.50 | | 0.00140 | 1944.3 |
| ST-200_2 | MHST-200 | CHAMBER-104-A | | 8.4 | 70.17 | 70.13 | CIRCULAR | 0.90 | | 0.00476 | 1133.8 |
| ST-201 | MHST-201 | MHST-157 | | 6.5 | 70.07 | 70.05 | CIRCULAR | 1.50 | | 0.00308 | 2190.6 |
| ST-202 | Chamber202-S | CONNECT | | 5.2 | 70.84 | 70.80 | CIRCULAR | 0.45 | | 0.00769 | 128.6 |
| ST-203 | MHST-203 | MHST-205 | | 8.6 | 73.11 | 73.09 | CIRCULAR | 0.68 | | 0.00232 | 278.7 |

# CONDUITS 4/4

| Name | Inlet Node | Outlet Node | Tag | Length (m) | Inlet Elev. (m) | Outlet Elev. (m) | Cross-Section | Geom1 (m) | Transect | Slope (m/m) | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-204 | MHST-204 | MHST-205 | | 12.7 | 73.11 | 73.09 | CIRCULAR | 0.53 | | 0.00158 | 189.2 |
| ST-205 | MHST-205 | MHST-206 | | 28.9 | 72.94 | 72.91 | CIRCULAR | 0.68 | | 0.00104 | 466.8 |
| ST-206 | MHST-206 | Chamber202 | | 10.3 | 72.91 | 72.88 | CIRCULAR | 0.68 | | 0.00341 | 699.5 |
| ST-208 | MHST-208 | MHST-209 | | 19.4 | 73.41 | 73.35 | CIRCULAR | 0.38 | | 0.00309 | 232.2 |
| ST-209 | MHST-209 | MHST-206 | | 28.6 | 73.32 | 73.21 | CIRCULAR | 0.38 | | 0.00385 | 235.0 |
| ST-211 | MHST-211 | Chamber201 | | 43.1 | 68.31 | 68.24 | CIRCULAR | 0.53 | | 0.00162 | 167.8 |
| ST-214 | MHST-214 | MHST-215 | | 38.3 | 68.23 | 68.27 | CIRCULAR | 0.75 | | -0.00104 | 232.3 |
| ST-215 | MHST-215 | Chamber201 | | 1.7 | 68.27 | 68.27 | CIRCULAR | 0.75 | | 0.00000 | 215.7 |
| ST-225 | CB225 | Chamber202 | | 29.0 | 73.46 | 73.17 | CIRCULAR | 0.20 | | 0.00997 | 6.1 |
| ST-42I | MHST-158-S | DICB9 | major_system | 9.7 | 74.58 | 74.28 | IRREGULAR | 0.00 | Road-E_S | 0.03109 | 46.0 |
| ST-60-S_1 | ST-60-S-B | DICB8 | Major_System | 125.5 | 74.11 | 69.82 | TRAPEZOIDAL | 1.00 | | 0.03419 | 385.8 |
| ST-62534 | MHST-62534 | CBMHST-162 | | 7.2 | 76.90 | 76.27 | CIRCULAR | 0.90 | | 0.08833 | 4099.7 |
| ST-62538 | MHST-161 | MHST-155 | | 13.4 | 78.96 | 78.70 | CIRCULAR | 0.53 | | 0.01941 | 37.8 |
| St-C104 | CHAMBER-104-A | MHST-201 | | 13.1 | 70.13 | 70.07 | CIRCULAR | 0.90 | | 0.00458 | 573.4 |
| ST-C203 | D-Chamber-203 | MHST-146 | | 15.9 | 71.42 | 71.38 | CIRCULAR | 0.30 | | 0.00251 | 90.6 |
| ST-CB6-S | SW_65D | DICB6 | major_system | 104.0 | 77.94 | 76.09 | TRAPEZOIDAL | 0.50 | | 0.01779 | 35.4 |
| ST-G107 | MHST-107 | OGS1 | | 52.5 | 62.03 | 61.24 | CIRCULAR | 0.30 | | 0.01505 | 34.1 |
| ST-OGS1_2 | OGS1 | Preston | | 10.0 | 61.21 | 61.06 | CIRCULAR | 0.30 | | 0.01500 | 85.2 |
| ST-P3 | DICB3 | IN119608 | | 71.1 | 64.23 | 63.80 | CIRCULAR | 0.20 | | 0.00605 | 0.0 |
| ST-P46 | IN119608 | IN119607 | | 30.0 | 63.50 | 63.20 | CIRCULAR | 0.20 | | 0.01000 | 0.0 |
| ST-SA1 | MH-SA1 | BI-SA1 | | 24.7 | 69.45 | 69.08 | CIRCULAR | 0.30 | | 0.01501 | 60.2 |
| ST-SA49 | MH-SA49 | Chamber-203 | | 17.9 | 74.02 | 73.80 | CIRCULAR | 0.38 | | 0.01228 | 171.1 |
| ST-SA50 | MH-SA50 | Chamber-203 | | 13.2 | 74.07 | 73.67 | CIRCULAR | 0.375 | | 0.03032 | 202.4 |
| ST-SA51-1 | MH-SA51-1 | Chamber-204 | | 14.69 | 73.91 | 73.76 | CIRCULAR | 0.45 | | 0.01021 | 219.92 |
| ST-SA51-2 | MH-SA51-2 | MH207 | | 16.236 | 74.11 | 73.98 | CIRCULAR | 0.375 | | 0.00801 | 155.83 |
| ST-SA52_1 | MHST-213 | MHST-214 | | 51.841 | 68.54 | 68.45 | CIRCULAR | 0.525 | | 0.00174 | 243.25 |
| ST-SA56-1 | MH-SA56-1 | MHST-203 | | 5.031 | 73.24 | 73.19 | CIRCULAR | 0.525 | | 0.00994 | 280.07 |
| ST-SA56-2 | MH-SA56-2 | MHST-204 | | 4.866 | 73.24 | 73.19 | CIRCULAR | 0.45 | | 0.01028 | 189.98 |
| ST-SA56-3 | MH-SA56-3 | MHST-208 | | 8.906 | 73.8 | 73.44 | CIRCULAR | 0.375 | | 0.04046 | 232.17 |
| ST-UGS6B | CHAMBER-102 | MHST-170 | | 16.625 | 72.03 | 71.96 | CIRCULAR | 0.375 | | 0.00421 | 188.66 |
| ST-UGS-Z1 | CHAMBER-104B | MHST-145 | | 8.4 | 69.91 | 69.90 | CIRCULAR | 0.90 | | 0.00119 | 499.6 |
| ST-xx | MH-SAxx | MHST-107 | | 10.7 | 62.45 | 62.15 | CIRCULAR | 0.20 | | 0.02805 | 7.0 |
| WD-OLF_3 | Wales-OLF-N03 | Wales-OLF-N04 | Major_System | 81.2 | 68.20 | 66.75 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01786 | 33.0 |
| WD-OLF_4 | Wales-OLF-N04 | Wales-OLF-N05 | Major_System | 95.0 | 66.75 | 65.50 | IRREGULAR | 0.00 | P_Wales_Dr | 0.01316 | 31.1 |

# Junctions 1/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| 13 | | NO | 67.93 | 70.22 | 2.29 | 1.03 | 68.96 | 10/04/2022 08:21 AM |
| BI-SA1 | | NO | 63.50 | 70.48 | 6.98 | 2.13 | 65.63 | 10/04/2022 08:20 AM |
| BI-SA1-S | Major_System | NO | 70.15 | 70.30 | 0.15 | 0.07 | 70.22 | 10/04/2022 08:10 AM |
| BI-SA49-S | Major_System | NO | 75.35 | 75.51 | 0.16 | 0.05 | 75.40 | 10/04/2022 08:11 AM |
| Carling_OLF1 | | NO | 66.50 | 66.70 | 0.20 | 0.08 | 66.58 | 10/04/2022 08:11 AM |
| Carling_OLFN1 | | NO | 65.41 | 65.61 | 0.20 | 0.12 | 65.52 | 10/04/2022 08:11 AM |
| Carling_OLFN3 | | NO | 64.80 | 65.00 | 0.20 | 0.16 | 64.96 | 10/04/2022 08:13 AM |
| CB_54A | | NO | 79.65 | 79.95 | 0.30 | 0.05 | 79.70 | 10/04/2022 08:10 AM |
| CB_54B | | NO | 79.67 | 79.97 | 0.30 | 0.02 | 79.69 | 10/04/2022 08:10 AM |
| CB209 | | NO | 77.64 | 77.79 | 0.15 | 0.02 | 77.66 | 10/04/2022 08:10 AM |
| CB225 | | NO | 73.46 | 77.72 | 4.26 | 0.06 | 73.51 | 10/04/2022 08:10 AM |
| CB225-S | | NO | 77.71 | 77.86 | 0.15 | 0.02 | 77.73 | 10/04/2022 08:10 AM |
| CB26 | | NO | 75.96 | 76.11 | 0.15 | 0.02 | 75.98 | 10/04/2022 08:10 AM |
| CB68 | | NO | 72.63 | 72.79 | 0.16 | 0.06 | 72.69 | 10/04/2022 08:10 AM |
| CB91 | | NO | 75.14 | 75.44 | 0.30 | 0.03 | 75.17 | 10/04/2022 08:10 AM |
| CB94 | | NO | 75.03 | 75.20 | 0.17 | 0.08 | 75.11 | 10/04/2022 08:11 AM |
| CBMHST-101 | | NO | 73.63 | 76.41 | 2.78 | 0.55 | 74.18 | 10/04/2022 08:27 AM |
| CBMHST103 | | NO | 72.10 | 74.28 | 2.18 | 1.50 | 73.60 | 10/04/2022 08:34 AM |
| CBMHST-103-S | | NO | 74.26 | 74.56 | 0.30 | 0.07 | 74.33 | 10/04/2022 08:11 AM |
| CBMHST-104 | | NO | 74.14 | 76.59 | 2.45 | 0.23 | 74.37 | 10/04/2022 08:26 AM |
| CBMHST105 | | NO | 72.40 | 74.73 | 2.33 | 1.36 | 73.76 | 10/04/2022 08:31 AM |
| CBMHST-162 | | NO | 76.10 | 82.72 | 6.62 | 4.49 | 80.59 | 10/04/2022 08:10 AM |
| Chamber201S | | NO | 67.95 | 68.95 | 1.00 | 1.00 | 68.95 | 10/04/2022 08:20 AM |
| Chamber202-S | | NO | 70.84 | 73.59 | 2.75 | 0.91 | 71.75 | 10/04/2022 08:29 AM |
| CONNECT | | NO | 69.56 | 74.02 | 4.46 | 2.18 | 71.74 | 10/04/2022 08:29 AM |
| D-Chamber-203 | | NO | 71.42 | 75.05 | 3.63 | 1.32 | 72.74 | 10/04/2022 08:28 AM |
| D-Chamber-204 | | NO | 73.03 | 74.63 | 1.60 | 0.31 | 73.34 | 10/04/2022 08:26 AM |
| DICB3 | | NO | 64.00 | 66.43 | 2.43 | 0.00 | 64.00 | 10/04/2022 00:00 AM |
| DICB6 | | NO | 74.70 | 76.59 | 1.89 | 0.04 | 74.74 | 10/04/2022 08:11 AM |
| DICB9 | | NO | 74.28 | 74.48 | 0.20 | 0.10 | 74.38 | 10/04/2022 08:10 AM |
| D-MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 0.79 | 63.39 | 10/04/2022 08:20 AM |
| D-MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 1.29 | 69.09 | 10/04/2022 08:28 AM |
| D-MHST-145 | | NO | 69.90 | 74.34 | 4.44 | 2.23 | 72.13 | 10/04/2022 08:29 AM |
| D-MHST-146_1 | | NO | 70.17 | 75.39 | 5.22 | 2.31 | 72.48 | 10/04/2022 08:28 AM |
| D-MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 2.72 | 76.75 | 10/04/2022 08:15 AM |
| D-MHST-157B | | NO | 69.97 | 74.44 | 4.47 | 2.44 | 72.41 | 10/04/2022 08:29 AM |
| D-MHST-161-S | Major_System | NO | 81.44 | 81.60 | 0.16 | 0.03 | 81.47 | 10/04/2022 08:10 AM |
| D-MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 1.44 | 73.37 | 10/04/2022 08:29 AM |
| IN119607 | | NO | 63.00 | 65.62 | 2.62 | 0.39 | 63.39 | 10/04/2022 08:19 AM |
| IN119608 | | NO | 63.50 | 66.14 | 2.64 | 0.00 | 63.50 | 10/04/2022 00:00 AM |
| MH207 | | NO | 73.95 | 75.43 | 1.48 | 0.48 | 74.43 | 10/04/2022 08:09 AM |
| MH-SA1 | | NO | 69.45 | 70.55 | 1.10 | 0.15 | 69.60 | 10/04/2022 07:52 AM |
| MH-SA49 | | NO | 73.97 | 75.45 | 1.48 | 0.32 | 74.29 | 10/04/2022 08:10 AM |
| MH-SA50 | | NO | 74.07 | 75.83 | 1.76 | 0.22 | 74.29 | 10/04/2022 08:10 AM |

## Junctions 2/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MH-SA51-1 | | NO | 74.08 | 76.53 | 2.45 | 0.23 | 74.31 | 10/04/2022 08:10 AM |
| MH-SA51-2 | | NO | 74.84 | 76.50 | 1.66 | 0.16 | 75.00 | 10/04/2022 08:10 AM |
| MH-SA56-1 | | NO | 73.24 | 74.54 | 1.30 | 0.37 | 73.61 | 10/04/2022 08:10 AM |
| MH-SA56-2 | | NO | 73.24 | 74.54 | 1.30 | 0.37 | 73.61 | 10/04/2022 08:10 AM |
| MH-SA56-3 | | NO | 73.80 | 75.80 | 2.00 | 0.77 | 74.57 | 10/04/2022 08:10 AM |
| MH-SAxx | | NO | 62.00 | 64.50 | 2.50 | 0.50 | 62.50 | 10/04/2022 05:55 AM |
| MHST_156B | | NO | 70.09 | 74.24 | 4.15 | 2.33 | 72.42 | 10/04/2022 08:29 AM |
| MHST-100 | | NO | 62.60 | 65.42 | 2.82 | 2.98 | 65.58 | 10/04/2022 08:20 AM |
| MHST-100-S | Major_System | NO | 65.42 | 65.72 | 0.30 | 0.04 | 65.46 | 10/04/2022 08:10 AM |
| MHST-101 | | NO | 63.00 | 66.07 | 3.07 | 2.60 | 65.60 | 10/04/2022 08:20 AM |
| MHST-101-S | Major_System | NO | 66.07 | 66.23 | 0.16 | 0.05 | 66.12 | 10/04/2022 08:10 AM |
| MHST-102 | | NO | 63.00 | 66.28 | 3.28 | 2.60 | 65.60 | 10/04/2022 08:20 AM |
| MHST-102-S | Major_System | NO | 66.28 | 66.44 | 0.16 | 0.04 | 66.32 | 10/04/2022 08:10 AM |
| MHST-104 | | NO | 63.30 | 70.80 | 7.50 | 2.32 | 65.62 | 10/04/2022 08:20 AM |
| MHST-104-S | Major_System | NO | 70.80 | 70.95 | 0.15 | 0.05 | 70.85 | 10/04/2022 08:10 AM |
| MHST-105 | | NO | 63.60 | 69.13 | 5.53 | 2.60 | 66.20 | 10/04/2022 08:17 AM |
| MHST-105-S | Major_System | NO | 68.64 | 68.79 | 0.15 | 0.09 | 68.73 | 10/04/2022 08:11 AM |
| MHST-106 | | NO | 63.00 | 71.87 | 8.87 | 2.61 | 65.61 | 10/04/2022 08:20 AM |
| MHST-106-S | Major_System | NO | 71.87 | 72.03 | 0.16 | 0.05 | 71.92 | 10/04/2022 08:10 AM |
| MHST-107 | | NO | 62.00 | 64.32 | 2.32 | 0.14 | 62.14 | 10/04/2022 08:10 AM |
| MHST-120-S | Major_System | NO | 74.46 | 74.62 | 0.16 | 0.08 | 74.54 | 10/04/2022 08:10 AM |
| MHST-130 | | NO | 67.69 | 70.21 | 2.52 | 1.27 | 68.96 | 10/04/2022 08:21 AM |
| MHST-132 | | NO | 73.25 | 75.96 | 2.71 | 1.51 | 74.76 | 10/04/2022 08:10 AM |
| MHST-134 | | NO | 76.62 | 79.19 | 2.57 | 0.20 | 76.82 | 10/04/2022 08:10 AM |
| MHST-135 | | NO | 70.62 | 79.31 | 8.69 | 2.22 | 72.84 | 10/04/2022 08:28 AM |
| MHST-135-S | Major_System | NO | 79.68 | 79.83 | 0.15 | 0.03 | 79.71 | 10/04/2022 08:10 AM |
| MHST-136 | | NO | 78.65 | 81.94 | 3.29 | 0.17 | 78.82 | 10/04/2022 08:10 AM |
| MHST-136-S | | NO | 81.70 | 82.00 | 0.30 | 0.04 | 81.74 | 10/04/2022 08:10 AM |
| MHST-137 | | NO | 77.24 | 80.00 | 2.76 | 0.20 | 77.44 | 10/04/2022 08:10 AM |
| MHST-137-S | | NO | 79.79 | 80.09 | 0.30 | 0.05 | 79.84 | 10/04/2022 08:10 AM |
| MHST-138 | | NO | 75.17 | 78.56 | 3.39 | 0.20 | 75.37 | 10/04/2022 08:10 AM |
| MHST-141 | | NO | 71.42 | 75.17 | 3.75 | 1.49 | 72.91 | 10/04/2022 08:28 AM |
| MHST-141-S | Major_System | NO | 75.21 | 75.36 | 0.15 | 0.03 | 75.24 | 10/04/2022 08:10 AM |
| MHST-142 | | NO | 67.80 | 72.58 | 4.78 | 3.66 | 71.46 | 10/04/2022 08:29 AM |
| MHST-143 | | NO | 69.45 | 74.02 | 4.57 | 2.20 | 71.65 | 10/04/2022 08:29 AM |
| MHST-144 | | NO | 69.68 | 75.30 | 5.62 | 2.18 | 71.86 | 10/04/2022 08:29 AM |
| MHST-145 | | NO | 69.90 | 73.97 | 4.07 | 2.49 | 72.39 | 10/04/2022 08:29 AM |
| MHST-146 | | NO | 70.17 | 75.39 | 5.22 | 2.54 | 72.71 | 10/04/2022 08:28 AM |

## Junctions 3/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-146-S | Major_System | NO | 75.38 | 75.58 | 0.20 | 0.03 | 75.41 | 10/04/2022 08:11 AM |
| MHST-147 | | NO | 70.25 | 75.92 | 5.67 | 2.50 | 72.75 | 10/04/2022 08:28 AM |
| MHST-147-S | Major_System | NO | 76.00 | 76.20 | 0.20 | 0.05 | 76.05 | 10/04/2022 08:11 AM |
| MHST-148 | | NO | 70.45 | 80.13 | 9.68 | 2.38 | 72.83 | 10/04/2022 08:28 AM |
| MHST-148-S | Major_System | NO | 80.37 | 80.53 | 0.16 | 0.05 | 80.42 | 10/04/2022 08:10 AM |
| MHST-149 | | NO | 70.69 | 78.30 | 7.61 | 2.15 | 72.84 | 10/04/2022 08:28 AM |
| MHST-149-S | Major_System | NO | 77.93 | 78.08 | 0.15 | 0.04 | 77.97 | 10/04/2022 08:10 AM |
| MHST-150 | | NO | 70.76 | 77.32 | 6.56 | 2.08 | 72.84 | 10/04/2022 08:28 AM |
| MHST-150-S1 | Major_System | NO | 77.24 | 77.39 | 0.15 | 0.02 | 77.26 | 10/04/2022 08:10 AM |
| MHST-151 | | NO | 71.23 | 77.10 | 5.87 | 2.31 | 73.54 | 10/04/2022 08:14 AM |
| MHST-151-S | Major_System | NO | 77.12 | 77.27 | 0.15 | 0.03 | 77.15 | 10/04/2022 08:10 AM |
| MHST-153 | | NO | 72.86 | 77.00 | 4.14 | 1.46 | 74.32 | 10/04/2022 08:12 AM |
| MHST-153-S | TGCB102 | NO | 76.52 | 76.82 | 0.30 | 0.05 | 76.57 | 10/04/2022 08:10 AM |
| MHST-154 | | NO | 75.60 | 81.92 | 6.32 | 1.90 | 77.50 | 10/04/2022 08:10 AM |
| MHST-154A | | NO | 76.00 | 82.52 | 6.52 | 4.31 | 80.31 | 10/04/2022 08:10 AM |
| MHST-154B | | NO | 75.90 | 81.89 | 5.99 | 3.56 | 79.46 | 10/04/2022 08:10 AM |
| MHST-155 | | NO | 74.03 | 81.22 | 7.19 | 0.72 | 74.75 | 10/04/2022 08:15 AM |
| MHST-156 | | NO | 70.13 | 74.49 | 4.36 | 2.29 | 72.42 | 10/04/2022 08:29 AM |
| MHST-157 | | NO | 70.02 | 74.65 | 4.63 | 2.40 | 72.42 | 10/04/2022 08:29 AM |
| MHST-158 | | YES | 71.74 | 74.80 | 3.06 | 2.22 | 73.96 | 10/04/2022 08:14 AM |
| MHST-158-S | Major_System | NO | 74.58 | 74.88 | 0.30 | 0.04 | 74.62 | 10/04/2022 08:10 AM |
| MHST-159 | | NO | 69.38 | 74.96 | 5.58 | 2.19 | 71.57 | 10/04/2022 08:29 AM |
| MHST-160 | | NO | 71.27 | 76.79 | 5.52 | 1.86 | 73.13 | 10/04/2022 08:14 AM |
| MHST-161 | | NO | 78.96 | 81.88 | 2.92 | 0.09 | 79.05 | 10/04/2022 08:10 AM |
| MHST-170 | | NO | 71.93 | 74.51 | 2.58 | 1.47 | 73.40 | 10/04/2022 08:29 AM |
| MHST-200 | | NO | 70.10 | 74.81 | 4.71 | 2.34 | 72.44 | 10/04/2022 08:29 AM |
| MHST-201 | | NO | 69.96 | 74.74 | 4.78 | 2.46 | 72.42 | 10/04/2022 08:29 AM |
| MHST-203 | | NO | 73.11 | 78.83 | 5.72 | 0.48 | 73.59 | 10/04/2022 08:10 AM |
| MHST-204 | | NO | 73.11 | 78.79 | 5.68 | 0.49 | 73.60 | 10/04/2022 08:10 AM |
| MHST-205 | | NO | 72.94 | 78.20 | 5.26 | 0.64 | 73.58 | 10/04/2022 08:10 AM |
| MHST-206 | | NO | 72.91 | 75.77 | 2.86 | 0.57 | 73.48 | 10/04/2022 08:10 AM |
| MHST-208 | | NO | 73.41 | 77.80 | 4.39 | 1.00 | 74.41 | 10/04/2022 08:10 AM |
| MHST-209 | | NO | 73.35 | 75.76 | 2.41 | 0.71 | 74.06 | 10/04/2022 08:10 AM |
| MHST-211 | | NO | 68.31 | 70.38 | 2.07 | 0.87 | 69.18 | 10/04/2022 08:28 AM |
| MHST-212 | | NO | 67.95 | 70.22 | 2.27 | 1.00 | 68.95 | 10/04/2022 08:21 AM |
| MHST-213 | | NO | 68.54 | 70.24 | 1.70 | 0.65 | 69.19 | 10/04/2022 08:27 AM |

## Junctions 4/4

| Name | Tag | Inflows | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) |
|---|---|---|---|---|---|---|---|---|
| MHST-214 | | NO | 68.23 | 70.31 | 2.08 | 0.95 | 69.18 | 10/04/2022 08:28 AM |
| MHST-215 | | NO | 68.27 | 70.25 | 1.98 | 0.91 | 69.18 | 10/04/2022 08:28 AM |
| MHST-221 | | NO | 66.62 | 69.70 | 3.08 | 2.58 | 69.20 | 10/04/2022 08:13 AM |
| MHST62528 | | NO | 67.34 | 70.08 | 2.74 | 1.05 | 68.39 | 10/04/2022 08:20 AM |
| MHST-62534 | | NO | 76.90 | 82.80 | 5.90 | 4.06 | 80.96 | 10/04/2022 08:10 AM |
| MHST62545 | | NO | 66.53 | 69.90 | 3.37 | 0.83 | 67.36 | 10/04/2022 08:20 AM |
| MHST62547 | | NO | 64.00 | 71.80 | 7.80 | 2.26 | 66.26 | 10/04/2022 08:20 AM |
| MSHT-103 | | NO | 63.00 | 66.13 | 3.13 | 2.61 | 65.61 | 10/04/2022 08:20 AM |
| MSHT-103-S | Major_System | NO | 66.13 | 66.29 | 0.16 | 0.09 | 66.22 | 10/04/2022 08:11 AM |
| OGS1 | | NO | 61.00 | 63.82 | 2.82 | 0.42 | 61.42 | 10/04/2022 08:10 AM |
| OGS-3 | | NO | 67.62 | 70.34 | 2.72 | 1.01 | 68.63 | 10/04/2022 08:21 AM |
| POW_D1 | | NO | 78.70 | 79.30 | 0.60 | 0.22 | 78.92 | 10/04/2022 08:11 AM |
| Preston | | NO | 61.00 | 63.00 | 2.00 | 0.37 | 61.37 | 10/04/2022 08:14 AM |
| ST-60-S-B | | NO | 74.11 | 74.41 | 0.30 | 0.10 | 74.21 | 10/04/2022 08:10 AM |
| SW_42I | | NO | 75.31 | 75.51 | 0.20 | 0.00 | 75.31 | 10/04/2022 00:00 AM |
| SW_65D | | NO | 77.94 | 78.44 | 0.50 | 0.03 | 77.97 | 10/04/2022 08:11 AM |
| TD_A | | NO | 67.42 | 69.10 | 1.68 | 1.68 | 69.10 | 10/04/2022 08:10 AM |
| TD_B | | NO | 67.88 | 69.13 | 1.25 | 1.25 | 69.12 | 10/04/2022 08:12 AM |
| Wales-OLF-N03 | | NO | 68.20 | 68.40 | 0.20 | 0.05 | 68.25 | 10/04/2022 08:11 AM |
| Wales-OLF-N04 | | NO | 66.75 | 66.95 | 0.20 | 0.05 | 66.80 | 10/04/2022 08:13 AM |
| Wales-OLF-N05 | | NO | 65.50 | 65.70 | 0.20 | 0.07 | 65.57 | 10/04/2022 08:15 AM |

## Storage 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Depth (m) | Storage Curve | Curve Name | Avg. Depth (m) | Max. Depth (m) | Max. HGL (m) | Max. Volume (1000 m³) | Max. Percent Full (%) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CB130 | 69.90 | 70.10 | 0.20 | TABULAR | CB(600x600) | 0.01 | 0.07 | 69.97 | 0 | 34 | 0.0760 |
| CB65 | 72.16 | 73.70 | 1.54 | TABULAR | CB65 | 0.02 | 0.04 | 72.20 | 0 | 0 | 1.5700 |
| CB95 | 75.52 | 75.82 | 0.30 | TABULAR | CB95-ponding | 0.02 | 0.30 | 75.82 | 0.084 | 100 | 0.6210 |
| CHAMBER-102 | 72.03 | 74.24 | 2.21 | TABULAR | Chamber102 | 0.32 | 1.54 | 73.57 | 0.33 | 70 | 2.7210 |
| CHAMBER-103 | 74.08 | 76.78 | 2.70 | TABULAR | Chamber103 | 0.33 | 2.70 | 76.78 | 2.127 | 100 | 13.6620 |
| CHAMBER-104-A | 70.13 | 72.43 | 2.30 | TABULAR | Chamber104A | 0.34 | 2.30 | 72.43 | 1.31 | 100 | 19.5370 |
| CHAMBER-104B | 69.91 | 72.61 | 2.70 | TABULAR | Chamber104B | 0.48 | 2.49 | 72.40 | 1.572 | 92 | 22.8040 |
| Chamber201 | 67.95 | 69.19 | 1.24 | TABULAR | Chamber201 | 0.23 | 1.23 | 69.18 | 0.506 | 99 | 1.1700 |
| Chamber202 | 70.84 | 72.43 | 1.59 | TABULAR | Chamber202 | 0.25 | 1.50 | 72.34 | 0.588 | 94 | 1.7870 |
| Chamber-203 | 71.42 | 72.90 | 1.48 | TABULAR | Chamber203 | 0.22 | 1.48 | 72.90 | 0.27 | 100 | 0.64 |
| Chamber-204 | 73.03 | 74.36 | 1.33 | TABULAR | Chamber204 | 0.18 | 1.22 | 74.25 | 0.27 | 92 | 0.66 |
| DICB8 | 68.11 | 69.83 | 1.72 | TABULAR | swale | 0.11 | 1.51 | 69.62 | 0.11 | 52 | 2.96 |
| MHST-157-S | 73.80 | 74.23 | 0.43 | TABULAR | CB98-ponding | 0.03 | 0.26 | 74.06 | 0.01 | 26 | 1.53 |
| PS | 64.92 | 70.03 | 5.11 | CYLINDRI | * | 3.16 | 4.38 | 69.30 | 0.01 | 86 | 0.23 |
| S-14B | 61.65 | 63.30 | 1.65 | TABULAR | S-14B | 0.42 | 1.65 | 63.30 | 0.01 | 100 | 0.13 |
| S-15 | 62.10 | 63.90 | 1.80 | TABULAR | S-15 | 1.26 | 1.80 | 63.90 | 0.11 | 100 | 0.36 |
| S-19 | 64.00 | 66.00 | 2.00 | TABULAR | S-19 | 0.70 | 1.71 | 65.71 | 0.09 | 34 | 0.21 |
| S-21B | 63.54 | 65.70 | 2.16 | TABULAR | S-21B | 1.41 | 2.02 | 65.56 | 0.91 | 71 | 1.81 |
| S-26B | 67.11 | 69.51 | 2.40 | TABULAR | DICB2ponding | 0.71 | 2.40 | 69.51 | 0.19 | 100 | 0.65 |
| S-26D | 67.19 | 69.25 | 2.06 | TABULAR | DICB1 | 0.36 | 1.99 | 69.18 | 0.03 | 67 | 0.08 |
| S-3Store | 62.20 | 64.24 | 2.04 | TABULAR | S-3 | 1.45 | 2.04 | 64.24 | 0.08 | 100 | 0.39 |
| S-63 | 79.80 | 84.02 | 4.22 | TABULAR | S-63 | 0.88 | 4.22 | 84.02 | 0.27 | 100 | 0.92 |
| SA-1 | 69.50 | 72.50 | 3.00 | TABULAR | S-1 | 0.60 | 2.89 | 72.39 | 0.64 | 96 | 1.24 |
| SA-2 | 62.60 | 65.60 | 3.00 | TABULAR | S-2 | 1.53 | 2.36 | 64.96 | 0.71 | 79 | 0.87 |

# Outlets 1/1

| Name | Inlet Node | Outlet Node | Inlet Elev. (m) | Rating Curve | Curve Name | Control Rules | Max. \|Flow\| (L/s) | Contributing Imp. Area (ha) |
|---|---|---|---|---|---|---|---|---|
| 1 | DICB6 | CBMHST-101 | 74.70 | TABULAR/DEPTH | 2CB | NO | 35.39 | 0.01 |
| 13 | CB_54B | MH-SA56-2 | 79.67 | TABULAR/DEPTH | 3CB | NO | 15.38 | 0.22 |
| 14 | CB95 | CBMHST-104 | 75.52 | TABULAR/DEPTH | 3CB | NO | 150.00 | 0.37 |
| 18 | MHST-141-S | MHST-141 | 75.21 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 60.75 | 0.30 |
| 20 | CB65 | MHST-144 | 72.16 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 21.86 | 0.93 |
| 22 | CB225-S | CB225 | 77.71 | TABULAR/DEPTH | S19_SL2_5 | NO | 6.27 | 0.29 |
| 24 | CBMHST-103-S | CBMHST103 | 74.26 | TABULAR/DEPTH | S28_SL4_0.5 | NO | 18.53 | 1.00 |
| 26 | CB91 | MHST-141 | 75.14 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 30.88 | 0.17 |
| 31 | CB26 | Chamber202 | 75.96 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 13.56 | 0.29 |
| BI-SA1-IC | BI-SA1-S | BI-SA1 | 70.15 | TABULAR/DEPTH | 6@R-B@S=1.5% | NO | 118.48 | 0.37 |
| BI-SA49-IC | BI-SA49-S | D-MHST-146_1 | 75.35 | TABULAR/DEPTH | S19_SL2_1x4 | NO | 119.44 | 0.54 |
| CB101_103_105 | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S22_SL2_5x3 | NO | 22.83 | 0.28 |
| CB102_106_DIC | MHST-153-S | MHST-153 | 76.52 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 131.31 | 0.28 |
| CB130OUT | CB130 | MHST-130 | 69.90 | TABULAR/DEPTH | S19_SL2_1 | NO | 43.89 | 0.04 |
| CB40,66-68 | CB68 | CONNECT | 72.63 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 164.80 | 0.63 |
| CB42-43 | D-MHST-161-S | MHST-161 | 81.44 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 37.73 | 0.08 |
| CB44-45 | MHST-148-S | MHST-148 | 80.37 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 69.62 | 0.26 |
| CB46_57 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 65.13 | 0.34 |
| CB47-55 | MHST-147-S | MHST-147 | 76.00 | TABULAR/DEPTH | S22_SL2_5x8 | NO | 60.18 | 0.34 |
| CB56_58 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S22_SL2_1x2 | NO | 7.47 | 0.34 |
| CB61_104 | MHST-146-S | MHST-146 | 75.38 | TABULAR/DEPTH | S19_SL2_1x2 | NO | 37.74 | 0.34 |
| CB63,64 | MHST-120-S | CONNECT | 74.46 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 26.87 | 0.63 |
| CB69_75 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S22_SL2_5x2 | NO | 10.08 | 0.13 |
| CB74_76_77 | MHST-149-S | MHST-149 | 77.93 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 96.31 | 0.13 |
| CB79-81 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S19_SL2_5x5 | NO | 58.23 | 0.18 |
| CB82 | MHST-151-S | MHST-151 | 77.12 | TABULAR/DEPTH | DB_S22_SL2_5 | NO | 2.26 | 0.21 |
| CB83 | MHST-150-S1 | MHST-150 | 77.24 | TABULAR/DEPTH | S22_SL2_5 | NO | 1.95 | 0.18 |
| CB84-85_90 | MHST-136-S | MHST-136 | 81.70 | TABULAR/DEPTH | S19_SL2_5x4 | NO | 92.06 | 0.12 |
| CB88_96 | MHST-137-S | MHST-137 | 79.79 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 62.12 | 0.19 |
| DICB2 | S-26B | BI-SA1 | 67.11 | TABULAR/DEPTH | 100VHV-1 | NO | 15.98 | 0.08 |
| DICB9_OL | DICB9 | CBMHST103 | 74.28 | TABULAR/DEPTH | S19_SL2_5 | NO | 53.00 | 1.00 |
| MHST-100-IC | MHST-100-S | MHST-100 | 66.30 | TABULAR/DEPTH | 1@R-A@S=5.0% | NO | 0.00 | 1.02 |
| MHST-101-IC | MHST-101-S | MHST-101 | 66.07 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 37.66 | 1.02 |
| MHST-102-IC | MHST-102-S | MHST-102 | 66.28 | TABULAR/DEPTH | 4@R-A@S=5.0% | NO | 34.02 | 0.91 |
| MHST-104-IC | MHST-104-S | MHST-104 | 70.80 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 21.58 | 0.10 |
| MHST-105-IC | MHST-105-S | MHST-105 | 68.64 | TABULAR/DEPTH | 3@R-B@S=1.5% | NO | 113.49 | 0.40 |
| MHST-106-IC | MHST-106-S | MHST-106 | 71.87 | TABULAR/DEPTH | 2@R-E@S=5.0% | NO | 19.52 | 0.68 |
| MHST-135-IC | MHST-135-S | MHST-135 | 79.68 | TABULAR/DEPTH | S19_SL2_5x2 | NO | 40.36 | 0.03 |
| MHST-157-IC | MHST-157-S | MHST-157 | 73.80 | TABULAR/DEPTH | DICB_MTO_CHART_4.20 | NO | 326.03 | 0.89 |
| MHST-158-IC | MHST-158-S | MHST-158 | 74.58 | TABULAR/DEPTH | S19_SL2_5x8 | NO | 151.25 | 0.63 |
| MSHT-103-IC | MSHT-103-S | MSHT-103 | 66.13 | TABULAR/DEPTH | 7@R-A@S=5.0% | NO | 340.68 | 0.79 |
| O-1 | SA-1 | MH-SA1 | 69.50 | TABULAR/HEAD | O-1 | NO | 60.00 | 1.24 |
| O-15 | S-15 | MHST-107 | 62.10 | TABULAR/DEPTH | O-15 | NO | 7.86 | 0.01 |
| O-19 | S-19 | MHST-101 | 64.00 | TABULAR/DEPTH | 50VHV-1 | NO | 3.85 | 0.02 |
| O-2 | SA-2 | MH-SAxx | 62.60 | TABULAR/HEAD | O-2 | NO | 7.00 | 0.86 |
| O-21B | S-21B | IN119607 | 63.54 | TABULAR/DEPTH | 50VHV-1 | NO | 4.22 | 0.23 |
| O-26D | S-26D | MHST-105 | 67.19 | TABULAR/DEPTH | 50VHV-1 | NO | 4.19 | 0.00 |
| O-3 | S-3Store | OGS1 | 62.20 | TABULAR/HEAD | 125VHV-2 | NO | 26.69 | 0.11 |
| O-4 | S-14B | Preston | 62.15 | TABULAR/HEAD | 125VHV-2 | NO | 20.15 | 0.00 |
| O-63 | S-63 | MHST-154A | 78.20 | TABULAR/DEPTH | O-63 | NO | 101.08 | 0.59 |
| O-CB209 | CB209 | MHST-209 | 77.64 | TABULAR/DEPTH | S28_SL2_5x2 | NO | 2.83 | 0.23 |
| OL_CB_54A | CB_54A | MH-SA56-1 | 79.65 | TABULAR/DEPTH | 3CB | NO | 91.59 | 0.19 |
| WD-OLF_5 | Wales-OLF-N05 | Preston | 65.50 | TABULAR/DEPTH | 2@R-E@S=1.0% | NO | 28.25 | 0.40 |

# Orifices 1/1

| Name | Inlet Node | Outlet Node | Type | Cross-Section | Height (m) | Width (m) | Inlet Elev. (m) | Discharge Coeff. | Max. \|Flow\| (L/s) |
|---|---|---|---|---|---|---|---|---|---|
| ICD201 | Chamber201 | Chamber201S | | CIRCULAR | 0.35 | 0 | 67.95 | 0.62 | 153.01 |
| ICD204 | Chamber-204 | D-Chamber-204 | | CIRCULAR | 0.19 | 0 | 73.03 | 0.62 | 74.42 |
| ICD203 | Chamber-203 | D-Chamber-203 | | CIRCULAR | 0.225 | 0 | 71.42 | 0.62 | 90.66 |
| ICD202 | Chamber202 | Chamber202-S | | CIRCULAR | 0.245 | 0 | 70.84 | 0.62 | 128.85 |
| ICD-100-1 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.3 | 0 | 63.06 | 0.62 | 287.42 |
| ICD-100-2 | MHST-100 | D-MHST-100 | | CIRCULAR | 0.1 | 0 | 63.85 | 0.62 | 27.96 |
| ICD111 | DICB8 | OGS-3 | | CIRCULAR | 0.4 | 0 | 68.11 | 0.62 | 362.33 |
| ICD-142 | MHST-142 | D-MHST-142 | | CIRCULAR | 0.7 | 0 | 69.32 | 0.62 | 1414.6 |
| OR-145 | MHST-145 | D-MHST-145 | | RECT_CLO | 0.75 | 0.75 | 69.9 | 0.62 | 1213.03 |
| OR-155 | D-MHST-155 | MHST-155 | | CIRCULAR | 0.675 | 0 | 74.06 | 0.62 | 1396.62 |
| OR-170 | MHST-170 | D-MHST-170 | | CIRCULAR | 0.1 | 0 | 71.93 | 0.62 | 21.34 |

# Weirs 1/1

| Name | Inlet Node | Outlet Node | Type | Height (m) | Length (m) | Inlet Elev. (m) | Max. \|Flow\| (L/s) | Time Max. Flow (M/D/Y) | Max/Full Depth | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| ST-146_1 | MHST-146 | D-MHST-146_1 | SIDEFLOW | 1.4 | 1.5 | 70.17 | 2943.07 | 10/04/2022 08:16 AM | 1 | 19.249 |
| Weir-142 | MHST-142 | D-MHST-142 | TRANSVERSE | 0.5 | 1.4 | 70.7 | 1167.2 | 10/04/2022 08:29 AM | 1 | 24.988 |
| Weir-145 | MHST-145 | D-MHST-145 | TRANSVERSE | 1 | 2 | 71.64 | 1621.58 | 10/04/2022 08:29 AM | 0.75 | 22.804 |
| Weir-155 | D-MHST-15 | MHST-155 | TRANSVERSE | 1 | 1 | 76.45 | 276.5 | 10/04/2022 08:15 AM | 0.3 | 13.662 |
| Weir-170 | MHST-170 | D-MHST-170 | TRANSVERSE | 0.3 | 1.5 | 73 | 186.58 | 10/04/2022 08:39 AM | 1 | 2.721 |

## Outfalls 1/1

| Name | Invert Elev. (m) | Rim Elev. (m) | Type | Max. Depth (m) | Max. HGL (m) | Time Max. HGL (M/D/Y) | Max. Flow (L/s) | Total Flow (ML) | Contributing Area (ha) |
|---|---|---|---|---|---|---|---|---|---|
| Carling_OLF | 64.6 | 64.8 | FREE | 0.14 | 64.74 | 10/04/2022 08:13 AM | 331.29 | 0.393 | 2.187 |
| Dows-Lake | 63.745 | 66.5 | FREE | 0.96 | 64.71 | 10/04/2022 08:21 AM | 3090.87 | 23.571 | 29.625 |
| LRT-Corridor | 56 | 57 | FREE | 0 | 56 | 10/04/2022 00:00 AM | 32.62 | 0.028 | 0.059 |
| Nepean-Bay-Trunk | 62.8 | 65.21 | NORMAL | 0 | 62.8 | 10/04/2022 00:00 AM | 320.12 | 3.773 | 6.163 |
| Preston_Street | 60.9 | 63.76 | NORMAL | 0.3 | 61.2 | 10/04/2022 08:09 AM | 125.5 | 2.718 | 2.435 |

# APPENDIX J: WATER BALANCE CALCULATIONS

| Project: | Ottawa Hospital | No.: | CA-WSP-P22-11020-51 | |
|---|---|---|---|---|
| By: | Fiona Allen | Date: | 2025-09-12 | Page: |
| Checked: | Alyssa Mohino-Barrie | Checked: | 2025-09-12 | 2 |

Subject: **Stormwater Management - Water Balance Analysis - Post-Development-Dows Lake Outlet**

| Catchment ID | Drainage area (ha) | LID Reuse Volume (m3) | Irrigation Reuse Volume (m3) |
|---|---|---|---|
| 40-External | 1.19 | | |
| 41-External | 1.52 | | |
| 42 A-C | 0.39 | | |
| 42 D-G | 0.37 | | |
| 42H | 0.20 | | |
| 42I | 0.15 | 3 | |
| 66A-B | 0.14 | | |
| 43-CUP | 0.84 | | |
| 45&63-CUP | 0.99 | | |
| 44-External | 12.75 | | |
| 45A | 0.19 | | |
| 47 | 0.04 | 32 | |
| 47A | 0.54 | 152 | |
| 47BCG | 0.37 | 96 | |
| 47D-F&47H-I | 0.67 | | |
| 53 | 0.15 | | |
| 55A-D | 0.10 | | |
| 59A-F | 0.68 | | |
| 59G | 0.08 | | |
| 60&60A-B | 1.15 | 22 | |
| 65D | 0.11 | 12 | |
| 67 | 0.62 | 142 | |
| 62,62A&62C-External | 2.02 | | |
| 65A-C,E-G&62B | 0.50 | 34 | |
| 54A&B | 0.54 | | |
| S-7-9, S11-AB | 0.81 | | 284 |
| S-10&11 | 0.70 | | 216 |
| S-5,6&12 | 0.74 | | 149 |
| S3&S4 | 0.72 | | 191 |
| **Total to Dow's Lake** | **29.25** | **493.92** | **840** |

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 5,581 | 0.20 | 0.25 | 0% |
| Forest | 800 | 0.40 | 0.50 | 40% |
| At-Grade Impervious | 5,476 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 11,857 | 0.54 | 0.61 | 48.9% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 5,581 | 0.025 | 139.51 | 139.51 | 0.00 |
| Forest | 800 | 0.025 | 20.00 | 20.00 | 0.00 |
| At-Grade Impervious | 5,476 | 0.000 | 0.00 | 136.90 | 136.90 |
| **Total Site Area:** | **11,857** | - | **159.51** | **296.42** | **136.90** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 136.9 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 12,157 | 0.20 | 0.25 | 0% |
| Forest | 800 | 0.40 | 0.50 | 40% |
| At-Grade Impervious | 2,224 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 15,181 | 0.31 | 0.37 | 16.8% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 12,157 | 0.025 | 303.91 | 303.91 | 0.00 |
| Forest | 800 | 0.025 | 20.00 | 20.00 | 0.00 |
| At-Grade Impervious | 2,224 | 0.000 | 0.00 | 55.61 | 55.61 |
| **Total Site Area:** | **15,181** | - | **323.91** | **379.53** | **55.61** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 55.6 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 2,626 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 1,274 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 3,900 | 0.43 | 0.50 | 32.7% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 2,626 | 0.025 | 65.64 | 65.64 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 1,274 | 0.000 | 0.00 | 31.86 | 31.86 |
| **Total Site Area:** | **3,900** | - | **65.64** | **97.50** | **31.86** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 31.9 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 340 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 3,356 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 3,696 | 0.84 | 0.93 | 90.8% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 340 | 0.025 | 8.50 | 8.50 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 3,356 | 0.000 | 0.00 | 83.89 | 83.89 |
| **Total Site Area:** | **3,696** | - | **8.50** | **92.39** | **83.89** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 83.9 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 248 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 1,725 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 1,973 | 0.81 | 0.91 | 87.4% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 248 | 0.025 | 6.20 | 6.20 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 1,725 | 0.000 | 0.00 | 43.13 | 43.13 |
| **Total Site Area:** | **1,973** | - | **6.20** | **49.33** | **43.13** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 43.1 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 432 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 1,032 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 1,464 | 0.69 | 0.78 | 70.5% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 432 | 0.025 | 10.80 | 10.80 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 1,032 | 0.000 | 0.00 | 25.80 | 25.80 |
| **Total Site Area:** | **1,464** | - | **10.80** | **36.61** | **25.80** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 25.8 $m^3$

The bioswale is proposed to treat stormwater from parking lots adjacent to it and retain water through infiltration

**Bioswale Facility 1**

***1. Capture capacity of stormwater***

**Tributary Catchment:**

| | | |
|---|---|---|
| Drainage area= | 1,464 | $m^2$ |
| Pervious area= | 432 | $m^2$ |
| Impervious area= | 1,032 | $m^2$ |
| Runoff coefficient= | 0.69 | |
| 25mm WB volume= | 25.80 | $m^3$ |

| | | |
|---|---|---|
| Base Area (A) of Planter | 21.5 | $m^2$ |
| Length of Swale | 21.5 | m |
| Gravel layer depth | 0.30 | m |
| Porosity of Gravel layer | 40% | |
| Storage in voids of gravel layer | 2.6 | $m^3$ |
| Total depth of system | 0.30 | m |
| **Total Storage** | **3** | **$m^3$** |

Therefore the bioretention facility has sufficient capacity to store and treat the required quantity of runoff.

***2. Drawdown Time***

Solve using MOE 2003 SWM Planning and Design Manual equation 4.2:

$$d = \frac{PT}{1,000}$$

| | | | | | |
|---|---|---|---|---|---|
| Assumed Percolation Rate of Native Soil (P) | 18.5 | mm/hr | Water depth in gravel layer | 0.30 | m |
| Drawdown Time (T) | 48 | hours | Percolation Rate of native soil(P) | 18.5 | mm/hr |
| Max. Allowable Depth (d) = | 0.89 | m | Drawdown Time | 16.2 | hr |

Therefore the bioretention facility is capable of infiltrating water stored in gravel layer within 48 hours.

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 397 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 1,045 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 1,442 | 0.71 | 0.79 | 72.5% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 397 | 0.025 | 9.92 | 9.92 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 1,045 | 0.000 | 0.00 | 26.13 | 26.13 |
| **Total Site Area:** | **1,442** | - | **9.92** | **36.05** | **26.13** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 26.1 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 0 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 8,360 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 8,360 | 0.90 | 1.00 | 100.0% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 0 | 0.025 | 0.00 | 0.00 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 8,360 | 0.000 | 0.00 | 209.00 | 209.00 |
| **Total Site Area:** | **8,360** | - | **0.00** | **209.00** | **209.00** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 209.0 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 3,531 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 6,361 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 9,892 | 0.65 | 0.73 | 64.3% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 3,531 | 0.025 | 88.28 | 88.28 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 6,361 | 0.000 | 0.00 | 159.03 | 159.03 |
| **Total Site Area:** | **9,892** | **-** | **88.28** | **247.31** | **159.03** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 159.0 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 76,264 | 0.20 | 0.25 | 0% |
| Forest | 10,500 | 0.40 | 0.50 | 40% |
| At-Grade Impervious | 40,686 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 127,450 | 0.44 | 0.51 | 35.2% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 76,264 | 0.025 | 1,906.61 | 1,906.61 | 0.00 |
| Forest | 10,500 | 0.025 | 262.50 | 262.50 | 0.00 |
| At-Grade Impervious | 40,686 | 0.000 | 0.00 | 1,017.14 | 1,017.14 |
| **Total Site Area:** | **127,450** | - | **2,169.11** | **3,186.25** | **1,017.14** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 1017.1 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 1,735 | 0.20 | 0.25 | 0% |
| Forest | 0 | 0.40 | 0.50 | 40% |
| At-Grade Impervious | 163 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 1,898 | 0.26 | 0.31 | 8.6% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 1,735 | 0.025 | 43.37 | 43.37 | 0.00 |
| Forest | 0 | 0.025 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 163 | 0.000 | 0.00 | 4.07 | 4.07 |
| **Total Site Area:** | **1,898** | - | **43.37** | **47.44** | **4.07** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 4.1 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 35 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 340 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 376 | 0.83 | 0.93 | 90.6% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 35 | 0.025 | 0.88 | 0.88 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 340 | 0.000 | 0.00 | 8.51 | 8.51 |
| **Total Site Area:** | **376** | - | **0.88** | **9.39** | **8.51** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 8.5 $m^3$

The bioswale is proposed to treat stormwater from parking lots adjacent to it and retain water through infiltration

**Bioswale Facility 47**

***1. Capture capacity of stormwater***

**Tributary Catchment:**

| | | |
|---|---|---|
| Drainage area= | 376 | $m^2$ |
| Pervious area= | 35 | $m^2$ |
| Impervious area= | 340 | $m^2$ |
| Runoff coefficient= | 0.83 | |
| 25 mm WB volume= | 8.51 | $m^3$ |

**Bioretention Capacity:**

| | | |
|---|---|---|
| Base Area (A) of Planter | 46.8 | $m^2$ |
| Filter Media Depth | 1.20 | m |
| Porosity of Filter Media | 35% | |
| Storage in voids of filter media | 19.7 | $m^3$ |
| Ponding Depth | 0.16 | m |
| Surface Storage | 7.5 | $m^3$ |
| Gravel layer depth | 0.26 | m |
| Porosity of Gravel layer | 40% | |
| Storage in voids of gravel layer | 4.9 | $m^3$ |
| Total depth of system | 1.46 | m |
| **Total Storage** | **32** | **$m^3$** |

Therefore the bioretention facility has sufficient capacity to store and treat the required quantity of runoff.

***2. Drawdown Time***

Solve using MOE 2003 SWM Planning and Design Manual equation 4.2:

$$d = \frac{PT}{1{,}000}$$

| | | | | | |
|---|---|---|---|---|---|
| Assumed Percolation Rate of Native Soil (P) | 5.4 | mm/hr | Water depth in gravel layer | 0.26 | m |
| Drawdown Time (T) | 48 | hours | Percolation Rate of native soil(P) | 5.4 | mm/hr |
| Max. Allowable Depth (d) = | 0.26 | m | Drawdown Time | 48.1 | hr |

Therefore the bioretention facility is capable of infiltrating water stored in gravel layer within 48 hours.

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 1,881 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 3,500 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 5,381 | 0.66 | 0.74 | 65.0% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 1,881 | 0.025 | 47.03 | 47.03 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 3,500 | 0.000 | 0.00 | 87.49 | 87.49 |
| **Total Site Area:** | **5,381** | - | **47.03** | **134.53** | **87.49** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 87.5 $m^3$

**Subject:** **Assessment of Bioretention Facility - Catchment 47A**

The bioswale is proposed to treat stormwater from parking lots adjacent to it and retain water through infiltration

**Bioswale Facility 47A**

***1. Capture capacity of stormwater***

**Tributary Catchment:**

| | | |
|---|---|---|
| Drainage area= | 5,381 | $m^2$ |
| Pervious area= | 1,881 | $m^2$ |
| Impervious area= | 3,500 | $m^2$ |
| Runoff coefficient= | 0.66 | |
| 25 mm WB volume= | 87.49 | $m^3$ |

**Bioretention Capacity:**

| | | |
|---|---|---|
| Base Area (A) of Planter | 279.8 | $m^2$ |
| Filter Media Depth | 1.20 | m |
| Porosity of Filter Media | 35% | |
| Storage in voids of filter media | 117.5 | $m^3$ |
| Ponding Depth | 0.02 | m |
| Surface Storage | 5.6 | $m^3$ |
| Gravel layer depth | 0.26 | m |
| Porosity of Gravel layer | 40% | |
| Storage in voids of gravel layer | 29.1 | $m^3$ |
| Total depth of system | 1.46 | m |
| **Total Storage** | **152** | **$m^3$** |

Therefore the bioretention facility has sufficient capacity to store and treat the required quantity of runoff.

***2. Drawdown Time***

Solve using MOE 2003 SWM Planning and Design Manual equation 4.2:

$$d = \frac{PT}{1,000}$$

| | | | | | |
|---|---|---|---|---|---|
| Assumed Percolation Rate of Native Soil (P) | 5.4 | mm/hr | Water depth in gravel layer | 0.26 | m |
| Drawdown Time (T) | 48 | hours | Percolation Rate of native soil(P) | 5.4 | mm/hr |
| Max. Allowable Depth (d) = | 0.26 | m | Drawdown Time | 48.1 | hr |

Therefore the bioretention facility is capable of infiltrating water stored in gravel layer within 48 hours.

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 875 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 2,824 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 3,700 | 0.73 | 0.82 | 76.3% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 875 | 0.025 | 21.88 | 21.88 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 2,824 | 0.000 | 0.00 | 70.61 | 70.61 |
| **Total Site Area:** | **3,700** | - | **21.88** | **92.49** | **70.61** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 70.6 $m^3$

**Subject:** **Assessment of Bioretention Facility - Catchment 47 B, C, G**

The bioswale is proposed to treat stormwater from parking lots adjacent to it and retain water through infiltration

**Bioswale Facility 47 B, C, G**

***1. Capture capacity of stormwater***

**Tributary Catchment:**

| | | |
|---|---|---|
| Drainage area= | 3,700 | $m^2$ |
| Pervious area= | 875 | $m^2$ |
| Impervious area= | 2,824 | $m^2$ |
| Runoff coefficient= | 0.73 | |
| 25 mm WB volume= | 70.61 | $m^3$ |

**Bioretention Capacity:**

| | | |
|---|---|---|
| Base Area (A) of Planter | 183.6 | $m^2$ |
| Filter Media Depth | 1.20 | m |
| Porosity of Filter Media | 35% | |
| Storage in voids of filter media | 77.1 | $m^3$ |
| Ponding Depth | 0 | m |
| Surface Storage | 0.0 | $m^3$ |
| Gravel layer depth | 0.26 | m |
| Porosity of Gravel layer | 40% | |
| Storage in voids of gravel layer | 19.1 | $m^3$ |
| Total depth of system | 1.46 | m |
| **Total Storage** | **96** | **$m^3$** |

Therefore the bioretention facility has sufficient capacity to store and treat the required quantity of runoff.

***2. Drawdown Time***

Solve using MOE 2003 SWM Planning and Design Manual equation 4.2:

$$d = \frac{PT}{1{,}000}$$

| | | | | | |
|---|---|---|---|---|---|
| Assumed Percolation Rate of Native Soil (P) | 5.4 | mm/hr | Water depth in gravel layer | 0.26 | m |
| Drawdown Time (T) | 48 | hours | Percolation Rate of native soil(P) | 5.4 | mm/hr |
| Max. Allowable Depth (d) = | 0.26 | m | Drawdown Time | 48.1 | hr |

Therefore the bioretention facility is capable of infiltrating water stored in gravel layer within 48 hours.

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 3,760 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 2,977 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 6,738 | 0.51 | 0.58 | 44.2% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 3,760 | 0.025 | 94.01 | 94.01 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 2,977 | 0.000 | 0.00 | 74.43 | 74.43 |
| **Total Site Area:** | **6,738** | - | **94.01** | **168.44** | **74.43** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 74.4 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 582 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 930 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 1,513 | 0.63 | 0.71 | 61.5% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 582 | 0.025 | 14.56 | 14.56 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 930 | 0.000 | 0.00 | 23.26 | 23.26 |
| **Total Site Area:** | **1,513** | - | **14.56** | **37.81** | **23.26** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 23.3 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 100 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 916 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 1,016 | 0.83 | 0.93 | 90.1% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 100 | 0.025 | 2.51 | 2.51 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 916 | 0.000 | 0.00 | 22.89 | 22.89 |
| **Total Site Area:** | **1,016** | - | **2.51** | **25.40** | **22.89** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 22.9 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 596 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 6,185 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 6,781 | 0.84 | 0.93 | 91.2% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 596 | 0.025 | 14.90 | 14.90 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 6,185 | 0.000 | 0.00 | 154.63 | 154.63 |
| **Total Site Area:** | **6,781** | - | **14.90** | **169.53** | **154.63** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 154.6 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 356 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 403 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 759 | 0.57 | 0.65 | 53.1% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 356 | 0.025 | 8.91 | 8.91 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 403 | 0.000 | 0.00 | 10.07 | 10.07 |
| **Total Site Area:** | **759** | - | **8.91** | **18.98** | **10.07** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 10.1 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff C | Impervious |
|---|---|---|---|
| Impervious Roof Area | | 0.90 | 100% |
| Green Roof | | 0.45 | 0% |
| Soft Landscaping | 10,017 | 0.20 | 0% |
| Permeable pavement | | 0.45 | 50% |
| At-Grade Impervious | 1,454 | 0.90 | 100% |
| **Total Site Area:** | 11,471 | 0.29 | 12.7% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 10,017 | 0.025 | 250.42 | 250.42 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 1,454 | 0.000 | 0.00 | 36.36 | 36.36 |
| **Total Site Area:** | **11,471** | - | **250.42** | **286.78** | **36.36** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 36.4 $m^3$

**Subject:** **Assessment of Bioretention Facility-Cacthment 60A**

The bioswale is proposed to treat stormwater from parking lots adjacent to it and retain water through infiltration

**Bioswale Facility 1**

***1. Capture capacity of stormwater***

**Tributary Catchment:**

| | | |
|---|---|---|
| Drainage area= | 717 | $m^2$ |
| Pervious area= | 146 | $m^2$ |
| Impervious area= | 571 | $m^2$ |
| Runoff coefficient= | 0.76 | |
| 25mm WB volume= | 14.28 | $m^3$ |

**Bioretention Capacity:**

| | | | |
|---|---|---|---|
| Base Area (A) of Planter | 35.6 | $m^2$ | |
| Filter Media Depth | 0.60 | m | |
| Porosity of Filter Media | 35% | | |
| Storage in voids of filter media | 7.5 | $m^3$ | |
| Ponding Depth | 0.6 | m | |
| Surface Storage | 21.4 | $m^3$ | |
| Gravel layer depth | 0.45 | m | |
| Porosity of Gravel layer | 40% | | |
| Storage in voids of gravel layer | 6.4 | $m^3$ | |
| Total depth of system | 1.05 | m | *Depth to groundwater table from top of bank: 1.9 mbgs* |
| **Total Storage** | **35** | **$m^3$** | |

Therefore the bioretention facility has sufficient capacity to store and treat the required quantity of runoff.

***2. Drawdown Time***

Solve using MOE 2003 SWM Planning and Design Manual equation 4.2:

$$d = \frac{PT}{1{,}000}$$

| | | | | | |
|---|---|---|---|---|---|
| Assumed Percolation Rate of Native Soil (P) | 5.4 | mm/hr | Water depth in gravel layer | 0.45 | m |
| Drawdown Time (T) | 48 | hours | Percolation Rate of native soil(P) | 5.4 | mm/hr |
| Max. Allowable Depth (d) = | 0.26 | m | Drawdown Time | 83.3 | hr |

Therefore the bioretention facility is capable of infiltrating water stored in gravel layer within 48 hours.

The bioswale is proposed to treat stormwater from parking lots adjacent to it and retain water through infiltration

**Bioswale Facility 1**

***1. Capture capacity of stormwater***

**Tributary Catchment:**

| | | |
|---|---|---|
| Drainage area= | 10,754 | $m^2$ |
| Pervious area= | 9,870 | $m^2$ |
| Impervious area= | 883 | $m^2$ |
| Runoff coefficient= | 0.26 | |
| 25mm WB volume= | 22.08 | $m^3$ |

| | | |
|---|---|---|
| Base Area (A) of Swale | 186.1 | $m^2$ |
| Length of Swale | 186.1 | m |
| Gravel layer depth | 0.30 | m |
| Porosity of Gravel layer | 40% | |
| Storage in voids of gravel layer | 22.3 | $m^3$ |
| Total depth of system | 0.30 | m |
| **Total Storage** | **22** | **$m^3$** |

Therefore the bioretention facility has sufficient capacity to store and treat the required quantity of runoff.

***2. Drawdown Time***

Solve using MOE 2003 SWM Planning and Design Manual equation 4.2:

$$d = \frac{PT}{1{,}000}$$

| | | | | | |
|---|---|---|---|---|---|
| Assumed Percolation Rate of Native Soil (P) | 5.4 | mm/hr | Water depth in gravel layer | 0.30 | m |
| Drawdown Time (T) | 48 | hours | Percolation Rate of native soil(P) | 5.4 | mm/hr |
| Max. Allowable Depth (d) = | 0.26 | m | Drawdown Time | 55.6 | hr |

Therefore the bioretention facility is capable of infiltrating water stored in gravel layer within 48 hours.

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 1,138 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 0 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 1,138 | 0.20 | 0.25 | 0.0% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 1,138 | 0.025 | 28.45 | 28.45 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| **Total Site Area:** | **1,138** | **-** | **28.45** | **28.45** | **0.00** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 0.0 $m^3$

**Subject:** **Assessment of Bioretention Facility-Catchment 65 D**

The bioswale is proposed to treat stormwater from parking lots adjacent to it and retain water through infiltration

**Bioswale Facility 65D**

***1. Capture capacity of stormwater***

**Tributary Catchment:**

| | | |
|---|---|---|
| Drainage area= | 1,138 | $m^2$ |
| Pervious area= | 1,138 | $m^2$ |
| Impervious area= | - | $m^2$ |
| Runoff coefficient= | 0.20 | |
| 25mm WB volume= | 0.00 | $m^3$ |

| | | | |
|---|---|---|---|
| Base Area (A) of Planter | 103.5 | $m^2$ | |
| Length of Swale | 103.5 | m | |
| Gravel layer depth | 0.30 | m | |
| Porosity of Gravel layer | 40% | | |
| Storage in voids of gravel layer | 12.4 | $m^3$ | |
| Total depth of system | 0.30 | m | *Depth to groundwater table from top of bank: 2.1 mbgs* |
| **Total Storage** | **12** | **$m^3$** | |

Therefore the bioretention facility has sufficient capacity to store and treat the required quantity of runoff.

***2. Drawdown Time***

Solve using MOE 2003 SWM Planning and Design Manual equation 4.2:

$$d = \frac{PT}{1{,}000}$$

| | | | | | |
|---|---|---|---|---|---|
| Assumed Percolation Rate of Native Soil (P) | 18.5 | mm/hr | Water depth in gravel layer | 0.30 | m |
| Drawdown Time (T) | 48 | hours | Percolation Rate of native soil(P) | 18.5 | mm/hr |
| Max. Allowable Depth (d) = | 0.89 | m | Drawdown Time | 16.2 | hr |

Therefore the bioretention facility is capable of infiltrating water stored in gravel layer within 48 hours.

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 2,504 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 3,718 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 6,221 | 0.62 | 0.70 | 59.8% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 2,504 | 0.025 | 62.59 | 62.59 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 3,718 | 0.000 | 0.00 | 92.94 | 92.94 |
| **Total Site Area:** | **6,221** | - | **62.59** | **155.53** | **92.94** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 92.9 $m^3$

**Subject:** **Assessment of Bioretention Facility - Catchment 67**

The bioswale is proposed to treat stormwater from parking lots adjacent to it and retain water through infiltration

**Bioswale Facility 67**

***1. Capture capacity of stormwater***

**Tributary Catchment:**

| | | |
|---|---|---|
| Drainage area= | 6,221 | $m^2$ |
| Pervious area= | 2,504 | $m^2$ |
| Impervious area= | 3,718 | $m^2$ |
| Runoff coefficient= | 0.62 | |
| 25mm WB volume= | 92.94 | $m^3$ |

**Bioretention Capacity:**

| | | | |
|---|---|---|---|
| Base Area (A) of Planter | 236.7 | $m^2$ | |
| Filter Media Depth | 1.20 | m | |
| Porosity of Filter Media | 35% | | |
| Storage in voids of filter media | 99.4 | $m^3$ | |
| Ponding Depth | 0 | m | |
| Surface Storage | 0.0 | $m^3$ | |
| Gravel layer depth | 0.45 | m | |
| Porosity of Gravel layer | 40% | | |
| Storage in voids of gravel layer | 42.6 | $m^3$ | |
| Total depth of system | 1.65 | m | *Depth to groundwater table from top of bank: 1.9 mbgs* |
| **Total Storage** | **142** | **$m^3$** | |

Therefore the bioretention facility has sufficient capacity to store and treat the required quantity of runoff.

***2. Drawdown Time***

Solve using MOE 2003 SWM Planning and Design Manual equation 4.2:

$$d = \frac{PT}{1{,}000}$$

| | | | | | |
|---|---|---|---|---|---|
| Assumed Percolation Rate of Native Soil (P) | 18.5 | mm/hr | Water depth in gravel layer | 0.45 | m |
| Drawdown Time (T) | 48 | hours | Percolation Rate of native soil(P) | 18.5 | mm/hr |
| Max. Allowable Depth (d) = | 0.89 | m | Drawdown Time | 24.3 | hr |

Therefore the bioretention facility is capable of infiltrating water stored in gravel layer within 48 hours.

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 11,378 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 62.00 | 50% |
| At-Grade Impervious | 8,804 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 20,182 | 0.51 | 0.58 | 43.6% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 11,378 | 0.025 | 284.44 | 284.44 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 8,804 | 0.000 | 0.00 | 220.11 | 220.11 |
| **Total Site Area:** | **20,182** | **-** | **284.44** | **504.55** | **220.11** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 220.1 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 2,273 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 2,137 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 4,411 | 0.54 | 0.61 | 48.5% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 2,273 | 0.025 | 56.84 | 56.84 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 2,137 | 0.000 | 0.00 | 53.44 | 53.44 |
| **Total Site Area:** | **4,411** | - | **56.84** | **110.27** | **53.44** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 53.4 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 620 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 62.00 | 50% |
| At-Grade Impervious | 0 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 620 | 0.20 | 0.25 | 0.0% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 620 | 0.025 | 15.50 | 15.50 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| **Total Site Area:** | **620** | **-** | **15.50** | **15.50** | **0.00** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 0.0 $m^3$

**Subject:** **Assessment of Bioretention Facility -Catchments 65 A-C, E-G & 62B**

The bioswale is proposed to treat stormwater from parking lots adjacent to it and retain water through infiltration

**Bioswale Facility 1**

***1. Capture capacity of stormwater***

**Tributary Catchment:**

| | | |
|---|---|---|
| Drainage area= | 5,031 | $m^2$ |
| Pervious area= | 2,893 | $m^2$ |
| Impervious area= | 2,137 | $m^2$ |
| Runoff coefficient= | 0.50 | |
| 25mm WB volume= | 53.44 | $m^3$ |

| | | | |
|---|---|---|---|
| Base Area (A) of Planter | 243.6 | $m^2$ | |
| Length of Swale | 194.9 | m | |
| Gravel layer depth | 0.35 | m | |
| Porosity of Gravel layer | 40% | | |
| Storage in voids of gravel layer | 34.1 | $m^3$ | |
| Total depth of system | 0.35 | m | *Depth to groundwater table from top of bank: 1.2 mbgs* |
| **Total Storage** | **34** | **$m^3$** | |

***2. Drawdown Time***

Solve using MOE 2003 SWM Planning and Design Manual equation 4.2:

$$d = \frac{PT}{1,000}$$

| | | | | | |
|---|---|---|---|---|---|
| Assumed Percolation Rate of Native Soil (P) | 5.4 | mm/hr | Water depth in gravel layer | 0.35 | m |
| Drawdown Time (T) | 48 | hours | Percolation Rate of native soil(P) | 5.4 | mm/hr |
| Max. Allowable Depth (d) = | 0.26 | m | Drawdown Time | 64.8 | hr |

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | | 0.90 | 1.00 | 100% |
| Green Roof | | 0.45 | 0.56 | 50% |
| Soft Landscaping | 1,351 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 4,046 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 5,397 | 0.72 | 0.81 | 75.0% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| Green Roof | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| Soft Landscaping | 1,351 | 0.025 | 33.77 | 33.77 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 4,046 | 0.000 | 0.00 | 101.16 | 101.16 |
| **Total Site Area:** | **5,397** | - | **33.77** | **134.93** | **101.16** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 101.2 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | 4,580 | 0.90 | 1.00 | 100% |
| Green Roof | 3,535 | 0.45 | 0.56 | 50% |
| Soft Landscaping | 0 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 0 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 8,115 | 0.70 | 0.81 | 78.2% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 4,580 | 0.000 | 0.00 | 114.50 | 114.50 |
| Green Roof | 3,535 | 0.010 | 35.35 | 88.38 | 53.03 |
| Soft Landscaping | 0 | 0.025 | 0.00 | 0.00 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| **Total Site Area:** | **8,115** | - | **35.35** | **202.88** | **167.53** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 167.5 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | 6,880 | 0.90 | 1.00 | 100% |
| Green Roof | 103 | 0.45 | 0.56 | 50% |
| Soft Landscaping | 0 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 0 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 6,983 | 0.89 | 0.99 | 99.3% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 6,880 | 0.000 | 0.00 | 172.00 | 172.00 |
| Green Roof | 103 | 0.010 | 1.03 | 2.58 | 1.55 |
| Soft Landscaping | 0 | 0.025 | 0.00 | 0.00 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| **Total Site Area:** | **6,983** | - | **1.03** | **174.58** | **173.55** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 173.5 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | 2,427 | 0.90 | 1.00 | 100% |
| Green Roof | 5,004 | 0.45 | 0.56 | 50% |
| Soft Landscaping | 0 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 0 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 7,431 | 0.60 | 0.71 | 66.3% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 2,427 | 0.000 | 0.00 | 60.68 | 60.68 |
| Green Roof | 5,004 | 0.010 | 50.04 | 125.10 | 75.06 |
| Soft Landscaping | 0 | 0.025 | 0.00 | 0.00 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| **Total Site Area:** | **7,431** | - | **50.04** | **185.78** | **135.74** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 135.7 $m^3$

In this case, the minimum on-site runoff retention will require the site to retain all runoff from 25 mm storm event

The current area measurements and land use types for the site are as follows:

| Land Use | Area ($m^2$) | Runoff 2-5yr C | Runoff 100yr C | Impervious |
|---|---|---|---|---|
| Impervious Roof Area | 7,167 | 0.90 | 1.00 | 100% |
| Green Roof | 20 | 0.45 | 0.56 | 50% |
| Soft Landscaping | 0 | 0.20 | 0.25 | 0% |
| Permeable pavement | | 0.45 | 0.56 | 50% |
| At-Grade Impervious | 0 | 0.90 | 1.00 | 100% |
| **Total Site Area:** | 7,187 | 0.90 | 1.00 | 99.9% |

| Water Balance Depth | 25 | mm |
|---|---|---|

| Surface Type | Area ($m^2$) | Initial Abstraction (m) | Volume Abstracted ($m^3$) | 25 mm Volume (m3) | Water Balance ($m^3$) |
|---|---|---|---|---|---|
| Impervious Roof Area | 7,167 | 0.000 | 0.00 | 179.18 | 179.18 |
| Green Roof | 20 | 0.010 | 0.20 | 0.50 | 0.30 |
| Soft Landscaping | 0 | 0.025 | 0.00 | 0.00 | 0.00 |
| Permeable pavement | 0 | 0.010 | 0.00 | 0.00 | 0.00 |
| At-Grade Impervious | 0 | 0.000 | 0.00 | 0.00 | 0.00 |
| **Total Site Area:** | **7,187** | - | **0.20** | **179.68** | **179.48** |

For the purposes of the water balance calculation it is assumed that green roofs can accept 10 mm of rainfall without producing any runoff. It is assumed that the remaining hard surfaces on the site can abstract 0 mm of rainfall, and that all soft landscaped areas can absorb 25 mm.

Therefore, volume of runoff during a 25 mm storm event: 179.5 $m^3$

## Infiltration Rate

Feasibility of the bioretention is evaluated in terms of percolation rate of the native soil, groundwater table, and bedrock table, based on the site Hydrogeological Assessment Report

### Percolation Rate of Native Soil

The percolation rate of the soil is estimated from hydraulic conductivity test result

A safety factor of 2.5 is applied and percolation rate used in the design is calculated as follows.

(Refer to Table C1 and C2 in Appendix C of CVC'S Low Impact Development SWMPDG.)

| BH | | Hydraulic Conductivity | | Infiltration Rate | | |
|---|---|---|---|---|---|---|
| | | m/s | cm/s | Estimated (mm/hr) | Safety Factor | Design (mm/hr) |
| silty sand to sandy silt | | 1.00E-06 | 1.00E-04 | 46.3 | 2.5 | 18.5 |

**Table C1: Approximate relationships between hydraulic conductivity, percolation time and infiltration rate**

| Hydraulic Conductivity, $K_{fs}$ (centimetres/second) | Percolation Time, T (minutes/centimetre) | Infiltration Rate, 1/T (millimetres/hour) |
|---|---|---|
| 0.1 | 2 | 300 |
| 0.01 | 4 | 150 |
| 0.001 | 8 | 75 |
| 0.0001 | 12 | 50 |
| 0.00001 | 20 | 30 |
| 0.000001 | 50 | 12 |

Source: Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997. Supplementary Guidelines to the Ontario Building Code 1997. SG-6 Percolation Time and Soil Descriptions. Toronto, Ontario.

**Table C2: Safety correction factors for calculating design infiltration rates**

| Ratio of Mean Measured Infiltration Rates[1] | Safety Correction Factor[2] |
|---|---|
| ≤ 1 | 2.5 |
| 1.1 to 4.0 | 3.5 |
| 4.1 to 8.0 | 4.5 |
| 8.1 to 16.0 | 6.5 |
| 16.1 or greater | 8.5 |

Source: Wisconsin Department of Natural Resources. 2004. Conservation Practice Standards. Site Evaluation for Stormwater Infiltration (1002). Madison, WI.

P = **18.5** mm/hr

## Infiltration Chamber Design

Feasibility of the bioretention is evaluated in terms of percolation rate of the native soil, groundwater table, and bedrock table, based on the site Hydrogeological Assessment Report

### Percolation Rate of Native Soil

The percolation rate of the soil is estimated from hydraulic conductivity test result

A safety factor of 2.5 is applied and percolation rate used in the design is calculated as follows.

(Refer to Table C1 and C2 in Appendix C of CVC'S Low Impact Development SWMPDG.)

| BH | | Hydraulic Conductivity | | Infiltration Rate | | |
|---|---|---|---|---|---|---|
| | | m/s | cm/s | Estimated (mm/hr) | Safety Factor | Design (mm/hr) |
| silty clay | | 1.00E-08 | 1.00E-06 | 13.5 | 2.5 | 5.4 |

**Table C1: Approximate relationships between hydraulic conductivity, percolation time and infiltration rate**

| Hydraulic Conductivity, $K_{fs}$ (centimetres/second) | Percolation Time, T (minutes/centimetre) | Infiltration Rate, 1/T (millimetres/hour) |
|---|---|---|
| 0.1 | 2 | 300 |
| 0.01 | 4 | 150 |
| 0.001 | 8 | 75 |
| 0.0001 | 12 | 50 |
| 0.00001 | 20 | 30 |
| 0.000001 | 50 | 12 |

Source: Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997. Supplementary Guidelines to the Ontario Building Code 1997. SG-6 Percolation Time and Soil Descriptions. Toronto, Ontario.

**Table C2: Safety correction factors for calculating design infiltration rates**

| Ratio of Mean Measured Infiltration Rates[1] | Safety Correction Factor[2] |
|---|---|
| ≤ 1 | 2.5 |
| 1.1 to 4.0 | 3.5 |
| 4.1 to 8.0 | 4.5 |
| 8.1 to 16.0 | 6.5 |
| 16.1 or greater | 8.5 |

Source: Wisconsin Department of Natural Resources. 2004. Conservation Practice Standards. Site Evaluation for Stormwater Infiltration (1002). Madison, WI.

P = **5.4** mm/hr

## 1.1 Water Balance (WB)

The proposed development should demonstrate that infiltration amount be maintained to the extent practicable, to achieve the same level of annual volume of infiltration under pre-development conditions.

### 1.1.1 Climate Water Budget

Data Source: Environment and Climate Change Canada
Data: Climate Normal (1981 ~ 2010)
Climate Station: Ottawa CDA
ID: 6105976 Latitude: 43˚23'00" N
Elevation: 76.20 m Longitude: 75˚43'00" W

#### 1.1.1.1 Water Surplus

*Thornthwaite (1948)*

| Month | Mean Temp. (ºC) | Heat Index | Potential ET (mm) | Daylight Correction Value | Adjust Potential ET (mm) | Total Precipitation (mm) | Surplus (mm) | Deficit (mm) |
|---|---|---|---|---|---|---|---|---|
| Jan | -10.2 | 0.0 | 0.0 | 0.784 | 0.0 | 62.9 | 62.9 | 0.0 |
| Feb | -7.9 | 0.0 | 0.0 | 0.879 | 0.0 | 49.7 | 49.7 | 0.0 |
| Mar | -2.2 | 0.0 | 0.0 | 0.987 | 0.0 | 57.5 | 57.5 | 0.0 |
| Apr | 6.5 | 1.5 | 28.8 | 1.120 | 32.3 | 71.1 | 38.8 | 0.0 |
| May | 13.5 | 4.5 | 64.4 | 1.219 | 78.5 | 86.6 | 8.1 | 0.0 |
| Jun | 18.7 | 7.3 | 92.2 | 1.280 | 118.0 | 92.7 | 0.0 | 25.3 |
| Jul | 21.2 | 8.9 | 105.8 | 1.248 | 132.1 | 84.4 | 0.0 | 47.7 |
| Aug | 19.9 | 8.1 | 98.7 | 1.161 | 114.6 | 83.8 | 0.0 | 30.8 |
| Sep | 15.3 | 5.4 | 73.9 | 1.040 | 76.9 | 92.7 | 15.8 | 0.0 |
| Oct | 8.4 | 2.2 | 38.2 | 0.919 | 35.1 | 85.9 | 50.8 | 0.0 |
| Nov | 2 | 0.3 | 7.9 | 0.810 | 6.4 | 82.7 | 76.3 | 0.0 |
| Dec | -5.6 | 0.0 | 0.0 | 0.735 | 0.0 | 69.5 | 69.5 | 0.0 |
| Total | | 38.1 | | | 594.0 | 919.5 | 429.3 | 103.9 |

Annual Water Surplus = 325.5 mm

Relevant Equations Used for Calculations:

$$E = 16C\left(10\frac{T_{mi}}{I}\right)^a$$

https://en.wikipedia.org/wiki/Potential_evaporation

Where, E = Potential Evapotranspiration (mm)

C = Daylight Correction Value, taken from Table 6, Thornthwaite & Mather (1957)
It's obtained using the following equations if data are available.

$$C = (H/12)(D/30)$$

H = Average Daily Length (Hours) of the Month being Calculated.

D = Number of Days in the Month being Calculated.

$T_{mi}$ = Average Monthly Temperature (ºC)

a = an exponent derived from Heat Index (I) 1.10

$$a = 67.5 \times 10^{-8} I^3 - 77.1 \times 10^{-6} I^2 + 0.0179 I + 0.492$$

I = Heat Index

$$I = \sum_{i=1}^{12}\left(\frac{T_{mi}}{5}\right)^{1.51} \quad \text{for } T_{mi} > 0$$

### 1.1.1.2 Total Moisture Surplus for Sandy Silt, Cultivated (200 mm Holding Capacity)

*Thornthwaite and Mather (1957)*

| Month | P - PE (mm) | Accu. Potential Water Loss (mm) | Soil Moisture (mm) | Change in Soil Moisture (mm) | Actual ET (mm) | Moisture Deficit (mm) | Unadjusted Moisture Surplus (mm) |
|---|---|---|---|---|---|---|---|
| Jan | 62.9 | 0.0 | 200.0 | 0.0 | 0.0 | 0.0 | 62.9 |
| Feb | 49.7 | 0.0 | 200.0 | 0.0 | 0.0 | 0.0 | 49.7 |
| Mar | 57.5 | 0.0 | 200.0 | 0.0 | 0.0 | 0.0 | 57.5 |
| Apr | 38.8 | 0.0 | 200.0 | 0.0 | 32.3 | 0.0 | 38.8 |
| May | 8.1 | 0.0 | 200.0 | 0.0 | 78.5 | 0.0 | 8.1 |
| Jun | -25.3 | -25.3 | 173.2 | -26.8 | 119.5 | -1.5 | 0.0 |
| Jul | -47.7 | -73.0 | 135.9 | -37.3 | 121.7 | 10.4 | 0.0 |
| Aug | -30.8 | -103.9 | 118.8 | -17.1 | 100.9 | 13.7 | 0.0 |
| Sep | 15.8 | 0.0 | 134.6 | 15.8 | 76.9 | 0.0 | 0.0 |
| Oct | 50.8 | 0.0 | 185.3 | 50.8 | 35.1 | 0.0 | 0.0 |
| Nov | 76.3 | 0.0 | 200.0 | 14.7 | 6.4 | 0.0 | 61.7 |
| Dec | 69.5 | 0.0 | 200.0 | 0.0 | 0.0 | 0.0 | 69.5 |
| Total | 325.5 | -202.2 | 2147.8 | 0.0 | 571.4 | 22.6 | **348.1** |

### 1.1.1.3 Total Moisture Surplus for Sandy Silt, Urban Lawn (100 mm Holding Capacity)

*Thornthwaite and Mather (1957)*

| Month | P - PE (mm) | Accu. Potential Water Loss (mm) | Soil Moisture (mm) | Change in Soil Moisture (mm) | Actual ET (mm) | Moisture Deficit (mm) | Unadjusted Moisture Surplus (mm) |
|---|---|---|---|---|---|---|---|
| Jan | 62.9 | 0.0 | 100.0 | 0.0 | 0.0 | 0.0 | 62.9 |
| Feb | 49.7 | 0.0 | 100.0 | 0.0 | 0.0 | 0.0 | 49.7 |
| Mar | 57.5 | 0.0 | 100.0 | 0.0 | 0.0 | 0.0 | 57.5 |
| Apr | 38.8 | 0.0 | 100.0 | 0.0 | 32.3 | 0.0 | 38.8 |
| May | 8.1 | 0.0 | 100.0 | 0.0 | 78.5 | 0.0 | 8.1 |
| Jun | -25.3 | -25.3 | 74.8 | -25.2 | 117.9 | 0.1 | 0.0 |
| Jul | -47.7 | -73.0 | 45.8 | -29.0 | 113.4 | 18.8 | 0.0 |
| Aug | -30.8 | -103.9 | 33.9 | -11.9 | 95.7 | 18.9 | 0.0 |
| Sep | 15.8 | 0.0 | 49.7 | 15.8 | 76.9 | 0.0 | 0.0 |
| Oct | 50.8 | 0.0 | 100.0 | 50.3 | 35.1 | 0.0 | 0.5 |
| Nov | 76.3 | 0.0 | 100.0 | 0.0 | 6.4 | 0.0 | 76.3 |
| Dec | 69.5 | 0.0 | 100.0 | 0.0 | 0.0 | 0.0 | 69.5 |
| Total | 325.5 | -202.2 | 1004.1 | 0.0 | 556.3 | 37.7 | **363.2** |

### 1.1.1.4 Climate Based Water Budget Summary

| Year of Climate Data | Total Precipitation (mm) | Total Adjusted PE (mm) | Total Water Surplus (mm) | Soil Type | Land Use | Water Holding Capacity (mm) | Total Actual ET (mm) | Total Moisture Surplus (mm) |
|---|---|---|---|---|---|---|---|---|
| 1981 - 2010 | 919.5 | 594.0 | 325.5 | Silty Sand | Cultivated | 200 | 571.4 | 348.1 |
| | | | | | Urban Lawn | 100 | 556.3 | 363.2 |

### 1.2.1 Pre-development Site Wide Water Balance Analysis

Total Development Area = 11.79 ha

Total Imervious Area = 1.84 ha

Section 3.2.3 of Stormwater Management Planning & Design Manual (SWMPDM, MECP, 2003) gives a water balance example.

The MECP's SWMPD Manual offers a method to estimate the infiltration on the site, based on a local infiltration factor "i", which is applied to the available water surplus to determine the groundwater recharge for a given area with pervious cover. The methodology considers factors such as the soil type, topography, and vegetation to arrive at the infiltration factor that is then applied against the water surplus to provide an estimate of the amount of water infiltrating into the ground. The remaining water surplus is considered runoff.

According to website of Environment and Climate Change Canada, the mean annual precipitation at Oshawa WPCP is

919.5 mm

Under existing conditions, the site is used as agriculture purpose.
The soil beneath the top soil is sandy silt with HSG = B

| | | | | |
|---|---|---|---|---|
| Average Annual Precipitation | 919.5 | mm, or | 108,375 | $m^3$ |
| Annual Evapotranspiration (Cultivated) | 571.4 | mm, or | 56,818 | $m^3$ |
| Available Water Surplus (or excess of precipitation over evapotranspiration) | 348.1 | mm, or | 34,616 | $m^3$ |

Then, infiltration factors are used to determine the fraction of water surplus that infiltrates into the ground and the fraction that runs off the site. Infiltration factor is determined by summing a factor for topography, soil, and cover.

**Table 3.1: Hydrologic Cycle Component Values**

**This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.*

| | | |
|---|---|---|
| Topography | Flat Land, average slope < 0.6 m/km | 0.3 |
| | Rolling Land, average slope 2.8 m to 3.8 m/km | 0.2 |
| | Hilly Land, average slope 28 m to 47 m/km | 0.1 |
| Soils | Tight impervious clay | 0.1 |
| | Medium combinations of clay and loam | 0.2 |
| | Open Sandy loam | 0.4 |
| Cover | Cultivated Land | 0.1 |
| | Woodland | 0.2 |

***SWM Planning & Design Manual*** ***- 3-4 -*** ***Environmental Design Criteria***

| | | |
|---|---|---|
| Topography Factor | 0.13 | for slope = 2.0% or 20 m/km |
| Soil Factor | 0.30 | for Silty Sand |
| Cover | 0.10 | for cultivated lands |
| Therefore, the infiltration factor is | 0.53 | |

| | | | | |
|---|---|---|---|---|
| Therefore, the annual infiltration amount is | 185.6 | mm, or | 18,452 | $m^3$ |
| and the annual runoff amount is | 162.5 | mm, or | 16,164 | $m^3$ |

| | (%) | (mm) | ($m^3$) | *Comments/Assumptions:* |
|---|---|---|---|---|
| Infiltration | 20.2 | 185.6 | 18,452 | … |
| Evapotranspiration | 62.1 | 571.4 | 56,818 | … |
| Runoff | 17.7 | 162.5 | 16,164 | … |
| Precipitation | 100 | 919.5 | 91,434 | |

| Project | Ottawa Civic Hospital | No. | CA-WSP-P22-11020-51 | |
|---|---|---|---|---|
| By | FA | Date | 2025-09-12 | Page |
| Checked | AMB | Date | 2025-09-12 | 4 |

Subject: **SWM _ Water Balance _ Pre-development Conditions**

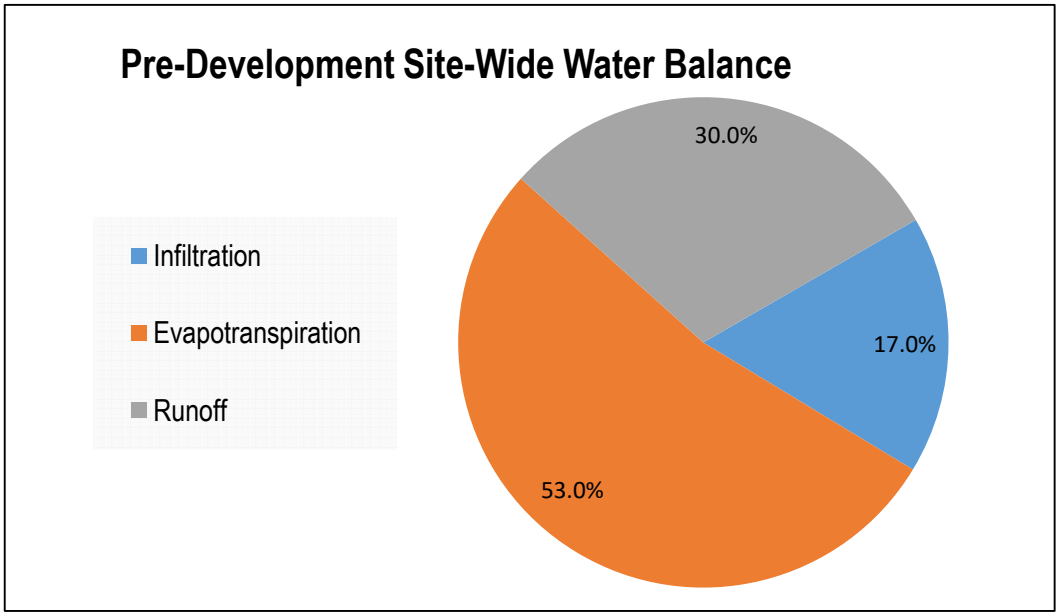
**Impervious Area**

| | (%) | (mm) | ($m^3$) |
|---|---|---|---|
| Infiltration | 0.0 | 0.0 | 0 |
| Evapotranspiration | 3.8 | 34.5 | 635 |
| Runoff | 96.3 | 885.0 | 16,306 |
| Precipitation | 100 | 919.5 | 16,941 |

*Comments/Assumptions:*

*1.5 mm of rainfall (equivalent to 3.75% annual volume) is lost to initial abstraction/evaporation*

| Hydrologic Cycle Components | Impervious Area | Pervious Area | Site-Wide Water Balance | | |
|---|---|---|---|---|---|
| | | | mm | % | $m^3$ |
| % Land-Use Coverage | 15.7% | 84.3% | 100.0% | | |
| Infiltration | 0.0 | 185.6 | 156.4 | 17.0% | 18,432 |
| Evapotranspiration | 34.5 | 571.4 | 487.0 | 53.0% | 57,395 |
| Runoff | 885.0 | 162.5 | 276.1 | 30.0% | 32,548 |
| Precipitation | 919.5 | 919.5 | 919.5 | 100.0% | 108,375 |



### 1.3.1 Post-development Site Wide Water Balance Analysis _ without Mitigation Measures

Water balance analysis for post-development conditions without mitigation measures is carried out to evaluate the impacts due to the proposed development.

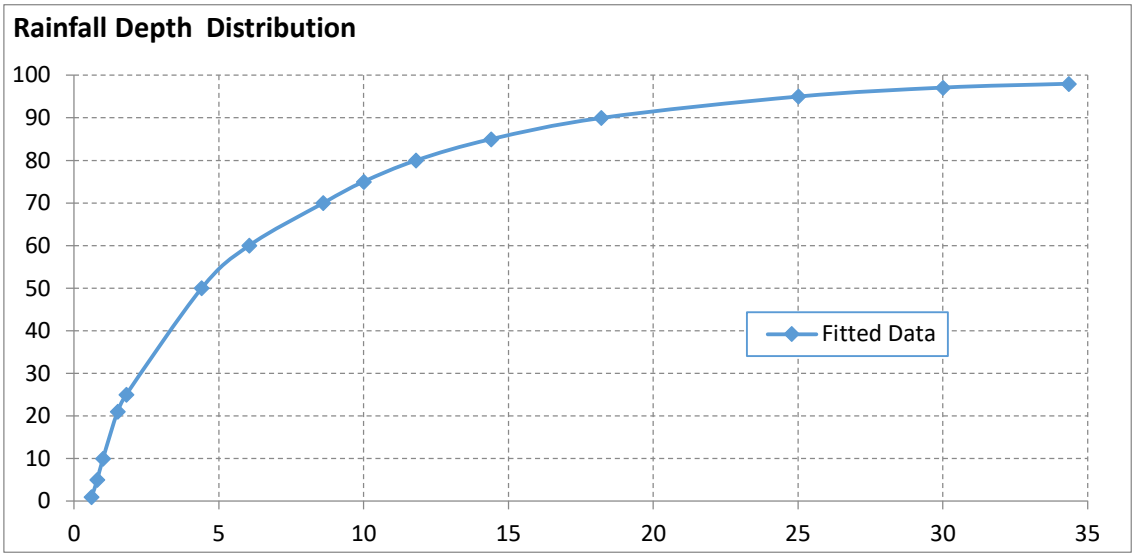
Water Balance for pervious areas follows the procedure illustrated in the WB analysis for pre-development conditions.

#### 1.3.1.1 Proposed Development

| Sub- Catchment | Drainage Area (ha) | Imperviousness (%) | Impervious Area (ha) |
|---|---|---|---|
| 100 | 3.123 | 80.7 | 2.521 |
| 200 | 5.303 | 55.5 | 2.942 |
| 300 | 3.360 | 64.1 | 2.153 |
| Total | 11.786 | 64.6 | 7.616 |

#### 1.3.1.2 Water Balance Relationship for the Impervious Area

7.616 ha, or 64.6%




| | (%) | (mm) | ($m^3$) | *Comments/Assumptions:* |
|---|---|---|---|---|
| Infiltration | 0.0 | 0.0 | 0 | ... |
| Evapotranspiration | 3.8 | 34.5 | 2,626 | |
| Runoff | 96.3 | 885.0 | 67,400 | ... |
| Precipitation | 100.0 | 919.5 | 70,026 | |

#### 1.3.1.3 Water Balance Relationship for the Pervious Area

Under proposed conditions, the site pervious area is urban lawn and sparse trees.

4.171 ha, or 35.4%

The soil beneath the top soil is sandy silt with HSG = B

| | | | | |
|---|---|---|---|---|
| Average Annual Precipitation | 919.5 | mm, or | 38,349 | $m^3$ |
| Annual Evapotranspiration (Urban Lawn) | 556.3 | mm, or | 23,200 | $m^3$ |
| Available Water Surplus (or excess of precipitation over evapotranspiration) | 363.2 | mm, or | 15,149 | $m^3$ |

Then, infiltration factors are used to determine the fraction of water surplus that infiltrates into the ground and the fraction that runs off the site. Infiltration factor is determined by summing a factor for topography, soil, and cover.

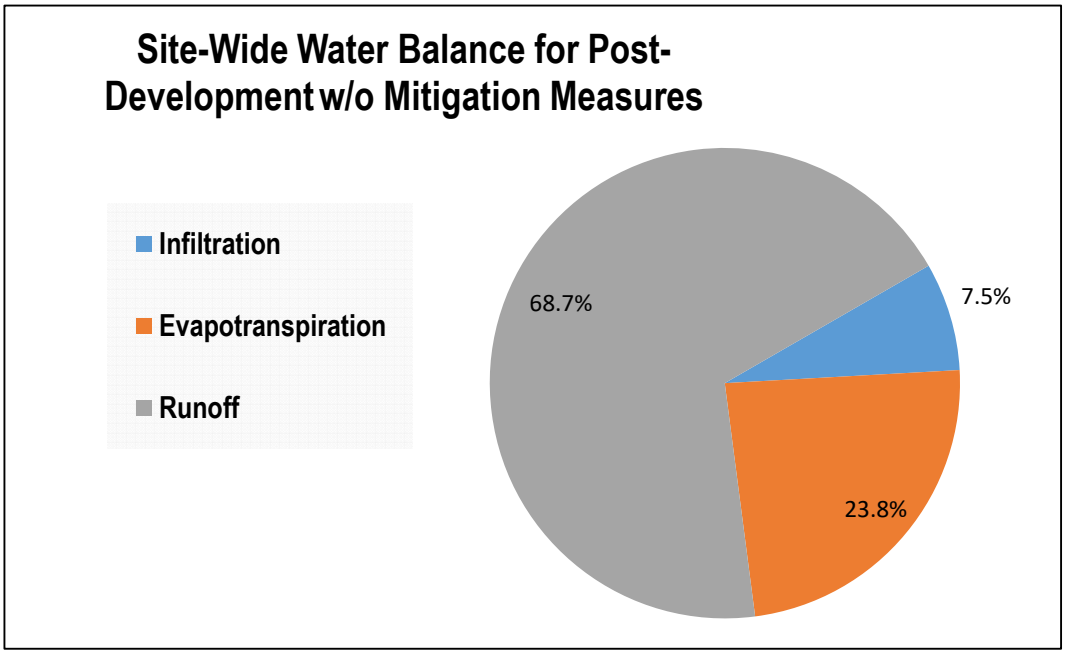
| | | |
|---|---|---|
| Topography Factor | 0.13 | for slope = 2.0% or 20 m/km |
| Soil Factor | 0.30 | for Sandy Silt |
| Cover | 0.10 | for Urban Lawn (Cultivated) |
| Therefore, the infiltration factor is | 0.53 | |

| | | | | |
|---|---|---|---|---|
| Therefore, the annual infiltration amount is | 193.6 | mm, or | 8,075 | $m^3$ |
| and the annual runoff amount is | 169.6 | mm, or | 7,074 | $m^3$ |

| | (%) | (mm) | ($m^3$) | *Comments/Assumptions:* |
|---|---|---|---|---|
| Infiltration | 21.1 | 193.6 | 8,075 | … |
| Evapotranspiration | 60.5 | 556.3 | 23,200 | … |
| Runoff | 18.4 | 169.6 | 7,074 | … |
| Precipitation | 100.0 | 919.5 | 38,349 | |

**1.3.1.4 Site Wide Water Balance Relationship _ Post-development without Mitigation Measures**

| Hydrologic Cycle Components | Impervious Area | Pervious Area | Site-Wide Water Balance | | |
|---|---|---|---|---|---|
| | | | mm | % | $m^3$ |
| % Land-Use Coverage | 64.6% | 35.4% | 100.0% | | |
| Infiltration | 0.0 | 193.6 | 68.5 | 7.5% | 8,075 |
| Evapotranspiration | 34.5 | 556.3 | 219.1 | 23.8% | 25,826 |
| Runoff | 885.0 | 169.6 | 631.9 | 68.7% | 74,474 |
| Precipitation | 919.5 | 919.5 | 919.5 | 100.0% | 108,375 |



### 1.3.2 Post-development Site Wide Water Balance Analysis

LID measures shall be incorporated into the site plan to enhance infiltration.

#### 1.3.2.1 Water Balance Strategies

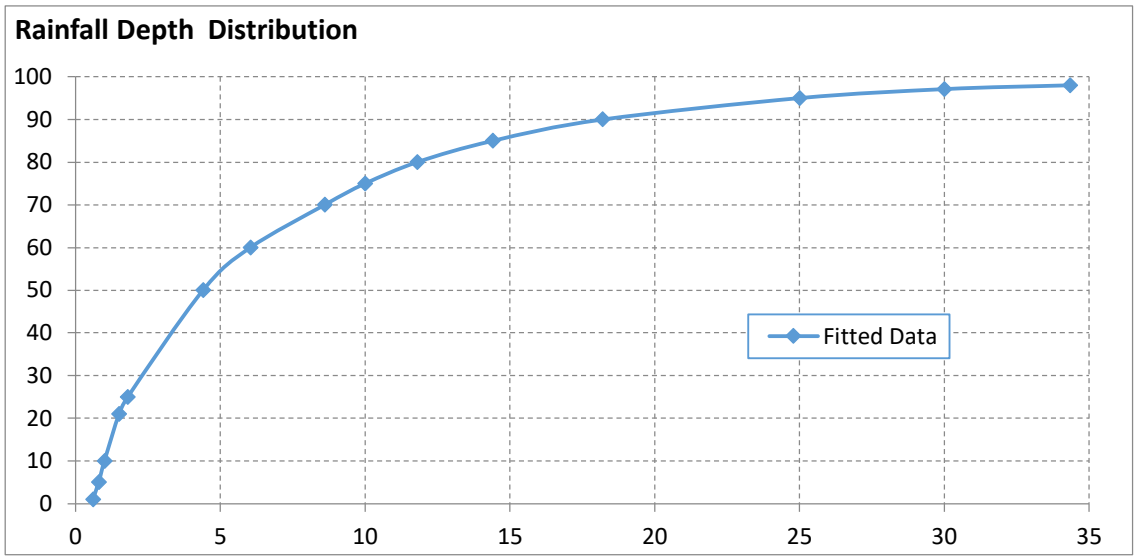
Runoff from the catchment 100 - rooftop of buildings, shall be directed to an underground chamber system for reuse.

#### 1.3.2.2 Water Balance Analysis Assumption

The following assumptions are applied in the analysis.

1) Water balance analysis for pervious areas shall follow the method used in the analysis for pre-development conditions.

Figure below presents the relationship of the % of the total annual rainfall depth vs. the daily rainfall amounts. This relationship will be used to conduct the water balance analysis for the subject site from an annual basis.




#### 1.3.2.3 Proposed Development

| Sub- Catchment | Drainage Area (ha) | Imperviousness (%) | Impervious Area (ha) |
|---|---|---|---|
| 100 | 2.007 | 100.0 | 2.007 |
| 101 | 0.175 | 45.0 | 0.079 |
| 102 | 0.941 | 45.0 | 0.423 |
| 200 | 5.303 | 55.5 | 2.942 |
| 300 | 3.360 | 64.1 | 2.153 |
| Total | 11.786 | 64.5 | 7.604 |

### 1.3.2.3.5 Configuration of Reuse Storage

Underground storage System shall provide storage volume for reuse for runoff from rooftop of the buildings

Storage Volume provided below the invert of outlet pipe 844.2 $m^3$

| Chamber Facility | Drainage Catchment | Total Area (ha) | Impervious Area (ha) | Rainfall Depth (mm) | ET (mm) | Runoff Depth (mm) | Retention Volume ($m^3$) | Equivalent Precipitation (%) |
|---|---|---|---|---|---|---|---|---|
| 201-204 | 100 | 2.007 | 2.007 | 42.1 | 0.0 | 42.1 | 844.2 | 100.0 |

### 1.3.2.4 Proposed LID storage

| Infiltration Facility | Drainage Catchment | Total Area (ha) | Impervious Area (ha) | Rainfall Depth (mm) | ET (mm) | Runoff Depth (mm) | Retention Volume ($m^3$) | Equivalent Precipitation (%) |
|---|---|---|---|---|---|---|---|---|
| LID | 200 | 5.303 | 2.942 | 14.1 | 0.0 | 14.1 | 414.8 | 90.4 |

### 1.3.2.5 Proposed Site Plan _ Area Breakdown

| *Area #* | *Description of Land Use & Drainage* | *Reuse* | *Area (ha)* | *Coverage (%)* |
|---|---|---|---|---|
| 1 | Impervious Surface, Rooftop of Buildings | Irrigation | 2.007 | 17.0% |
| 2 | Pervious Surface, Intensive Greenroof | Green Roof | 0.175 | 1.5% |
| 3 | Pervious Surface, Extensive Greenroof | Green Roof | 0.941 | 8.0% |
| 4 | At-Grade Impervious Surfaces, to LID | LID | 2.942 | 25.0% |
| 5 | At-Grade Impervious Surfaces, no LID | NA | 2.153 | 18.3% |
| 6 | All Pervious Surfaces | NA | 3.568 | 30.3% |
| Total Site Area | | | 11.786 | 100.0% |

### 1.3.2.7 Define Individual Water Balance Relationships for Each Surface Type:

#### 1.3.2.7.1 Impervious Area to Underground Storage for irrgation

| | (%) | (mm) | ($m^3$) |
|---|---|---|---|
| Infiltration | 21.1 | 193.6 | 3,885 |
| Evapotranspiration | 60.5 | 556.3 | 11,162 |
| Runoff | 18.4 | 169.6 | 3,403 |
| Precipitation | 100 | 919.5 | 18,451 |

*Comments/Assumptions:*

*Apply pervious area relationship to 98% of area*

*…*

#### 1.3.2.7.2 Intensive Green Roof

| | (%) | (mm) | ($m^3$) |
|---|---|---|---|
| Infiltration | 0.0 | 0.0 | 0 |
| Evapotranspiration | 95.0 | 873.5 | 1,531 |
| Runoff | 5.0 | 46.0 | 81 |
| Precipitation | 100 | 919.5 | 1,612 |

*Comments/Assumptions:*

*Intensive Green Roof can abstract first 25 mm*

*…*

#### 1.3.2.7.2 Extensive Green Roof

| | (%) | (mm) | ($m^3$) |
|---|---|---|---|
| Infiltration | 0.0 | 0.0 | 0 |
| Evapotranspiration | 75.0 | 689.6 | 6,489 |
| Runoff | 25.0 | 229.9 | 2,163 |
| Precipitation | 100 | 919.5 | 8,652 |

*Comments/Assumptions:*

*Intensive Green Roof can abstract first 10 mm*

*…*

#### 1.3.2.7.2 Impervious Area to LID

| | (%) | (mm) | ($m^3$) |
|---|---|---|---|
| Infiltration | 91.3 | 839.0 | 24,688 |
| Evapotranspiration | 3.8 | 34.5 | 1,015 |
| Runoff | 5.0 | 46.0 | 1,353 |
| Precipitation | 100 | 919.5 | 27,055 |

*Comments/Assumptions:*

*1.5 mm of rainfall (equivalent to 3.75% annual volume) is lost to initial abstraction/evaporation*

#### 1.3.2.7.3 Impervious Area without LID Measures

| | (%) | (mm) | ($m^3$) |
|---|---|---|---|
| Infiltration | 0.0 | 0.0 | 0 |
| Evapotranspiration | 3.8 | 34.5 | 324 |
| Runoff | 96.3 | 885.0 | 19,052 |
| Precipitation | 100 | 919.5 | 19,794 |

*Comments/Assumptions:*

*1.5 mm of rainfall (equivalent to 3.75% annual volume) is lost to initial abstraction/evaporation*

#### 1.3.2.7.4 All Pervious Area

*Refer to Section 1.3.1.3*

| | (%) | (mm) | ($m^3$) |
|---|---|---|---|
| Infiltration | 21.1 | 193.6 | 6,909 |
| Evapotranspiration | 60.5 | 556.3 | 16,367 |
| Runoff | 18.4 | 169.6 | 4,990 |
| Precipitation | 100 | 919.5 | 27,055 |

*Comments/Assumptions:*

*…*

*…*

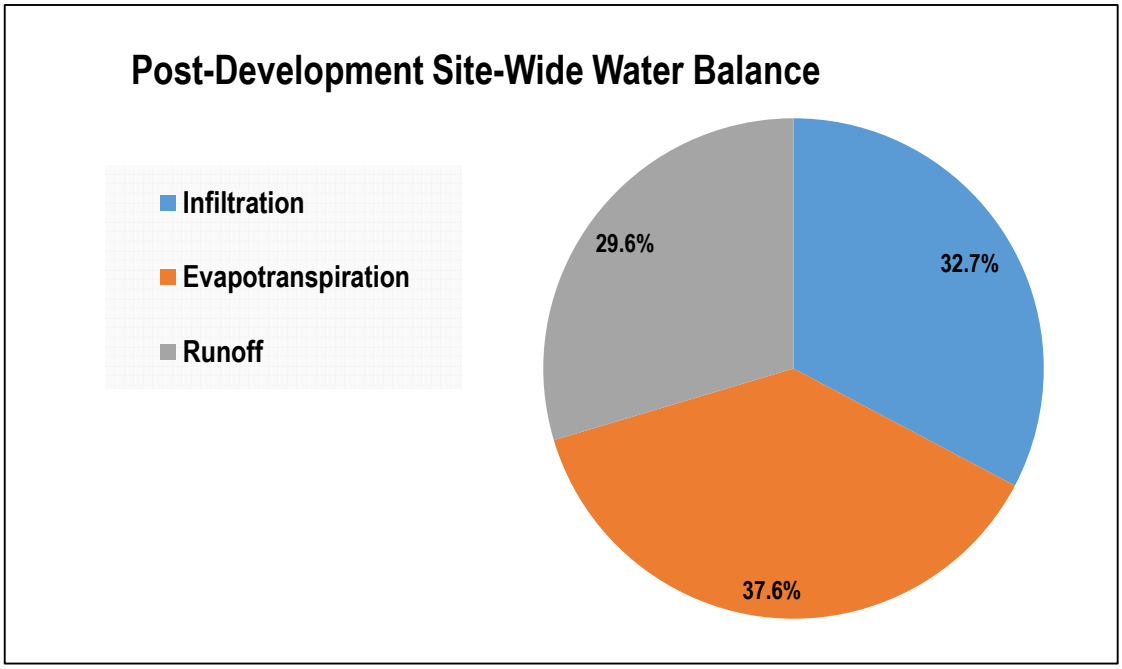
*…*

### 1.3.2.8 Site Wide Water Balance Relationship _ Post-development Conditions with Mitigation Measures

| Hydrologic Cycle Components | Impervious Surface, Rooftop of Buildings | Pervious Surface, Intensive Greenroof | Pervious Surface, Extensive Greenroof |
|---|---|---|---|
| % Land-Use Coverage | 17.0% | 1.5% | 8.0% |
| Infiltration (mm) | 193.6 | 0.0 | 0.0 |
| Evapotranspiration (mm) | 556.3 | 873.5 | 689.6 |
| Runoff (mm) | 169.6 | 46.0 | 229.9 |
| Precipitation (mm) | 919.5 | 919.5 | 919.5 |

| Hydrologic Cycle Components | At-Grade Impervious Surfaces, to LID | At-Grade Impervious Surfaces, no LID | Pervious Surface |
|---|---|---|---|
| % Land-Use Coverage | 25.0% | 18.3% | 30.3% |
| Infiltration | 839.0 | 0.0 | 193.6 |
| Evapotranspiration | 34.5 | 34.5 | 556.3 |
| Runoff | 46.0 | 885.0 | 169.6 |
| Precipitation | 919.5 | 919.5 | 919.5 |

| Hydrologic Cycle Components | Site-Wide Water Balance Relationship | | |
|---|---|---|---|
| | mm | % | $m^3$ |
| % Land-Use Coverage | 100.0% | | |
| Infiltration | 301.0 | 32.7% | 35,482 |
| Evapotranspiration | 346.1 | 37.6% | 40,789 |
| Runoff | 272.4 | 29.6% | 32,104 |
| Precipitation | 919.5 | 100.0% | 108,375 |




1.3.2.9 Post-development vs Pre-Development Water Balance

| Hydrologic Cycle Components | Pre-Development Conditions | | Post-Dev. Conditions with Mitigation Measures | | Difference | |
|---|---|---|---|---|---|---|
| | % | $m^3$ | % | $m^3$ | $m^3$ | % |
| Infiltration | 17.0% | 18,432 | 32.7% | 35,482 | 17,050 | 92.5% |
| Evapotranspiration | 53.0% | 57,395 | 37.6% | 40,789 | -16,606 | -28.9% |
| Runoff | 30.0% | 32,548 | 29.6% | 32,104 | -444 | -1.4% |
| Precipitation | 0% | 108,375 | 100% | 108,375 | 0 | 0.0% |

# APPENDIX K: DRAFT SALT MANAGEMENT PLAN

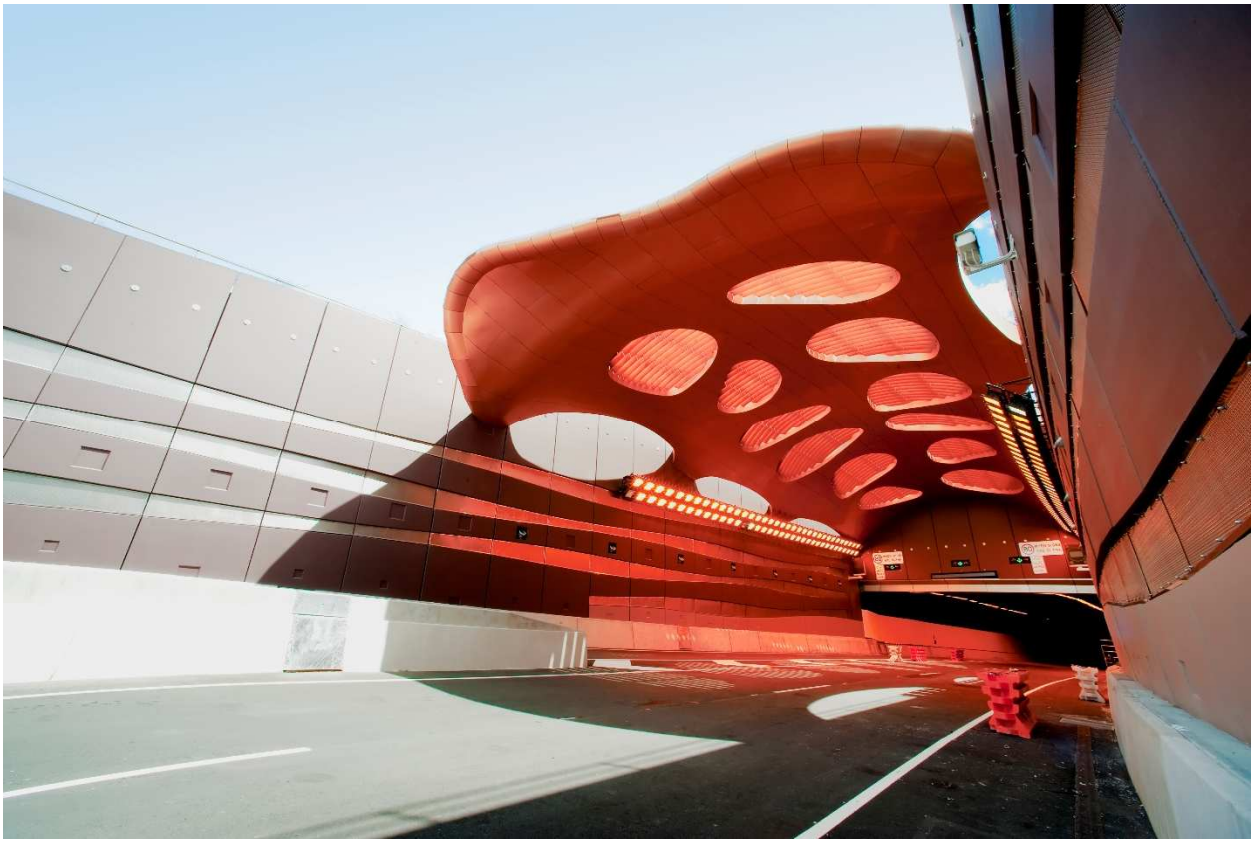
THE OTTAWA HOSPITAL

# NEW CAMPUS DEVELOPMENT FOR THE OTTAWA HOSPITAL

## SALT MANAGEMENT PLAN

JANUARY 09, 2025

DRAFT



# NEW CAMPUS DEVELOPMENT FOR OTTAWA HOSPITAL

## THE OTTAWA HOSPITAL

DRAFT

PROJECT NO.: CA0010209.4580
DATE: JANUARY 2025

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# QUALITY MANAGEMENT

| ISSUE/REVISION | FIRST ISSUE | REVISION #1 | REVISION #2 |
|---|---|---|---|
| Remarks | | | |
| Date | 2022/03/22 | | |
| Prepared by | F. Allen | | |
| Signature | Fiona Allen | | |
| Checked by | A. Mohino-Barrie | | |
| Signature | A. M. | | |
| Project number | CA0010209.4580 | | |

# SIGNATURES

PREPARED BY

Fiona Allen, EIT
Designer, Water Resources

APPROVED[1] BY

Alyssa Mohino-Barrie, P.Eng.
Senior Project Manager, Water Resources

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# PRODUCTION TEAM

## CLIENT

The Ottawa Hospital

## WSP

| | |
|---|---|
| Experienced Engineer | Fiona Allen, P.Eng. |
| Manager | Alyssa Mohino-Barrie, P.Eng. |

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## *FIGURES*

**NO TABLE OF FIGURES ENTRIES FOUND.**

## *APPENDICES*

# 1 INTRODUCTION

## 1.1 DISCLAIMER

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The purpose of this document is to provide guidelines to manage salt use on site and reduce the impact of salt on the proposed stormwater management (SWM) facilities within the site and the receiving water way.

Recommendations were taken from the 2013 Syntheses of Best Practices Road Salt Management issued by Transportation Association of Canada (TAC) and the 2017 Parking Lot Design Guidelines to Promote salt Reduction by the Lake Simcoe Region Conservation Authority (LSRCA) and further details may be found within these reference documents.

## 1.2 SITE LOCATION

The New Civic Campus is approximately a 20-hectare development located at 930 and 850 Carling Avenue, occurring at the intersection of Preston Street Carling Avenue, adjacent to Dow's Lake, in the heart of the National Capital Region. The design of the Main Hospital Building (Phase 3) is the responsibility of WSP. The site is approximately 10 ha in area and is comprised of roof top surfaces, parking lots and roads.

## 1.3 SWM INFRASTRUCTURE OVERVIEW

The stormwater management plan contains the following elements as part of the control strategy:

- 4 underground storage systems to collected and control runoff of the roof of the main hospital building.
- 3 underground storage systems to collected and control runoff from parking lots and roads.
- Swales to collect and convey major overland flow
- bioretention facilities have been proposed within the landscaped areas to filter stormwater and retain runoff volume. These areas are to be confirmed
- Permeable paving area with storage bedding and underdrains to filter, store, and infiltrate stormwater. These areas are to be confirmed
- An Oil and Grit Separator (OGS) to treat runoff before discharging runoff to Dow's Lake

# 2 DESIGN RECOMMENDATIONS

## 2.1 PARKING LOT

Below is a list of recommendations which can be utilized in the parking lot design to reduce salting.

- Include designated areas for snow storage and show them on the civil grading plan/servicing plans. Refer to LSRCA Salt Reduction "Snow Pile storage location and design" for additional details.
- In parking areas slopes of 2 to 4% are recommended, where possible, to minimize the potential depressions which result in the pooling of runoff and formation of ice which results in increased need for salting.
- Grading should direct runoff towards collection systems such as catchbasins and LIDs and away from building entrances and high traffic walkways.
- Target drainage area of 1,000 - 2,000 $m^2$ to each catchbasin and collection features to be laid out minimizing the distance meltwater travels before being removed from the parking lot surface.
- Catch basin filters should typically be inspected three to four times annually and cleaned or replaced every one to two years, when sediment buildup reduces permeability.
- OGS should be vacuum-cleaned or dredged every one to two years when sediment accumulation occupies 25% of sump. Inspections should be performed every 1 to 2 years and look for chloride buildup.

## 2.2 LOW IMPACT DEVELOPMENT AND LANDSCAPE

Low impact development (LID) can be effective way to reduce salt loadings in runoff as they use natural means, including vegetation and engineered soil, to treat stormwater by filtering out contaminants commonly found in runoff. Below is a list of recommendations which can be utilized in the design of the LIDs to reducing salting.

- Curb cuts can be installed to direct runoff from the parking lot into landscaped features
- Salt tolerant plants should be used in areas which will accept runoff from parking lots and walkways.
- Pretreatment is recommended to treat runoff before entering LIDs. This can include a strip of rip rap, this reduces erosion and captures the initial runoff which has the highest salt loadings.

# APPENDIX L: BOUNDARY CONDITIONS

## Curley, Liam

**From:** Steele, Matt <Matt.Steele@ottawa.ca>
**Sent:** April 23, 2025 10:44 AM
**To:** Curley, Liam
**Cc:** Graham, Colin; Shillington, Jeffrey; Moore, Sean; Evans, Allan
**Subject:** Re: TOH Boundary Conditions Request

Hi Liam,

The boundary conditions provided in the attached are still relevant.

Matt

Matt Steele, P.Eng.
Senior Water Resources Engineer
Infrastructure and Water Services
City of Ottawa
P: 613-580-2424 Ext. 16024

Classified as City of Ottawa - Internal / Ville d'Ottawa - classé interne

---

**From:** Curley, Liam <Liam.Curley@wsp.com>
**Sent:** Wednesday, April 23, 2025 9:18 AM
**To:** Steele, Matt <Matt.Steele@ottawa.ca>
**Cc:** Graham, Colin <colin.graham@wsp.com>; Shillington, Jeffrey <jeff.shillington@ottawa.ca>; Moore, Sean <Sean.Moore@ottawa.ca>; Evans, Allan <Allan.Evans@ottawa.ca>
**Subject:** TOH Boundary Conditions Request

**CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.**
**ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.**

Hi Matt,

We have taken control of the watermain model for the TOH project and we had received the boundary conditions through the Parsons report, received by them 2022-05-17. We are just looking to request updated boundary conditions to confirm if they have remained the same or have changed since the original request that was made by Parsons. I found your emails through their report however I'm not sure if this is something I can coordinate with you or if not if you could forward this on to the relevant people or point me in the direction of the person I should talk to in order to get this closed out.

**Liam Curley**
Designer EIT

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**WSP**
2611 Queensview Drive, Suite 300
Ottawa, Ontario
K2B 8K2 Canada

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'

## APPENDIX M: PRECONSULTATION MINUTES

To be included with final submission

# APPENDIX N: CATCH BASIN CALCULATIONS

# CATCH BASIN CALCULATION SHEET
## NCD - Hospital

**Designed by:** Liam Hill
**Checked by:** Liam Curley
**Approved by:** Colin Graham
**Drawing Ref:** C1-200THRU204 and C5-200THRU204

**Rainfall**

2 year i =732.951 (tc + 6.199)^ -0.8 at tc=10 min; i = 77 mm/hr

5 year i =998.071 (tc + 6.053)^ -0.8 at tc=10 min; i = 104 mm/hr
10 year i =1174.184 (tc + 6.014)^ -0. at tc=10 min; i = 122 mm/hr
100 year i = 1735.688 (tc + 6.014)^-0. at tc=10 min; i = 179 mm/hr
Q = 0.375 * So^(0.5) * d^2.667/(n*Sx) (ref: Modified Manning Equation)

**Catch basin** **2FB = Double Surface Inlet OPSD 400.01**

**CI = Curb Inlet - Type S22**
With local gutter depression
No ponding

**FB = Surface Inlet OPSD 400.01**
Dished Herringbone Grate - square cover
No ponding

**2CI = Double Curb Inlet - Type S22**
With local gutter depression
No ponding

**Capture for CI**

Q capture = a * b^(1/x) * x^c

| Where: | So = 1% | So = 2% | Reduction factor for variable cross fall | |
|---|---|---|---|---|
| a = | 0.060000 | 0.049624 | Sx = 3.0 % | Rf = 1.0 |
| b = | 0.999000 | 0.999149 | Sx = 2.0 % | Rf = 0.8 |
| c = | 0.470000 | 0.475954 | Sx = 1.0 % | Rf = 0.6 |

**Spread Criteria**

For Urban Cross-Sections
- 5 Yr Minor Storm; No barrier curb overHPping.
- Allowable depth of flooding is half of the adjacent through lane
- Catchbasin spacing determined using an inlet time of 5 min.
- 100 Yr Major Storm, max allowable depth for ponding shall be 300mm at edge of pavement
- For depressed sections, max allowable depth for 25 yr storm is 100mm on the adjacent through lane
- At stations pavement CBs shall be adequate to allow no more than 1.25m of horizontal encroachment on a through lane during a 5 yr event

**Capture for Surface Inlet**

Q <= y, capture = Q
Q > y, capture = min(Q, b*(Q-a)^c

**Storm Event** **100**

**CB Count**

| | |
|---|---|
| CI | 21 |
| 2CI | 3 |
| FB | 49 |
| 2FB | 11 |
| Total | **76** |

**Sag Analysis**

*Ref: Appendix 7-A Type S22 Curb Inlet Catch Basin, Ottawa Sewer Guidelines*

| | |
|---|---|
| Sx = 1% | $d = 0.1858*Q^{0.3424}$ |
| Sx = 2% | $d = 0.156*Q^{0.3179}$ |
| Sx = 3% | $d = 0.136*Q^{0.3059}$ |
| Sx = 4% | $d = 0.1245*Q^{0.2986}$ |

| From | To | Allow. Spread m | Sx % | So % | Coeffiecent | Area ha | Increm. Q m³/s | Total Q m³/s | Depth m | Inlet type | Spread m | Capture m³/s | Carry Over m³/s | Remarks | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ROAD D | | | | | | | | | | | | | | | |
| HP | CB 43 | 2.00 | 2.0 | 5.0 | 0.68 | 0.042 | 0.014 | 0.014 | 0.023 | FB | **1.2** | 0.010 | 0.004 | OK | |
| CB 43 | CB 45 | 2.00 | 2.0 | 5.0 | 0.64 | 0.023 | 0.007 | 0.011 | 0.021 | FB | **1.1** | 0.009 | 0.002 | OK | |
| CB 45 | CB 46 | 2.00 | 2.0 | 5.0 | 0.74 | 0.018 | 0.007 | 0.009 | 0.020 | CI | **1.0** | 0.004 | 0.005 | OK | |
| CB46 | CB 48 | 2.00 | 2.0 | 5.0 | 0.74 | 0.019 | 0.007 | 0.012 | 0.022 | CI | **1.1** | 0.004 | 0.008 | OK | |
| CB48 | CB 50 | 2.00 | 2.0 | 5.0 | 0.74 | 0.019 | 0.007 | 0.015 | 0.024 | CI | **1.2** | 0.005 | 0.010 | OK | |
| CB50 | CB 52 | 2.00 | 2.0 | 5.0 | 0.74 | 0.013 | 0.005 | 0.015 | 0.024 | CI | **1.2** | 0.005 | 0.010 | OK | |
| CB52 | CB 54 | 2.00 | 2.0 | 5.0 | 0.75 | 0.013 | 0.005 | 0.015 | 0.024 | CI | **1.2** | 0.005 | 0.010 | OK | |
| HP | CB 42 | 2.00 | 2.0 | 5.0 | 0.90 | 0.018 | 0.008 | 0.008 | 0.019 | FB | **0.9** | 0.007 | 0.001 | OK | |
| CB 42 | CB 44 | 2.00 | 2.0 | 5.0 | 0.90 | 0.009 | 0.004 | 0.005 | 0.016 | FB | **0.8** | 0.005 | 0.001 | OK | |
| HP | CB 47 | 2.00 | 2.0 | 5.0 | 0.90 | 0.009 | 0.004 | 0.004 | 0.014 | CI | **0.7** | 0.002 | 0.002 | OK | |
| CB 47 | CB 49 | 2.00 | 2.0 | 5.0 | 0.90 | 0.004 | 0.002 | 0.004 | 0.014 | 2CI | **0.7** | 0.004 | 0.000 | OK | |
| CB 49 | CB 51 | 2.00 | 2.0 | 5.0 | 0.90 | 0.004 | 0.002 | 0.002 | 0.011 | CI | **0.5** | 0.001 | 0.001 | OK | |
| CB 51 | CB 53 | 2.00 | 2.0 | 5.0 | 0.90 | 0.004 | 0.002 | 0.002 | 0.012 | CI | **0.6** | 0.002 | 0.001 | OK | |
| CB 53 | CB 55 | 2.00 | 2.0 | 5.0 | 0.90 | 0.004 | 0.002 | 0.003 | 0.013 | 2CI | **0.6** | 0.003 | 0.000 | OK | |
| CB 54 | CB 56 | 2.00 | 2.0 | 2.5 | 0.90 | 0.014 | 0.006 | 0.016 | 0.028 | FB | **1.4** | 0.012 | 0.005 | OK | |
| CB 56 | CB 58 | 2.00 | 2.0 | 2.5 | 0.90 | 0.024 | 0.011 | 0.016 | 0.027 | FB | **1.4** | 0.011 | 0.004 | OK | |
| CB 58 | CB 104 | 2.00 | 2.0 | 2.0 | 0.90 | 0.024 | 0.011 | 0.015 | 0.028 | FB | **1.4** | 0.011 | 0.004 | OK | |
| CB 104 | CB 59 | 4.50 | 1.3 | 1.0 | 0.90 | 0.033 | 0.015 | 0.019 | 0.030 | FB | **2.3** | 0.013 | 0.006 | OK | |
| CB 59 | CB 114 | 4.50 | 1.2 | 1.5 | 0.90 | 0.027 | 0.012 | 0.018 | 0.026 | FB | **2.2** | 0.012 | 0.006 | OK | |
| CB 55 | CBMH 57 | N/A | 2.0 | 3.0 | 0.90 | 0.014 | 0.006 | 0.006 | 0.019 | FB | **1.0** | 0.006 | 0.001 | N/A | CB in landscaped infiltration area |
| CBMH 57 | CB 61 | N/A | 1.0 | 2.0 | 0.90 | 0.076 | 0.034 | 0.035 | 0.030 | FB | **3.0** | 0.019 | 0.015 | N/A | CB in landscaped infiltration area |
| HP | CB 62 | N/A | 2.0 | 0.5 | 0.90 | 0.073 | 0.033 | 0.033 | 0.049 | FB | **2.4** | 0.019 | 0.014 | N/A | CB in landscaped infiltration area |
| HP | CB 98 | N/A | 1.0 | 2.0 | 0.77 | 0.433 | 0.166 | 0.166 | 0.054 | FB | **5.4** | 0.052 | 0.114 | N/A | CB in landscaped infiltration area |
| HP | CB 65 | 2.00 | 2.5 | 0.5 | 0.9 | 0.018 | 0.008 | 0.008 | 0.031 | FB | **1.3** | 0.007 | 0.001 | OK | |
| ROAD E - WEST | | | | | | | | | | | | | | | |
| CB 44 | CB 71 | 2.00 | 2.0 | 3.5 | 0.9 | 0.013 | 0.006 | 0.006 | 0.018 | FB | **0.9** | 0.005 | 0.001 | OK | |
| HP | CB 75 | 2.00 | 2.0 | 3.5 | 0.9 | 0.010 | 0.004 | 0.004 | 0.016 | CI | **0.8** | 0.002 | 0.002 | OK | |
| HP | CB 77 | 2.00 | 5.0 | 1.4 | 0.9 | 0.055 | 0.024 | 0.024 | 0.051 | 2FB | **1.0** | 0.037 | 0.000 | OK | |
| CB 75 | CB 69 | 2.00 | 2.0 | 3.5 | 0.9 | 0.013 | 0.006 | 0.008 | 0.020 | CI | **1.0** | 0.003 | 0.004 | OK | |
| CB 77 | CB 76 | 2.00 | 1.5 | 3.5 | 0.9 | 0.007 | 0.003 | 0.003 | 0.012 | FB | **0.8** | 0.003 | 0.000 | OK | |
| CB 69 | CB 74 | 2.00 | 2.0 | 3.5 | 0.9 | 0.006 | 0.003 | 0.007 | 0.019 | CI | **1.0** | 0.003 | 0.004 | OK | |
| CB 76 | CB 80 | 2.00 | 2.0 | 3.7 | 0.9 | 0.006 | 0.002 | 0.002 | 0.013 | FB | **0.6** | 0.002 | 0.000 | OK | |
| CB 74 | CB 79 | 2.00 | 1.5 | 3.7 | 0.9 | 0.005 | 0.002 | 0.006 | 0.016 | 2FB | **1.1** | 0.011 | 0.000 | OK | |
| CB 80/79 | CB 81 | 2.00 | 1.0 | 1.4 | 0.9 | 0.013 | 0.006 | 0.006 | 0.016 | 2FB | **1.6** | 0.012 | 0.000 | OK | |
| CB 81 | CB 83 | 2.00 | 1.0 | 1.0 | 0.9 | 0.004 | 0.002 | 0.002 | 0.011 | CI | **1.1** | 0.001 | 0.001 | OK | |
| CB 83 | CB 82 | 2.00 | 1.0 | 1.1 | 0.9 | 0.009 | 0.004 | 0.005 | 0.016 | 2CI | **1.6** | 0.005 | 0.000 | OK | |
| CB 82 | CBMH 89 | 2.00 | 1.0 | 2.9 | 0.9 | 0.022 | 0.010 | 0.010 | 0.017 | 2FB | **1.7** | 0.016 | 0.000 | OK | |
| CBMH 89 | CB 92 | 2.50 | 1.2 | 2.9 | 0.9 | 0.055 | 0.025 | 0.035 | 0.030 | 2FB | **2.5** | 0.040 | 0.000 | OK | |
| CB 92 | CB 94 | 2.50 | 1.0 | 1.0 | 0.9 | 0.030 | 0.013 | 0.013 | 0.024 | 2FB | **2.4** | 0.035 | 0.000 | OK | |
| CB 94 | CB 93 | 2.00 | 2.6 | 0.5 | 0.9 | 0.043 | 0.019 | 0.019 | 0.044 | 2FB | **1.7** | 0.037 | 0.000 | OK | |
| CB 93 | CB 107 | 2.00 | 2.5 | 1.2 | 0.9 | 0.053 | 0.024 | 0.024 | 0.040 | 2FB | **1.6** | 0.040 | 0.000 | OK | |
| CB 107 | CB 100 | 2.00 | 2.9 | 0.4 | 0.9 | 0.017 | 0.008 | 0.008 | 0.034 | 2FB | **1.2** | 0.031 | 0.000 | OK | |
| CB 100 | DICB 9 | N/A | 1.6 | 1.3 | 0.9 | 0.062 | 0.028 | 0.028 | 0.035 | FB | **2.2** | 0.017 | 0.011 | N/A | CB in landscaped area |
| HP | CB 87 | 2.00 | 2.0 | 5.0 | 0.9 | 0.066 | 0.029 | 0.029 | 0.031 | FB | **1.5** | 0.017 | 0.012 | OK | |
| CB 87 | CB 91 | 2.00 | 2.3 | 1.6 | 0.9 | 0.033 | 0.015 | 0.027 | 0.038 | FB | **1.7** | 0.016 | 0.011 | OK | |
| ROAD E - EAST | | | | | | | | | | | | | | | |
| HP | CB 85 | 2.00 | 2.1 | 3.8 | 0.9 | 0.014 | 0.006 | 0.006 | 0.019 | FB | **0.9** | 0.006 | 0.001 | OK | |
| HP | CB 84 | 2.00 | 1.9 | 3.8 | 0.9 | 0.020 | 0.009 | 0.009 | 0.020 | FB | **1.1** | 0.007 | 0.002 | OK | |
| CB 85 | CB 90 | 2.00 | 2.0 | 3.2 | 0.9 | 0.010 | 0.005 | 0.005 | 0.018 | 2FB | **0.9** | 0.009 | 0.000 | OK | |
| CB 84/90 | CB 88 | 2.00 | 1.8 | 4.2 | 0.9 | 0.027 | 0.012 | 0.014 | 0.023 | FB | **1.3** | 0.010 | 0.003 | OK | |
| CB 88 | CB 96 | 2.00 | 2.1 | 4.3 | 0.9 | 0.033 | 0.015 | 0.018 | 0.027 | FB | **1.3** | 0.013 | 0.006 | OK | |
| CB 96 | CB 97 | 2.00 | 1.9 | 3.8 | 0.9 | 0.018 | 0.008 | 0.014 | 0.024 | CI | **1.2** | 0.004 | 0.009 | OK | |
| CB 97 | CB 101 | 2.00 | 1.6 | 4.5 | 0.9 | 0.012 | 0.005 | 0.014 | 0.022 | CI | **1.4** | 0.005 | 0.010 | OK | |
| CB 97 | CB 102 | 2.00 | 1.8 | 3.8 | 0.9 | 0.014 | 0.006 | 0.011 | 0.021 | FB | **1.2** | 0.009 | 0.002 | OK | |
| CB 102 | CB 106 | 2.00 | 2.0 | 3.6 | 0.9 | 0.011 | 0.005 | 0.007 | 0.019 | 2FB | **1.0** | 0.012 | 0.000 | OK | |
| CB 101 | CB 103 | 2.00 | 2.0 | 3.8 | 0.9 | 0.015 | 0.007 | 0.016 | 0.026 | CI | **1.3** | 0.005 | 0.012 | OK | |
| CB 103/106 | CB 105 | 2.00 | 2.0 | 3.8 | 0.9 | 0.011 | 0.005 | 0.017 | 0.026 | CI | **1.3** | 0.005 | 0.012 | OK | |
| ROAD E - PARKING LOT | | | | | | | | | | | | | | | |
| HP | CBMH 105 | 2.00 | 1.5 | 1.5 | 0.9 | 0.052 | 0.023 | 0.023 | 0.031 | FB | **2.1** | 0.000 | 0.023 | N/A | |
| HP | CB 99 | 2.00 | 2.0 | 2.0 | 0.9 | 0.116 | 0.052 | 0.052 | 0.045 | FB | **2.2** | 0.000 | 0.052 | N/A | |
| HP | CBMH 104 | 2.00 | 2.0 | 2.0 | 0.9 | 0.008 | 0.003 | 0.003 | 0.016 | FB | **0.8** | 0.000 | 0.003 | OK | |
| HP | CB 95 | N/A | 2.0 | 2.0 | 0.9 | 0.114 | 0.051 | 0.051 | 0.045 | FB | **2.2** | 0.000 | 0.051 | N/A | CB in landscaped area |
| HP | CBMH 101 | 2.00 | 2.0 | 2.0 | 0.9 | 0.105 | 0.047 | 0.047 | 0.043 | FB | **2.2** | 0.000 | 0.047 | N/A | |
| HP | CBMH 103 | 2.00 | 2.0 | 2.0 | 0.9 | 0.021 | 0.009 | 0.009 | 0.024 | FB | **1.2** | 0.000 | 0.009 | OK | |
| FOH - WEST | | | | | | | | | | | | | | | |
| HP | CB 255 | 2.00 | 1.0 | 6.0 | 0.9 | 0.023 | 0.010 | 0.010 | 0.015 | FB | **1.5** | 0.008 | 0.002 | OK | |
| CB 255 | CB 64 | 2.50 | 1.0 | 6.0 | 0.9 | 0.052 | 0.023 | 0.025 | 0.022 | FB | **2.2** | 0.016 | 0.010 | OK | |
| CB 64 | CBMH 67 | 2.00 | 1.0 | 6.0 | 0.9 | 0.014 | 0.006 | 0.016 | 0.018 | FB | **1.8** | 0.011 | 0.005 | OK | |
| CBMH 67 | CB 40 | 2.00 | 1.0 | 6.0 | 0.9 | 0.007 | 0.003 | 0.008 | 0.014 | FB | **1.4** | 0.007 | 0.001 | OK | |
| FOH - EAST | | | | | | | | | | | | | | | |
| HP | CBMH 208 | 2.00 | 1.0 | 6.0 | 0.9 | 0.019 | 0.008 | 0.008 | 0.014 | CI | **1.4** | 0.003 | 0.006 | OK | |
| CBMH 208 | CBMH 209 | 2.00 | 1.0 | 6.0 | 0.9 | 0.012 | 0.005 | 0.011 | 0.016 | CI | **1.6** | 0.003 | 0.008 | OK | |
| CBMH 209 | CB 63 | 2.00 | 2.0 | 6.0 | 0.9 | 0.039 | 0.018 | 0.026 | 0.028 | CI | **1.4** | 0.006 | 0.020 | OK | |

| From | To | Allow. Spread | Sx | So | Coeffiecent | Area | Increm. Q | Total Q | Depth | Inlet type | Spread | Capture | Carry Over | Remarks | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | m | % | % | | ha | m³/s | m³/s | m | | m | m³/s | m³/s | | |
| CB 63 | CBMH 66 | 2.00 | 2.0 | 6.0 | 0.9 | 0.012 | 0.005 | 0.025 | 0.028 | CI | **1.4** | 0.006 | 0.019 | OK | |
| CBMH 66 | CB 68 | 2.00 | 2.0 | 6.0 | 0.9 | 0.010 | 0.005 | 0.023 | 0.027 | CI | **1.4** | 0.006 | 0.018 | OK | |
| | | | | | | | | | | | | | | | |
| FOH - PARKING LOT | | | | | | | | | | | | | | | |
| HP | AD01 | 2.00 | 2.0 | 1.5 | 0.9 | 0.051 | 0.023 | 0.023 | 0.035 | FB | **1.7** | 0.015 | 0.008 | OK | |
| HP | AD02 | 2.00 | 1.5 | 1.5 | 0.9 | 0.026 | 0.011 | 0.011 | 0.024 | FB | **1.6** | 0.009 | 0.003 | OK | |
| HP | AD03 | 2.00 | 1.5 | 1.5 | 0.9 | 0.026 | 0.012 | 0.012 | 0.024 | FB | **1.6** | 0.009 | 0.003 | OK | |
| HP | AD04 | 2.00 | 1.5 | 1.5 | 0.9 | 0.031 | 0.014 | 0.014 | 0.026 | FB | **1.7** | 0.010 | 0.004 | OK | |
| HP | AD05 | 2.00 | 1.5 | 1.5 | 0.9 | 0.031 | 0.014 | 0.014 | 0.026 | FB | **1.7** | 0.010 | 0.003 | OK | |
| HP | AD06 | 2.00 | 2.0 | 1.0 | 0.9 | 0.052 | 0.023 | 0.023 | 0.038 | FB | **1.9** | 0.015 | 0.009 | OK | |
| | | | | | | | | | | | | | | | |
| ROAD L | | | | | | | | | | | | | | | |
| HP | CB 72 | 2.00 | 1.2 | 2.5 | 0.9 | 0.016 | 0.007 | 0.007 | 0.017 | FB | **1.4** | 0.006 | 0.001 | OK | |
| HP | CB 86 | 2.00 | 1.0 | 2.5 | 0.9 | 0.017 | 0.008 | 0.008 | 0.016 | FB | **1.6** | 0.006 | 0.001 | OK | |
| HP | CB 130 | 2.00 | 2.0 | 1.5 | 0.9 | 0.039 | 0.017 | 0.017 | 0.031 | FB | **1.6** | 0.012 | 0.005 | OK | |
| CB 109 | CB 113 | 2.50 | 2.5 | 2.5 | 0.9 | 0.153 | 0.068 | 0.107 | 0.061 | FB | **2.5** | 0.039 | 0.068 | OK | |
| CB 108 | CB 109 | 2.50 | 2.5 | 2.5 | 0.9 | 0.094 | 0.042 | 0.069 | 0.052 | FB | **2.1** | 0.030 | 0.039 | OK | |
| TD 01 | CB 108 | 2.50 | 2.5 | 2.5 | 0.9 | 0.117 | 0.052 | 0.052 | 0.047 | FB | **1.9** | 0.025 | 0.027 | OK | |
| | | | | | | | | | | | | | | | |
| ADDITIONAL AREAS | | | | | | | | | | | | | | | |
| HP | DICB 11 | 2.00 | 3.5 | 25 | 0.2 | 0.156 | 0.015 | 0.015 | 0.022 | FB | **0.6** | 0.013 | 0.002 | OK | |
| HP | DICB 6 | 2.00 | 3.5 | 11 | 0.2 | 0.156 | 0.015 | 0.015 | 0.026 | FB | **0.7** | 0.013 | 0.002 | OK | |

# APPENDIX O: AREA DRAIN SPECIFICATIONS

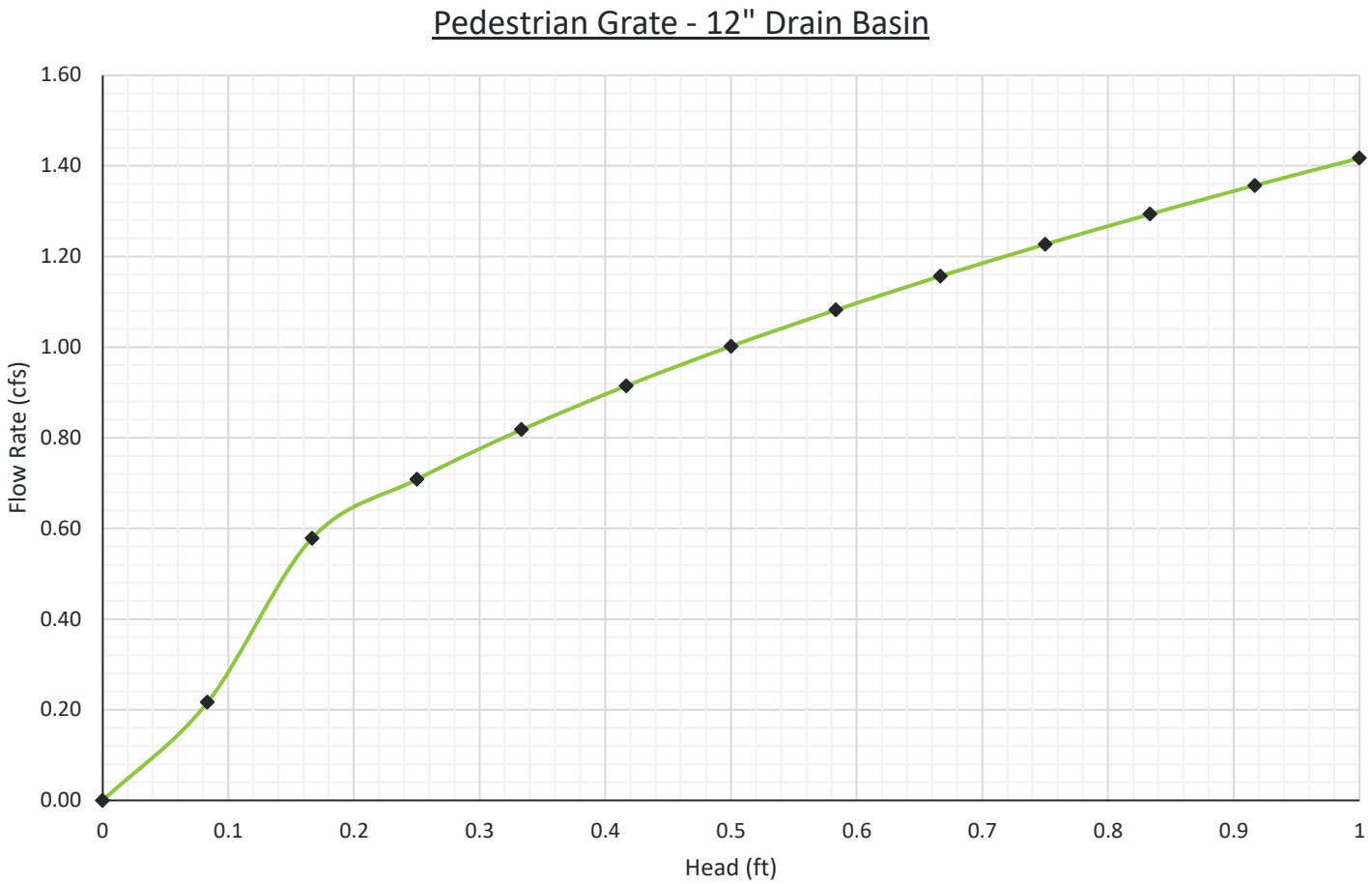
# Dynamic Nyloplast Inlet Capacity Calculator

| | | |
|---|---|---|
| Grate Style | 2ft x 2ft Road & Highway | Drop Down |
| Basin Size | 12" | Drop Down |
| Clogging Factor | 25% | Input |

THIS APPLICATION AND THE DATA WITHIN ARE PROPERTY OF ADVANCED DRAINAGE SYSTEMS AND ITS SUBSIDIARIES. ANY UNAUTHORIZED USE WITHOUT WRITTEN CONSENT IS PROHIBITED. EQUATIONS AND CALCULATIONS ARE BASED OFF USDOT/FHWA URBAN DESIGN MANUAL, HYDRAULIC ENGINEERING CIRCULAR NO. 22, THIRD EDITION, PUBLICATION NO. FHWA-NHI-10-009.

# Dynamic Nyloplast Inlet Capacity Calculator

| | | |
|---|---|---|
| Grate Style | Pedestrian Grate | Drop Down |
| Basin Size | 12" | Drop Down |
| Clogging Factor | 25% | Input |

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# APPENDIX P: ONTARIO BUILDING CODE SANITARY CALCULATIONS BREAKDOWN

Salas O'Brien

January 7, 2026

City of Ottawa
101 Centrepointe Drive
Ottawa, Ontario

RE: **The Ottawa Hospital New Campus Development**
**Site Plan Control – Water and Sanitary Drainage Flows – Mechanical Design**

To Whom it May Concern,

This report summarizes how the domestic water and sanitary drainage flow requirements have been estimated as part of the ongoing mechanical design for the new hospital building that is proposed as part of the above noted project.

***Domestic Water***

The design incoming domestic water flow has been calculated as follows:

- Summing the quantity of connected fixtures of each type based on the currently proposed layouts and project requirements, plus allowances for future fixtures.
- Applying Ontario Building Code (OBC) Tables 7.6.3.2.-A, 7.6.3.2.-C, and 7.6.3.2-D to determine hydraulic loads in water supply fixture units for cold water and hot water.
- Estimating the diversified design flow rate based on the hydraulic load following OBC 7.6.3.2, known continuous flows, and ASHRAE and/or ASPE guidelines.

It is noted that the design domestic water flow rates represent estimated peak flow and not average or typical flow.

| Building Water Service | Water Supply Fixture Units | Design Flow (gpm) | Remarks |
|---|---|---|---|
| Domestic Cold | 18,300 | 1800 | From site service connection |
| Domestic Hot | 5300 | 650 | From Central Utility Plant (CUP) |
| Fire Protection | N/A | 750 | Shared site service connection with DCW |

In the current design, domestic cold water entering the hospital building serves the domestic cold water demand but does not provide makeup to the domestic hot water system; domestic hot water is provided to the hospital from the separate Central Utility Plant (CUP) building. It is being considered to generate domestic hot water for the hospital in the hospital building instead of in the CUP. If this design change is implemented, the flow requirement for the domestic cold water service would increase to include the domestic hot water flow that is indicated above.

Incoming building water flow requirements for fire protection have been determined in accordance with OBC and NFPA 13 as applicable.

***Sanitary Drainage***

The design sanitary drainage flow rate for each leaving building sewer connection has been calculated as follows:

- Summing the quantity of connected fixtures of each type based on the currently proposed layouts and project requirements, plus allowances for future fixtures.
- Applying OBC Table 7.4.9.3 to determine the hydraulic load in drainage fixture units.
- Applying OBC Table 7.4.10.5 to estimate the diversified flow rate based on the hydraulic load.
- Adding known continuous flows.

It is noted that the design sanitary drainage flow rates represent estimated peak flow and not average or typical flow.

| Building Sanitary Connection | Drainage Fixture Units | Fixture Design Flow (gpm) | Largest Sump Pump Flow (gpm) | Total Design Flow (gpm) |
|---|---|---|---|---|
| TA-SAN-1 | 4800 | 506 | N/A | 506 |
| TA-SAN-2 | 5500 | 561 | 325 | 886 |
| PG-SAN-1 | 1100 | 184 | N/A | 184 |
| TB-SAN-1 | 4400 | 472 | 250 | 722 |
| TB-SAN-2 | 4400 | 472 | 325 | 797 |
| TB-SAN-3 | 5000 | 522 | N/A | 522 |
| TB-SAN-4 | 2600 | 315 | 100 | 415 |

The proposed sanitary sump pumps will serve only elevator pits and in some cases, emergency floor drains or funnel floor drains serving fire protection system drains used for maintenance and testing. Sanitary sump pump operation will be infrequent and of short duration and it would be rare that multiple sump pumps would operate simultaneously.

Yours very truly,

**PATRICK WALLER, P.ENG.**
*Senior Vice President*

LICENSED PROFESSIONAL ENGINEER
#22238
JAN. 7, 2026
P.S. WALLER
100192642
PROVINCE OF ONTARIO