Site Servicing & Stormwater Management Report

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

January 12th, 2026
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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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Signatures

Site Servicing

Prepared by

Liam Curley, P. Eng 2026-01-12
Project Engineer
Land Development & Municipal Engineering

Approved[1] by *(must be reviewed for technical accuracy prior to approval)*

Colin Graham, P. Eng, PMP 2026-01-12
Senior Project Engineer
Land Development & Municipal Engineering

Stormwater Management

Prepared by

Fiona Allen, P. Eng 2026-01-12
Experienced Engineer
Water Resources, Land Development Ontario

Approved[2] by *(must be reviewed for technical accuracy prior to approval)*

On behalf of Alyssa Mohino-Barrie, P. Eng 2026-01-12
Manager
Water Resources, Land Development Ontario

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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.

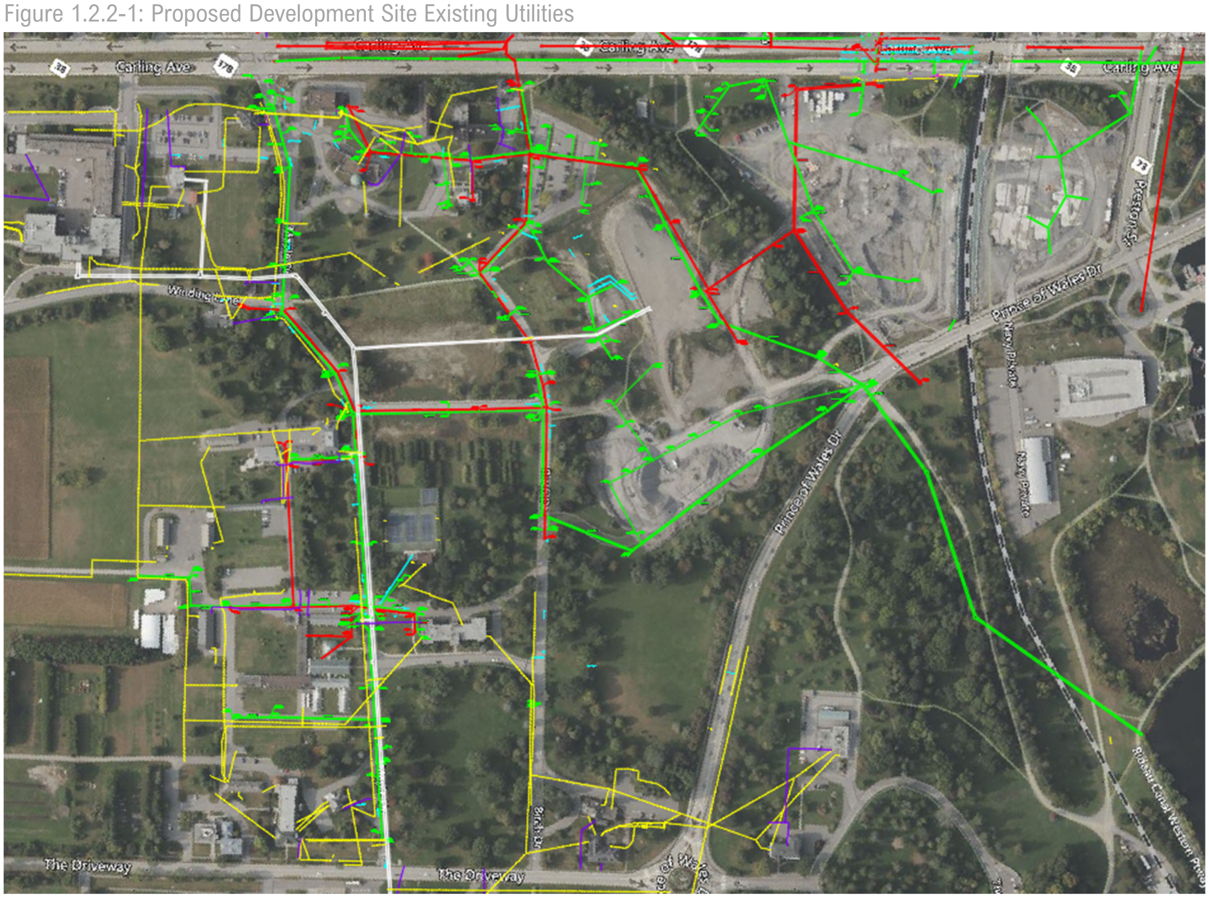
The CCME Canadian Water Quality Guidelines for Protection of Aquatic Life must be met. The discharge of water during construction should also be monitored for signs of scouring and ensure there is no suspension of contaminated settlement.

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



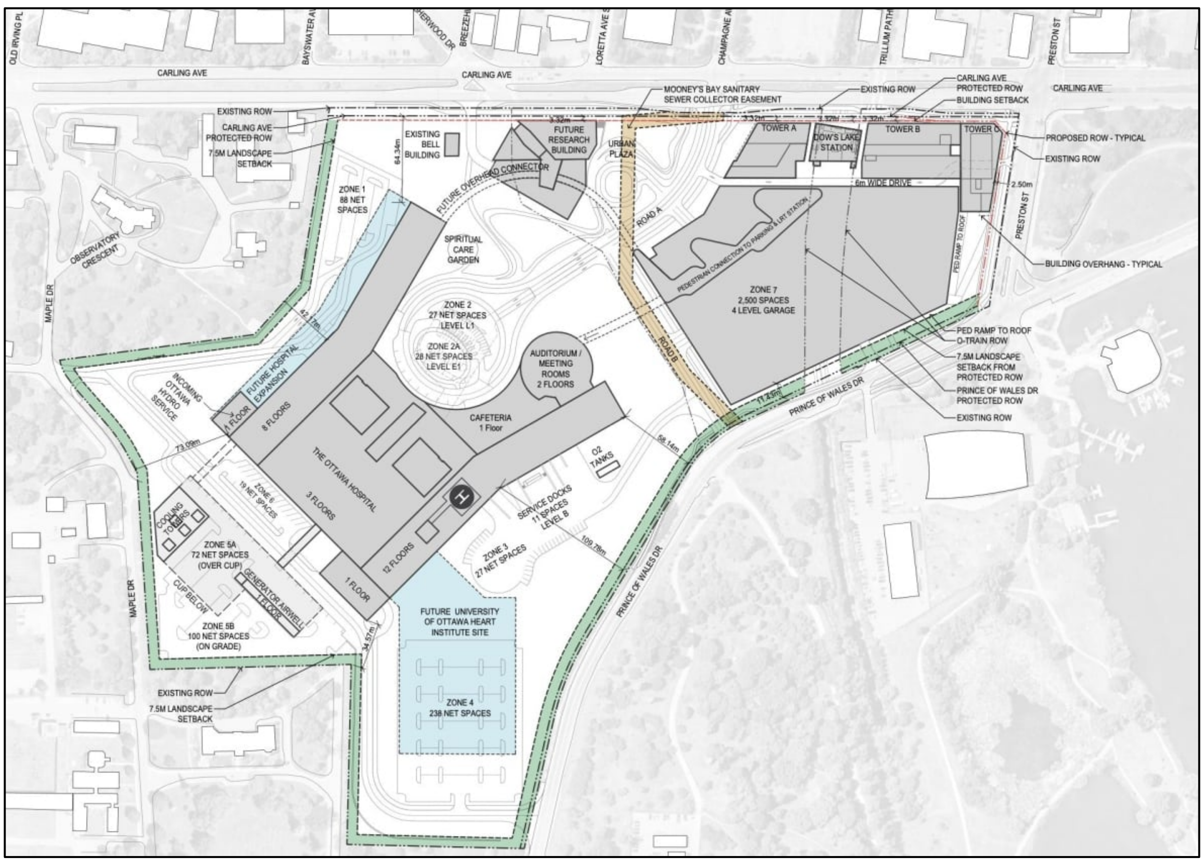
1.3 Proposed Development

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.

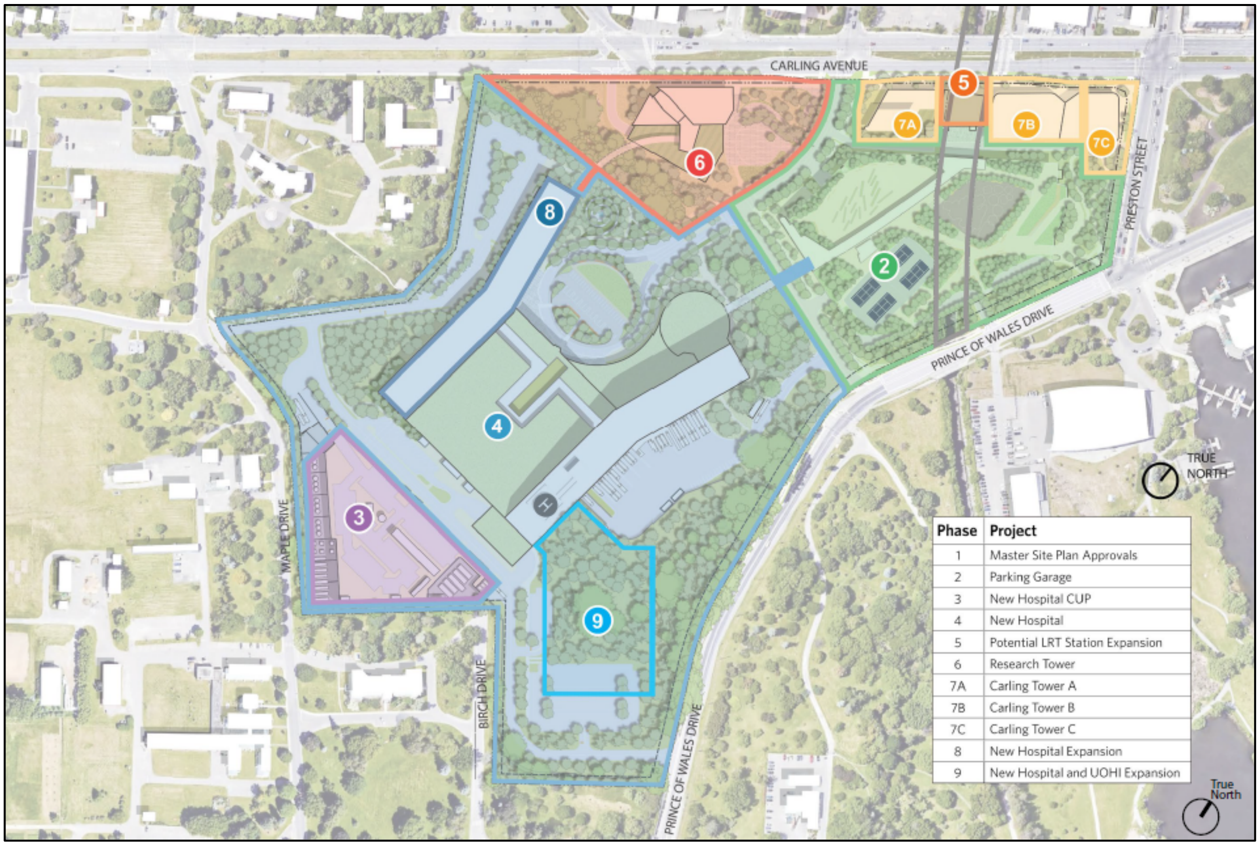
The Ottawa Hospital, via Parsons Corporation, has completed utility and stormwater management design for the mainline utilities contained in the Advanced Works contract. The design capacities of these utilities consider the buildout of the Parking Garage, Central Utility Plant, and Main Hospital Building. 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



Phase	Project
1	Master Site Plan Approvals
2	Parking Garage
3	New Hospital CUP
4	New Hospital
5	Potential LRT Station Expansion
6	Research Tower
7A	Carling Tower A
7B	Carling Tower B
7C	Carling Tower C
8	New Hospital Expansion
9	New Hospital and UOHI Expansion

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.

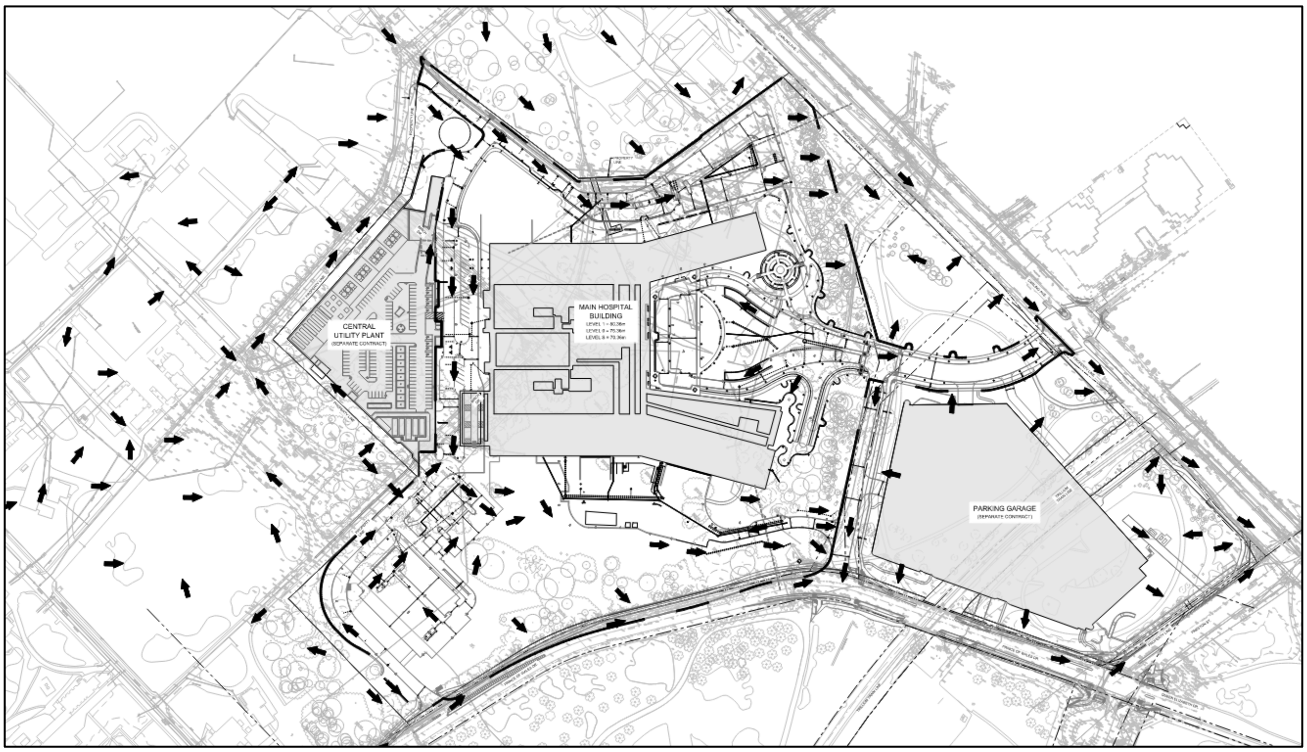
The accompanying site grading drawings, provided as part of the 95% Developed Design submittal, show critical grade elevations, proposed contours, overland flow, and other grading features.

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

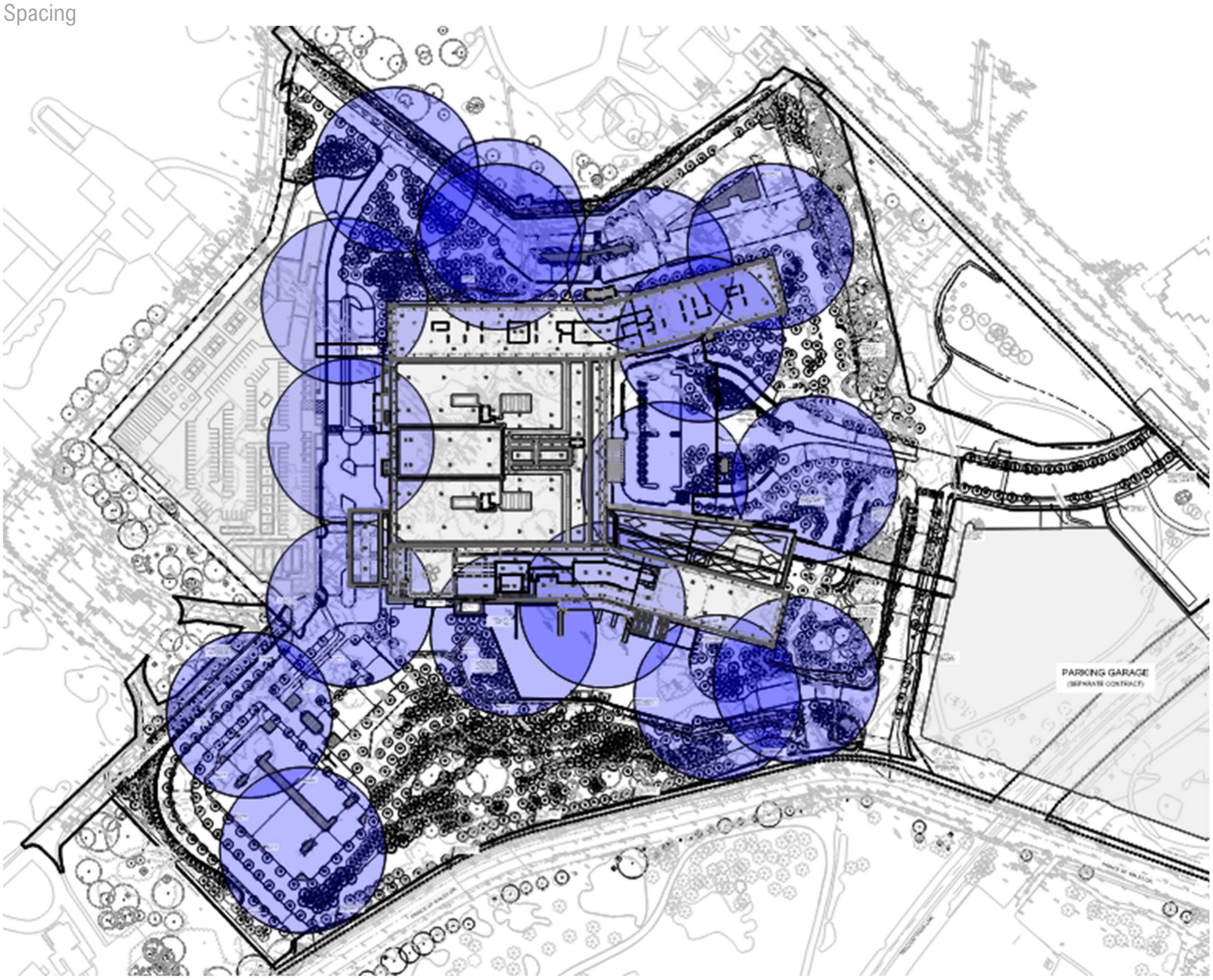
Table 3.3-1 denotes the contribution of each hydrant in terms of allowable capacity to the Central Utility Plan, Future Heart Institute, and Main Hospital Building.

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:

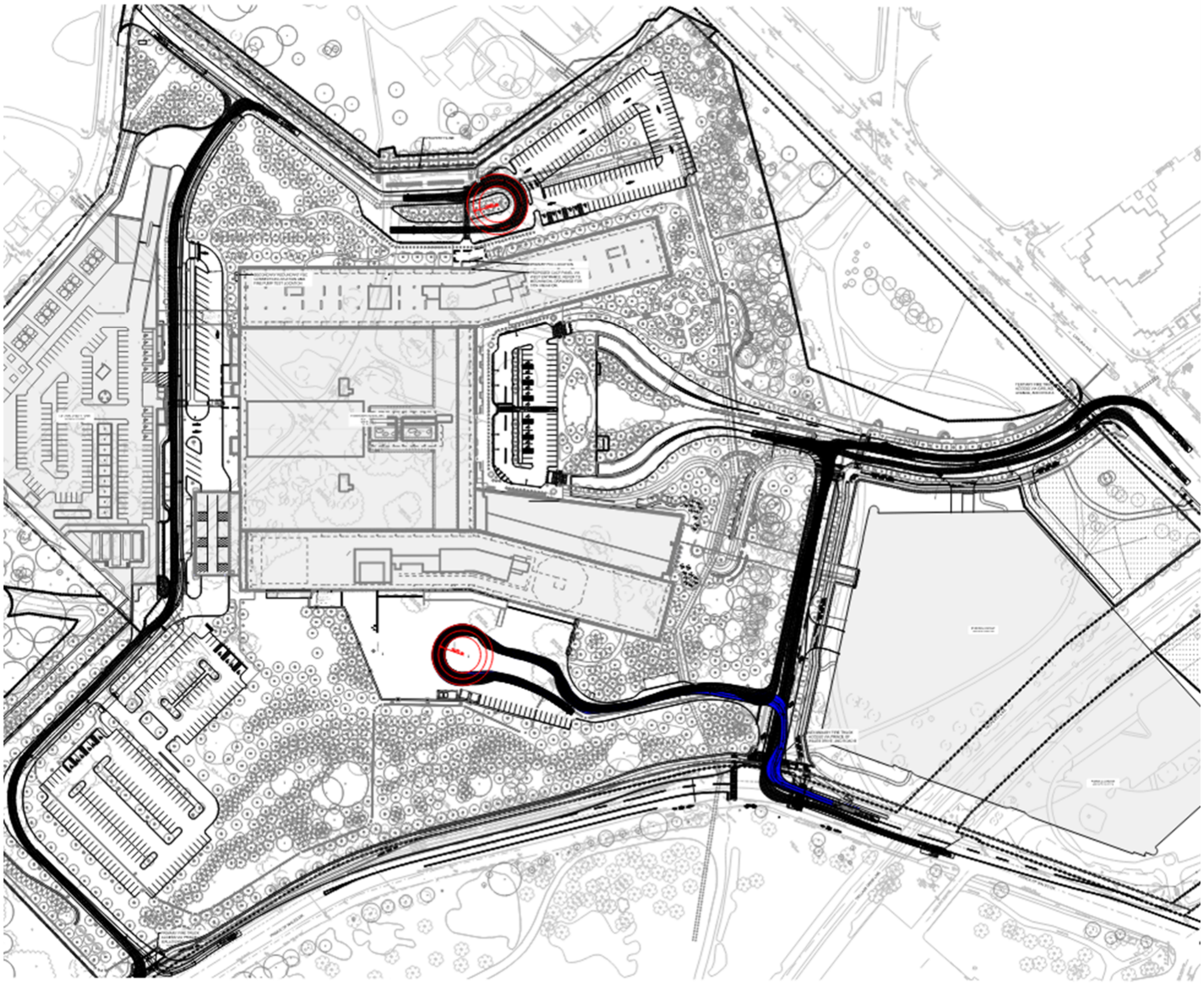
- The fire truck route shall provide primary fire access from Maple Drive and Prince of Wales Drive, via Roads D and E, to the CACF fire panel at the Facility's West Entrance on Level E1.
- The secondary fire access route shall be to the Facility's loading docks via new Roads B and L.
- The tertiary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

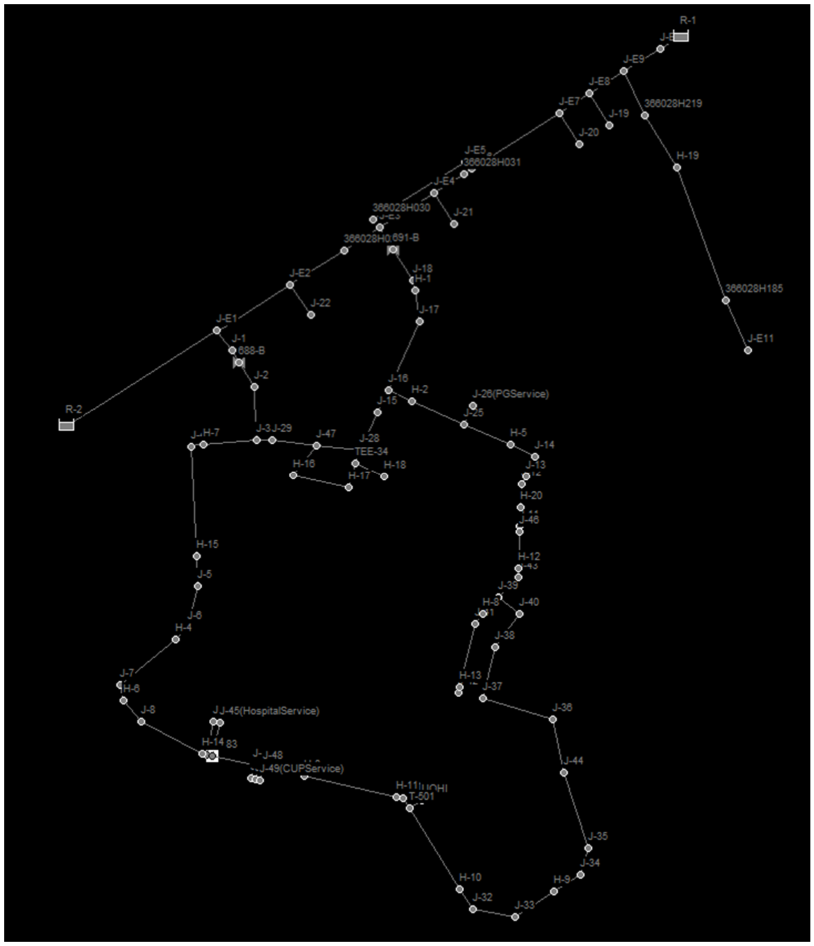
Figure 3.3-2: Fire Access Routes and Hydrants



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

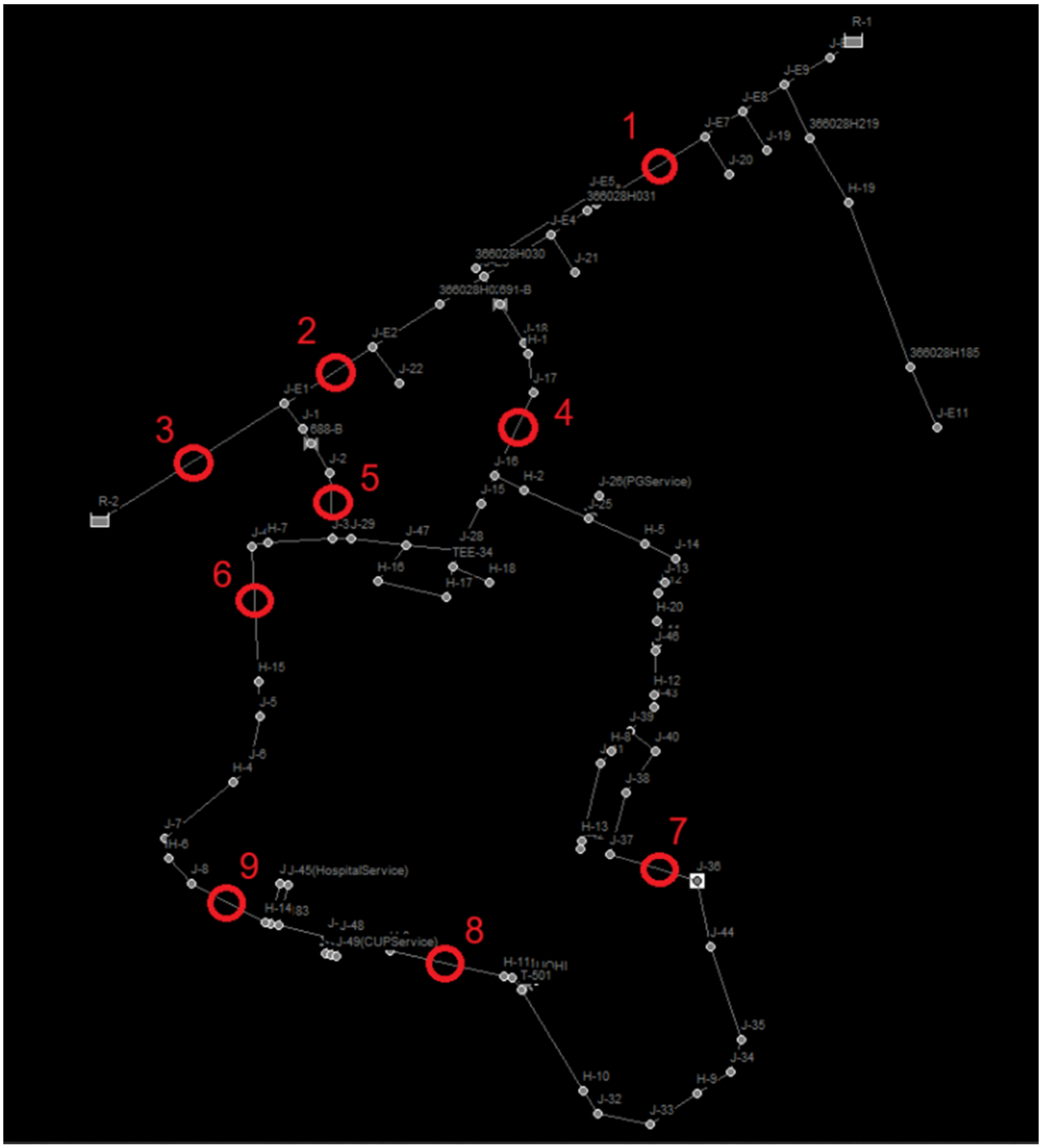


Table 3.3-3: EPANET Results at Break Locations

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

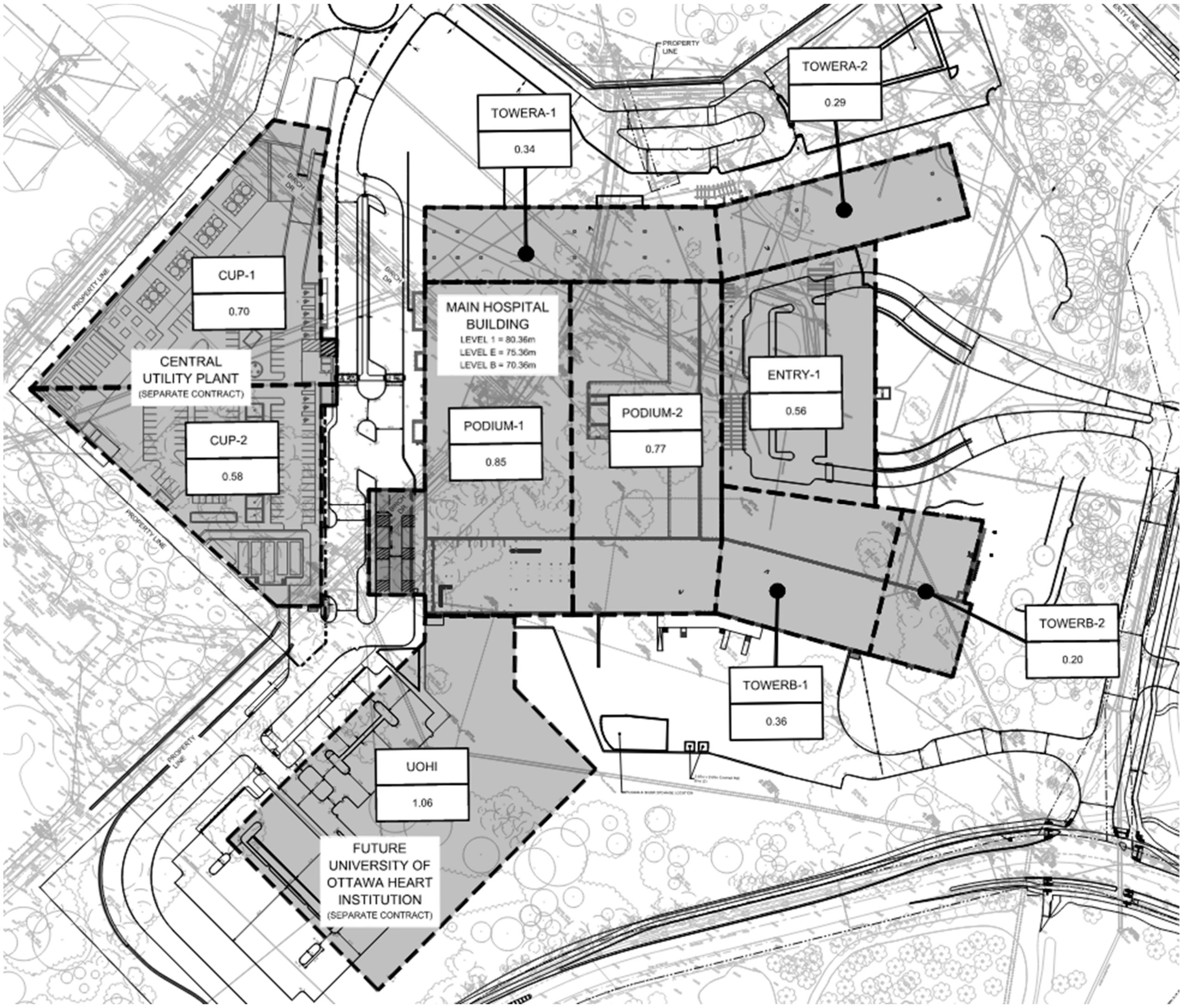


Table 4.2-2 summarizes the proposed sanitary sewer flows in accordance with Section 4.4.1 of the City of Ottawa Sewer Design Guidelines – 2012. The Central Utility Plant will have two proposed sanitary service connections as per the Central Utility Plant design drawings available at the time of print, 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

<table>
<tr><th rowspan="2">Storage Tank Name</th><th colspan="3">Subcatchment Characteristics</th><th colspan="2">Quantity Control</th><th colspan="3">Water Balance</th><th rowspan="2">Total Storage Volume (m³)</th></tr>
<tr><th>Sub- catchment Name/Nº</th><th>Outlet</th><th>Area (ha)</th><th>100-yr + 20% Storage Volume for Quantity Control (m³)</th><th>Provided Active Storage (m³)</th><th>Runoff (mm)</th><th>Runoff Volume (m³)</th><th>Provided Sump Volume for Water Balance (m³)</th></tr>
<tr><td rowspan="2">Tower B (Eastern)/ Chamber 201</td><td>S-11</td><td>MH-SA52</td><td>0.4268</td><td rowspan="2">506</td><td rowspan="2">510</td><td>29.8</td><td>127</td><td rowspan="2">216</td><td rowspan="2">726</td></tr>
<tr><td>S-10</td><td>MH-SA52</td><td>0.2975</td><td>30.0</td><td>89</td></tr>
<tr><td rowspan="3">Dome (Northern) Chamber 202</td><td>S-7</td><td>MH-SA56-1</td><td>0.2899</td><td rowspan="3">588</td><td rowspan="3">625</td><td>25.0</td><td>72</td><td rowspan="3">284</td><td rowspan="3">909</td></tr>
<tr><td>S-9 & 53</td><td>MH-SA56-2</td><td>0.4718</td><td>28.8</td><td>136</td></tr>
<tr><td>S-8, 54B, S11A&B</td><td>D-S56_2</td><td>0.3028</td><td>25.0</td><td>76</td></tr>
<tr><td rowspan="2">Tower A (Western)/ Chamber-203</td><td>S-4</td><td>MH-SA49</td><td>0.2908</td><td rowspan="2">271</td><td rowspan="2">271</td><td>30.0</td><td>87</td><td rowspan="2">191</td><td rowspan="2">461</td></tr>
<tr><td>S-3</td><td>MH-SA50</td><td>0.3456</td><td>30.0</td><td>104</td></tr>
<tr><td rowspan="3">Podium (Southern)/ Chamber 204</td><td>S-6</td><td>MH- SA51-1</td><td>0.2932</td><td rowspan="3">271</td><td rowspan="3">295</td><td>22.3</td><td>65</td><td rowspan="3">149</td><td rowspan="3">444</td></tr>
<tr><td>S-5</td><td>MH-SA51-2</td><td>0.2767</td><td>22.0</td><td>61</td></tr>
<tr><td>S-12</td><td>MH-SA51-1</td><td>0.0933</td><td>24.3</td><td>23</td></tr>
<tr><td>Total</td><td></td><td></td><td>3.0884</td><td>1,636</td><td>1,700</td><td></td><td>840</td><td>844</td><td>2,544</td></tr>
</table>

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 90th Percentile occurrence', to obtain the maximum 3 points assigned to the sustainable sites. For developments located in the City of Ottawa, retention of the 90th 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 100th 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

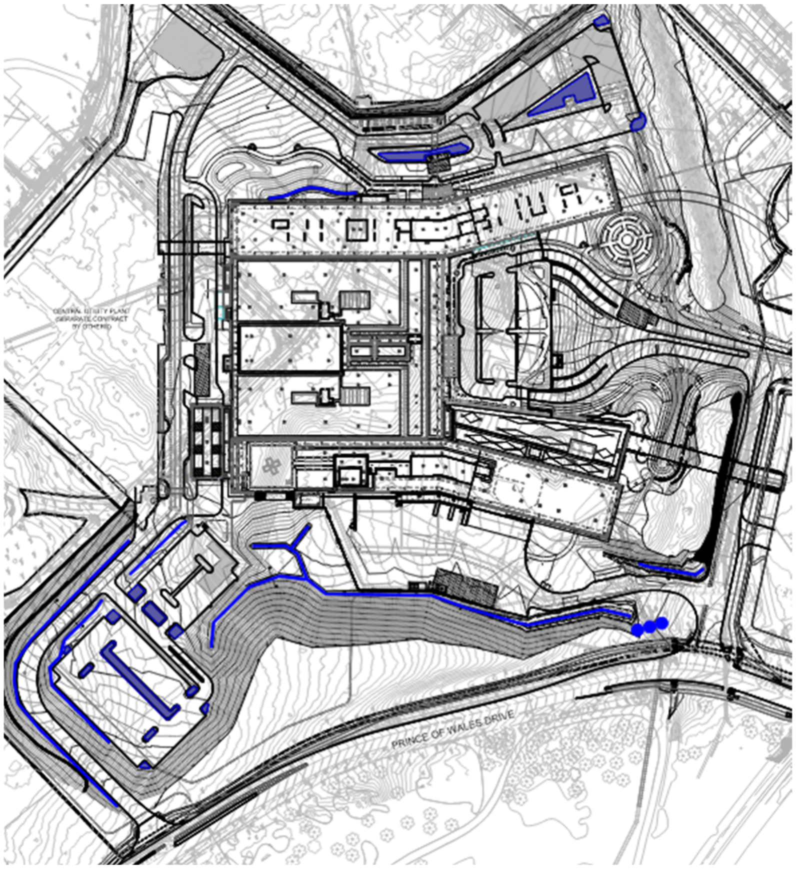
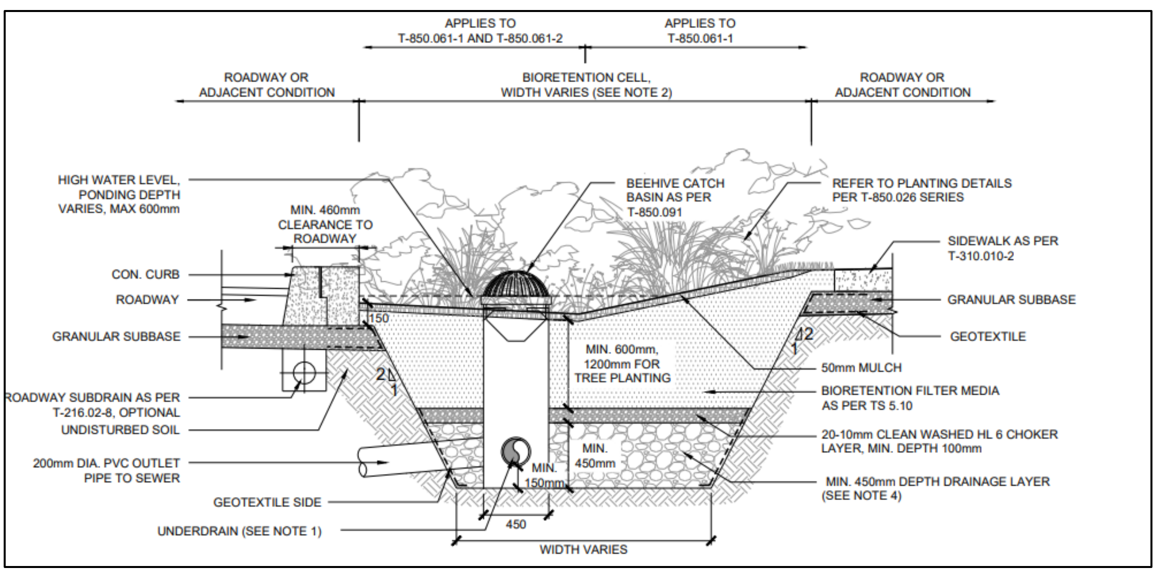


Figure 6.2-2: Proposed Bioretention Cell



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

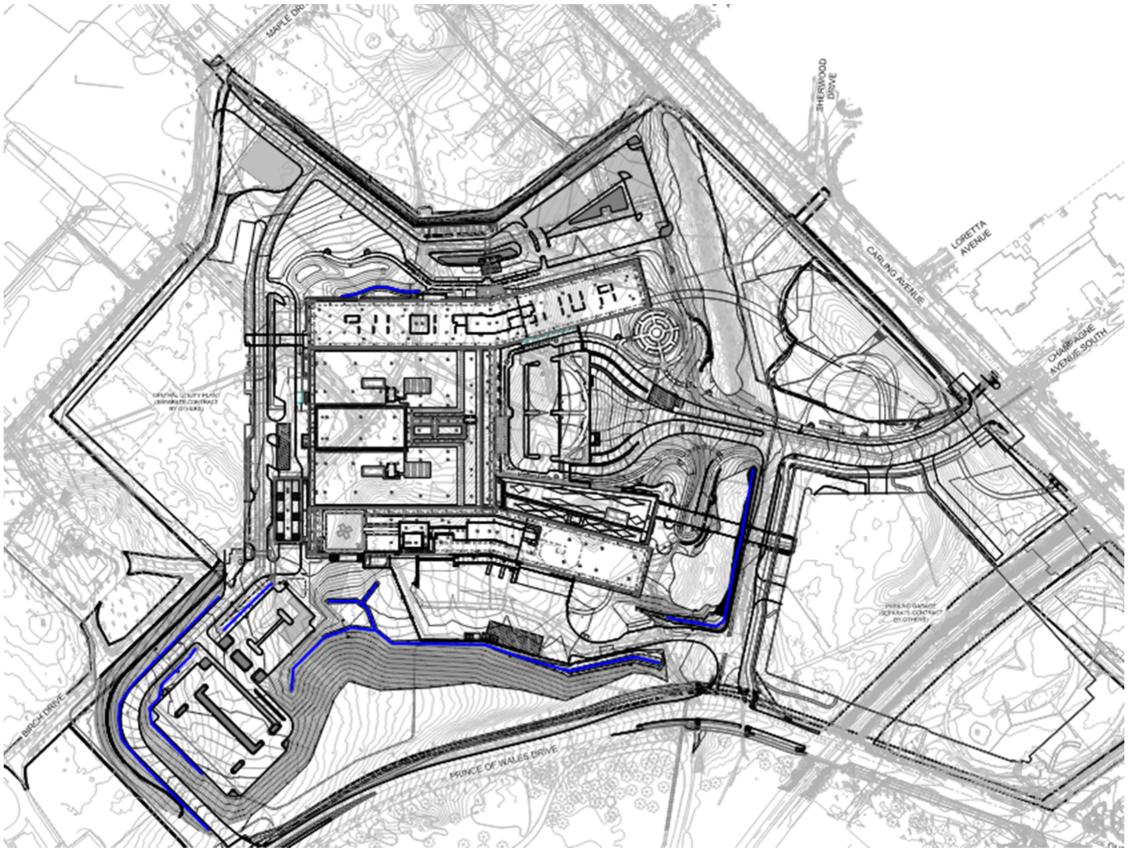
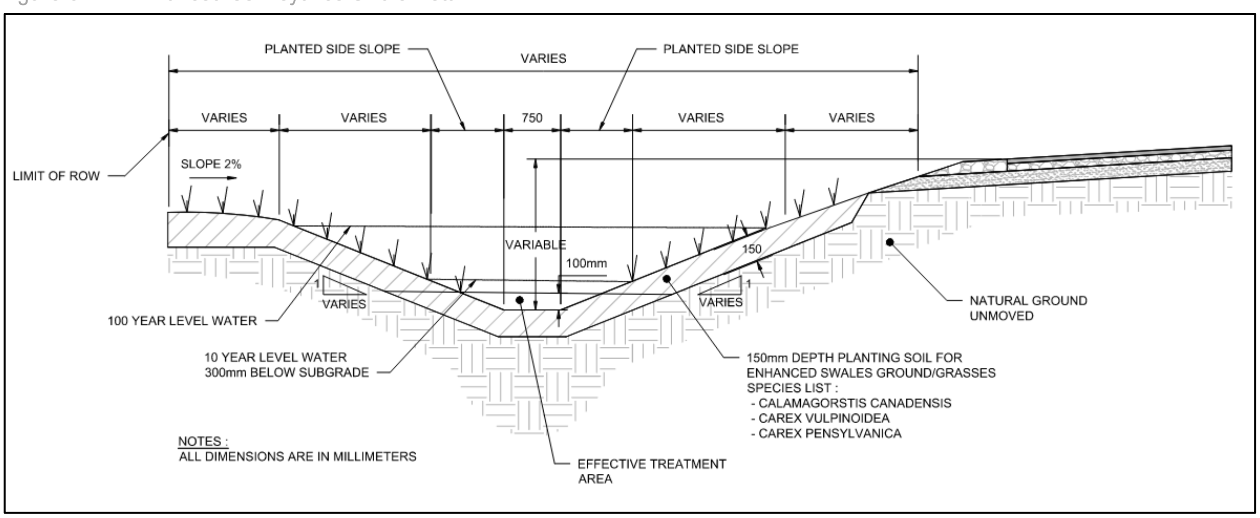


Figure 6.2-4: Enhanced Conveyance Swale Detail



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

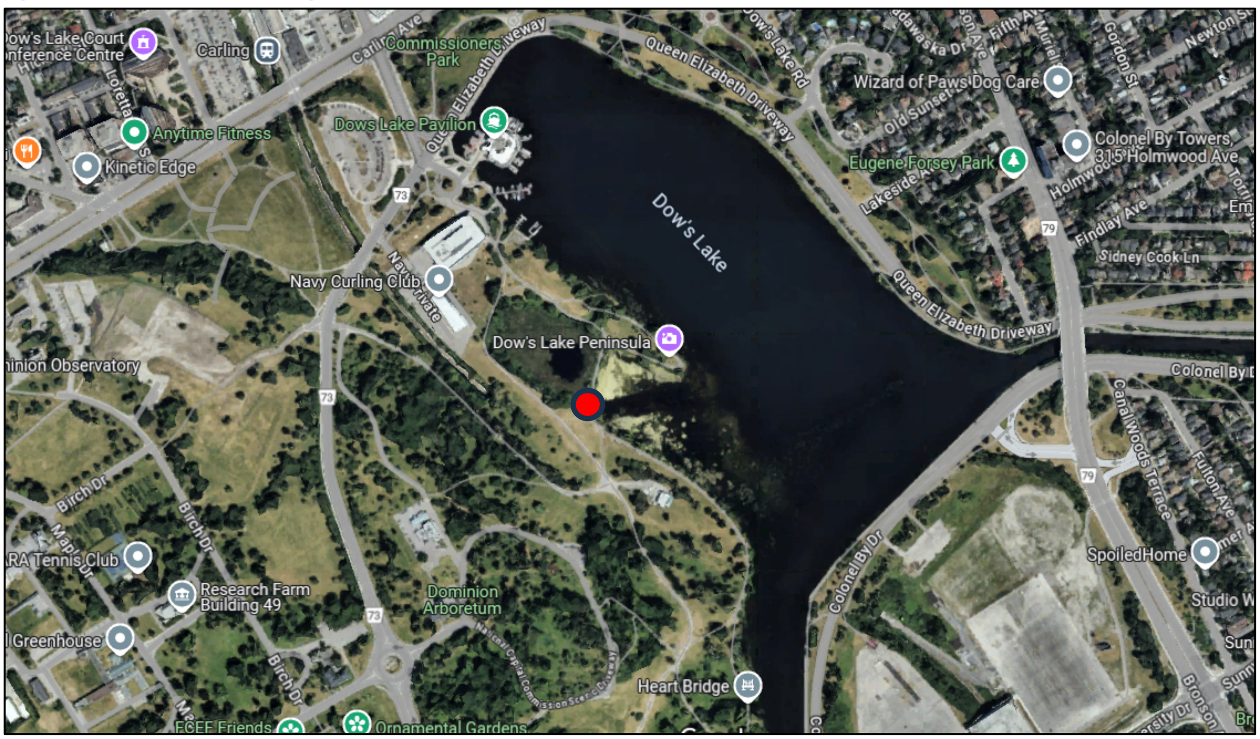


Figure 6.2-5: Location of Existing Dow's Lake Outlet

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

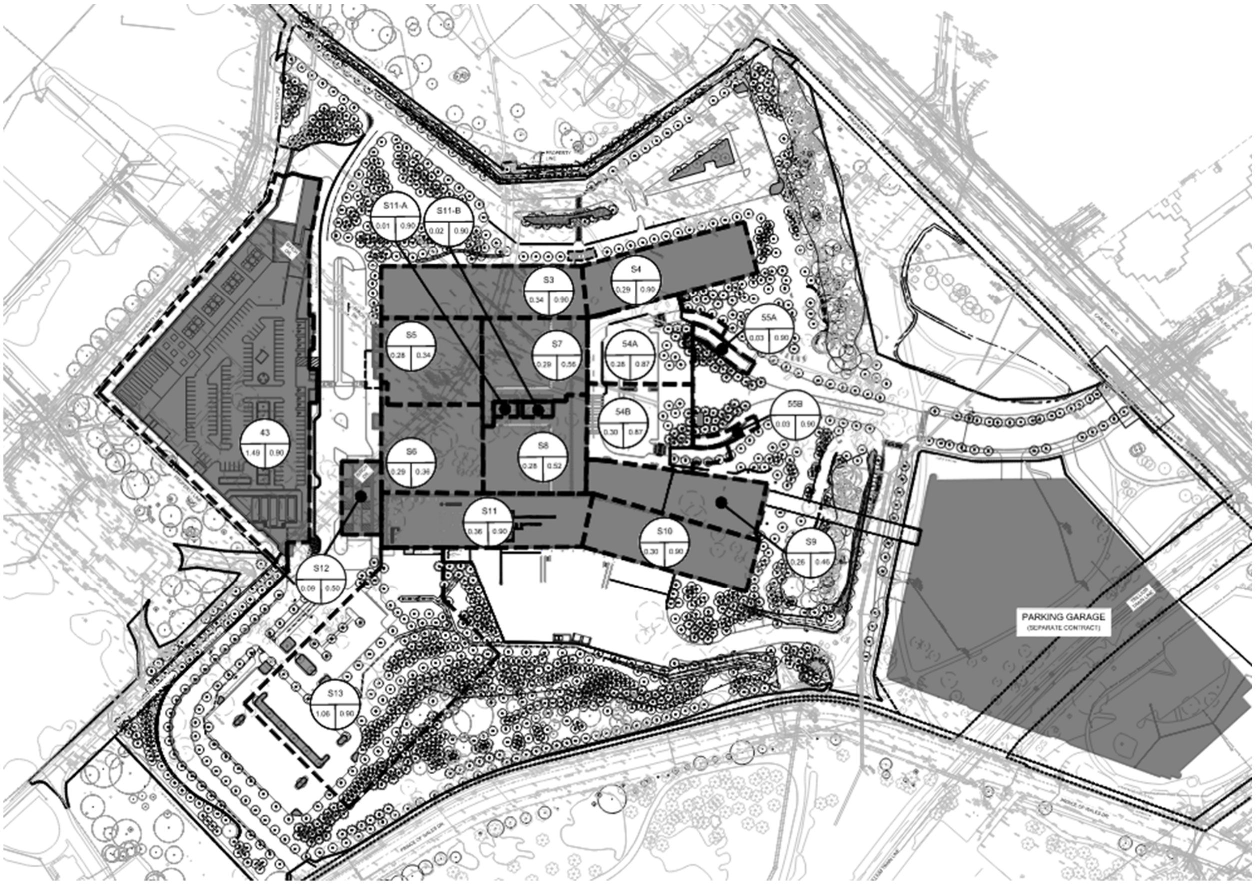
- Two south connections into a stormwater management detention tank

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

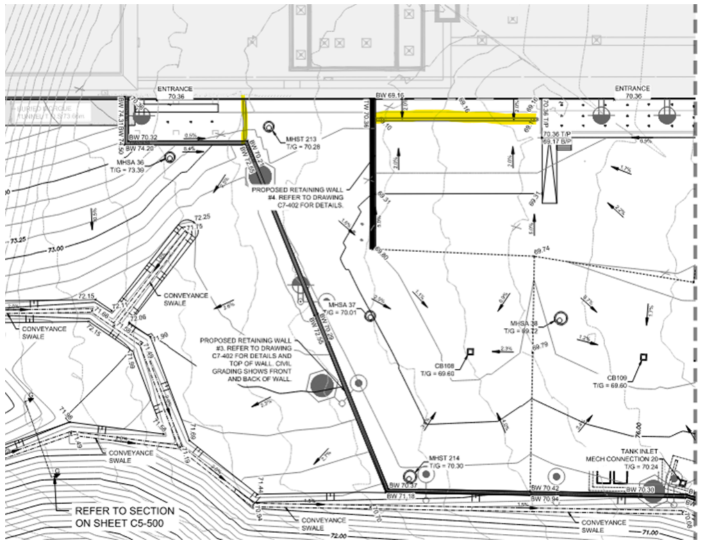


Figure 6.3-3: Trench Drain Design – Tower B East

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.

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 loading. Buildings with multiple should use the most restrictive occupancy.
Limited Combustible	-15%	
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%	

Justifications – *NORTH SIDE*

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

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%	

SOUTH SIDE

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

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%	

EAST SIDE

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

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

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%	

Justifications – *NORTH SIDE*

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

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%	

SOUTH SIDE

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

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%	

EAST SIDE

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

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

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

Link - Node Table: (continued)

Link ID | Start Node | End Node | Length m | Diameter 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 ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
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 ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
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 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	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

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******************************************************************
*                           E P A N E T                          *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                          Version 2.2                           *
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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-PropWM300mmHospital	J-2	J-3	44.3429614279853	300
32-PropWM300mmRdL	J-12	J-13	8.10	300
21-ExWM400mmCarlingAve	R-2	J-E1	148.67	1000
20-ExWM400mmCarlingAve	J-E1	J-E2	72.06	400
16-ExWM400mmCarlingAve	J-E4	J-E3	53.8905996515422	400
8-ExWM400mmCarlingAve	J-E8	J-E7	30.3005394242057	400
45-PropWM300mmHospital	J-E1	J-1	20.64	300
19-PropWM150mmResearchB	J-E2	J-22	30.3462421119232	150
15-PropWM150mmCarlingV-T#3	J-E4	J-21	30.9676844497797	150
9-PropWM150mmCarlingV-T#2	J-E7	J-20	31.0736886830009	150
7-PropWM150mmCarlingV-T#1	J-E8	J-19	31.2526179381906	150
23-PropWM300mmRdA	J-18	H-1	8.34306529014965	300
24-PropWM300mmRdA	H-1	J-17	26.2370276682741	300
37-PropWM300mmRdD	J-6	H-4	14.21	300
36-PropWM300mmRdD	H-4	J-7	59.70	300
28-PropWM300mmRdB	H-2	J-25	47.92	300
30-PropWM300mmRdB	J-25	H-5	42.00	300
29-PropWM150mmPGService	J-25	J-26(PGService)	16.98	150
14-ExWM400mmCarlingAve	366028H031	J-E4	29.2340814798819	400
17-ExWM400mmCarlingAve	366028H029	J-E3	35.0957871684793	400
18-ExWM400mmCarlingAve	J-E2	366028H029	54.4871678813318	400
10-ExWM400mmCarlingAve	J-E7	J-E6	86.5525765463542	400
13-ExWM400mmCarlingAve	J-E6	366028H031	7.73250133830889	400
11-ExWM150mmCarlingAve	J-E6	J-E5	7.45726728454382	150
12-ExWM150mmCarlingAve	J-E5	366028H030	90.9465713866359	150
6-ExWM400mmCarlingAve	J-E9	J-E8	0.382945097269914	400
4-ExWM150mmPrestonSt	J-E9	366028H219	40.1973470697933	150
31-PropWM300mmRdB	J-14	H-5	22.94	300
25-PropWM300mmRdA	J-17	J-16	62.29	300
40-PropWM300mmHospital	J-4	H-15	91.57	300
39-PropWM300mmHospital	H-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

Link - Node Table: (continued)

Link ID / Start Node	End Node	Length m	Diameter 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 ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
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 ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
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

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******************************************************************
*                           E P A N E T                          *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                         Version 2.2                            *
******************************************************************
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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	VelocityUnit m/s	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	VelocityUnit m/s	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

Page 7 Scenario: with hospital loop
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                            *
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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-PropWM300mmHospital	J-2	J-3	44.3429614279853	300
32-PropWM300mmRdL	J-12	J-13	8.10173833723436	300
21-ExWM400mmCarlingAve	R-2	J-E1	148.67	1000
20-ExWM400mmCarlingAve	J-E1	J-E2	72.0604746626472	400
16-ExWM400mmCarlingAve	J-E4	J-E3	53.8905996515422	400
8-ExWM400mmCarlingAve	J-E8	J-E7	30.3005394242057	400
45-PropWM300mmHospital	J-E1	J-1	20.6394832517881	300
19-PropWM150mmResearchB	J-E2	J-22	30.3462421119232	150
15-PropWM150mmCarlingV-T#3	J-E4	J-21	30.9676844497797	150
9-PropWM150mmCarlingV-T#2	J-E7	J-20	31.0736886830009	150
7-PropWM150mmCarlingV-T#1	J-E8	J-19	31.2526179381906	150
23-PropWM300mmRdA	J-18	H-1	8.34306529014965	300
24-PropWM300mmRdA	H-1	J-17	26.2370276682741	300
37-PropWM300mmRdD	J-6	H-4	14.21	300
36-PropWM300mmRdD	H-4	J-7	59.70	300
28-PropWM300mmRdB	H-2	J-25	47.9195248882866	300
30-PropWM300mmRdB	J-25	H-5	42.0036195237461	300
29-PropWM150mmPGService	J-25	J-26(PGService)	16.98	150
14-ExWM400mmCarlingAve	366028H031	J-E4	29.2340814798819	400
17-ExWM400mmCarlingAve	366028H029	J-E3	35.0957871684793	400
18-ExWM400mmCarlingAve	J-E2	366028H029	54.4871678813318	400
10-ExWM400mmCarlingAve	J-E7	J-E6	86.5525765463542	400
13-ExWM400mmCarlingAve	J-E6	366028H031	7.73250133830889	400
11-ExWM150mmCarlingAve	J-E6	J-E5	7.45726728454382	150
12-ExWM150mmCarlingAve	J-E5	366028H030	90.9465713866359	150
6-ExWM400mmCarlingAve	J-E9	J-E8	0.382945097269914	400
4-ExWM150mmPrestonSt	J-E9	366028H219	40.1973470697933	150
31-PropWM300mmRdB	J-14	H-5	22.941571844959	300
25-PropWM300mmRdA	J-17	J-16	62.2851182626027	300
33-PropWM300mmRdL	H-12	J-12	28.8853068075771	300
40-PropWM300mmHospital	J-4	H-15	91.57	300

39-PropWM300mmHospital	H-15	J-5	24.29	300
42-PropWM300mmHospital	J-3	H-7	43.89	300
41-PropWM300mmHospital	H-7	J-4	10.80	300
38-PropWM300mmHospital	J-5	J-6	35.8431820756787	300
1-ExWM400mmCarlingAve	R-1	J-E10	0.217566858316817	1000

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
3-ExWM400mmCarlingAve	J-E10	J-E9	0.399488044413268	400
5A-ExWM150mmPrestonSt	J-E11	366028H185	45.2635914858321	150
46-PropWM200mmCUPService	J-27(CUPService)	J-24	11.58	200
27-PropWM300mmRdB	J-16	H-2	21.5808707602312	300
26-PropWM300mmRdA	J-16	J-15	21.3543962701595	300
47-PropWM300mmHospital	J-3	J-29	12.8116327584704	300
49-PropWM300mmRdA	J-28	J-15	34.6655277241037	300
50-PropWM300mmRdE	J-7	H-6	13.31	300
51-PropWM300mmRdE	H-6	J-8	22.67	300
56-PropWM300mmRdE	H-11	J-31	5.74	300
57-PropWM200mmCUPService	J-30(CUPService)	J-10	11.59	200
59-PropWM300mmRdE	H-10	J-32	19.01	300
60-PropWM300mmRdE	J-32	J-33	35.9527228433413	300
61-PropWM300mmRdE	J-33	H-9	38.6955804752682	300
62-PropWM300mmRdE	H-9	J-34	26.326879710781	300
63-PropWM300mmRdE	J-34	J-35	22.6847258729083	300
64-PropWM300mmHospital	J-35	J-44	66.2303194539337	300
65-PropWM300mmHospital	J-44	J-36	45.3820485822456	300
66-PropWM300mmHospital	J-36	J-37	61.1082602227364	300
67-PropWM300mmHospital	J-37	J-38	43.5544391693597	300
68-PropWM300mmHospital	J-38	J-40	34.5857153250994	300
69-PropWM300mmHospital	J-40	J-39	22.0228385256111	300
70-PropWM300mmLoadingDock	J-42	H-13	4.94	300
71-PropWM300mmLoadingDock	H-13	J-41	54.59	300
72-PropWM300mmLoadingDock	J-41	H-8	10.281839107194	300
73-PropWM300mmLoadingDock	H-8	J-39	18.8763427083242	300
74-PropWM300mmLoadingDock	J-39	J-43	23.4020520143924	300
75-PropWM300mmRdL	J-43	J-46	37.5282521890565	300
77-PropWM300mmRdL	J-46	J-11	5.05366092600287	300
78-PropWM300mmRdL	J-11	H-12	6.0260271211011	300
80-PropWM300mmRdL	J-13	J-14	17.9428667770884	300
48-PropWM300mmHospital	J-29	J-47	37.9955088729321	300
48B-PropWM300mmHospital	J-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-ExWM150mmPrestonSt	366028H185	H-19	118.755824075502	150
5-ExWM150mmPrestonSt	H-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	VelocityUnit m/s	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	VelocityUnit m/s	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                            *
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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-PropWM300mmHospital	J-2	J-3	44.3429614279853	300
32-PropWM300mmRdL	J-12	J-13	8.10173833723436	300
21-ExWM400mmCarlingAve	R-2	J-E1	148.67	1000
20-ExWM400mmCarlingAve	J-E1	J-E2	72.0604746626472	400
16-ExWM400mmCarlingAve	J-E4	J-E3	53.8905996515422	400
8-ExWM400mmCarlingAve	J-E8	J-E7	30.3005394242057	400
45-PropWM300mmHospital	J-E1	J-1	20.6394832517881	300
19-PropWM150mmResearchB	J-E2	J-22	30.3462421119232	150
15-PropWM150mmCarlingV-T#3	J-E4	J-21	30.9676844497797	150
9-PropWM150mmCarlingV-T#2	J-E7	J-20	31.0736886830009	150
7-PropWM150mmCarlingV-T#1	J-E8	J-19	31.2526179381906	150
23-PropWM300mmRdA	J-18	H-1	8.34306529014965	300
24-PropWM300mmRdA	H-1	J-17	26.2370276682741	300
37-PropWM300mmRdD	J-6	H-4	14.21	300
36-PropWM300mmRdD	H-4	J-7	59.70	300
28-PropWM300mmRdB	H-2	J-25	47.9195248882866	300
30-PropWM300mmRdB	J-25	H-5	42.0036195237461	300
29-PropWM150mmPGService	J-25	J-26(PGService)	16.98	150
14-ExWM400mmCarlingAve	366028H031	J-E4	29.2340814798819	400
17-ExWM400mmCarlingAve	366028H029	J-E3	35.0957871684793	400
18-ExWM400mmCarlingAve	J-E2	366028H029	54.4871678813318	400
10-ExWM400mmCarlingAve	J-E7	J-E6	86.5525765463542	400
13-ExWM400mmCarlingAve	J-E6	366028H031	7.73250133830889	400
11-ExWM150mmCarlingAve	J-E6	J-E5	7.45726728454382	150
12-ExWM150mmCarlingAve	J-E5	366028H030	90.9465713866359	150
6-ExWM400mmCarlingAve	J-E9	J-E8	0.382945097269914	400
4-ExWM150mmPrestonSt	J-E9	366028H219	40.1973470697933	150
31-PropWM300mmRdB	J-14	H-5	22.941571844959	300
25-PropWM300mmRdA	J-17	J-16	62.2851182626027	300
33-PropWM300mmRdL	H-12	J-12	28.8853068075771	300
40-PropWM300mmHospital	J-4	H-15	91.57	300

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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

Page 2                                   Scenario: with hospital loop
Link - Node Table: (continued)
----------------------------------------------------------------------
Link            Start           End                 Length  Diameter
ID              Node            Node                    m         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

Page 7 Scenario: with hospital loop

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

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******************************************************************
*                         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-PropWM300mmHospital	J-2	J-3	44.3429614279853	300
32-PropWM300mmRdL	J-12	J-13	8.10173833723436	300
21-ExWM400mmCarlingAve	R-2	J-E1	148.67	1000
20-ExWM400mmCarlingAve	J-E1	J-E2	72.0604746626472	400
16-ExWM400mmCarlingAve	J-E4	J-E3	53.8905996515422	400
8-ExWM400mmCarlingAve	J-E8	J-E7	30.3005394242057	400
45-PropWM300mmHospital	J-E1	J-1	20.6394832517881	300
19-PropWM150mmResearchB	J-E2	J-22	30.3462421119232	150
15-PropWM150mmCarlingV-T#3	J-E4	J-21	30.9676844497797	150
9-PropWM150mmCarlingV-T#2	J-E7	J-20	31.0736886830009	150
7-PropWM150mmCarlingV-T#1	J-E8	J-19	31.2526179381906	150
23-PropWM300mmRdA	J-18	H-1	8.34306529014965	300
24-PropWM300mmRdA	H-1	J-17	26.2370276682741	300
37-PropWM300mmRdD	J-6	H-4	14.21	300
36-PropWM300mmRdD	H-4	J-7	59.70	300
28-PropWM300mmRdB	H-2	J-25	47.9195248882866	300
30-PropWM300mmRdB	J-25	H-5	42.0036195237461	300
29-PropWM150mmPGService	J-25	J-26(PGService)	16.98	150
14-ExWM400mmCarlingAve	366028H031	J-E4	29.2340814798819	400
17-ExWM400mmCarlingAve	366028H029	J-E3	35.0957871684793	400
18-ExWM400mmCarlingAve	J-E2	366028H029	54.4871678813318	400
10-ExWM400mmCarlingAve	J-E7	J-E6	86.5525765463542	400
13-ExWM400mmCarlingAve	J-E6	366028H031	7.73250133830889	400
11-ExWM150mmCarlingAve	J-E6	J-E5	7.45726728454382	150
12-ExWM150mmCarlingAve	J-E5	366028H030	90.9465713866359	150
6-ExWM400mmCarlingAve	J-E9	J-E8	0.382945097269914	400
4-ExWM150mmPrestonSt	J-E9	366028H219	40.1973470697933	150
31-PropWM300mmRdB	J-14	H-5	22.941571844959	300
25-PropWM300mmRdA	J-17	J-16	62.2851182626027	300
33-PropWM300mmRdL	H-12	J-12	28.8853068075771	300
40-PropWM300mmHospital	J-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	VelocityUnit m/s	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	VelocityUnit m/s	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

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******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                         Version 2.2                            *
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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-PropWM300mmHospital	J-2	J-3	44.3429614279853	300
32-PropWM300mmRdL	J-12	J-13	8.10173833723436	300
21-ExWM400mmCarlingAve	R-2	J-E1	148.67	1000
20-ExWM400mmCarlingAve	J-E1	J-E2	72.0604746626472	400
16-ExWM400mmCarlingAve	J-E4	J-E3	53.8905996515422	400
8-ExWM400mmCarlingAve	J-E8	J-E7	30.3005394242057	400
45-PropWM300mmHospital	J-E1	J-1	20.6394832517881	300
19-PropWM150mmResearchB	J-E2	J-22	30.3462421119232	150
15-PropWM150mmCarlingV-T#3	J-E4	J-21	30.9676844497797	150
9-PropWM150mmCarlingV-T#2	J-E7	J-20	31.0736886830009	150
7-PropWM150mmCarlingV-T#1	J-E8	J-19	31.2526179381906	150
23-PropWM300mmRdA	J-18	H-1	8.34306529014965	300
24-PropWM300mmRdA	H-1	J-17	26.2370276682741	300
37-PropWM300mmRdD	J-6	H-4	14.21	300
36-PropWM300mmRdD	H-4	J-7	59.70	300
28-PropWM300mmRdB	H-2	J-25	47.9195248882866	300
30-PropWM300mmRdB	J-25	H-5	42.0036195237461	300
29-PropWM150mmPGService	J-25	J-26(PGService)	16.98	150
14-ExWM400mmCarlingAve	366028H031	J-E4	29.2340814798819	400
17-ExWM400mmCarlingAve	366028H029	J-E3	35.0957871684793	400
18-ExWM400mmCarlingAve	J-E2	366028H029	54.4871678813318	400
10-ExWM400mmCarlingAve	J-E7	J-E6	86.5525765463542	400
13-ExWM400mmCarlingAve	J-E6	366028H031	7.73250133830889	400
11-ExWM150mmCarlingAve	J-E6	J-E5	7.45726728454382	150
12-ExWM150mmCarlingAve	J-E5	366028H030	90.9465713866359	150
6-ExWM400mmCarlingAve	J-E9	J-E8	0.382945097269914	400
4-ExWM150mmPrestonSt	J-E9	366028H219	40.1973470697933	150
31-PropWM300mmRdB	J-14	H-5	22.941571844959	300
25-PropWM300mmRdA	J-17	J-16	62.2851182626027	300
33-PropWM300mmRdL	H-12	J-12	28.8853068075771	300
40-PropWM300mmHospital	J-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-PropWM300mmHospital	J-1	688-A	11.7604930134715	300
44-PropWM300mmHospital(2)	688-B	J-2	23.8506572610621	300
22-PropWM300mmRdA	J-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-PropWM300mmHospitalService	J-45(HospitalService)	J-183	28.02	300
79-PropWM300mmHospitalService	J-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
FIRESERVICEMETER2	688-A	688-B	#N/A	300 Valve
FIRESERVICEMETER1	691-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	VelocityUnit m/s	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	VelocityUnit m/s	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

Page 7 Scenario: with hospital loop

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
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

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****************************************************************
*                          E P A N E T                         *
*                  Hydraulic and Water Quality                 *
*                  Analysis for Pipe Networks                  *
*                         Version 2.2                          *
****************************************************************
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Input File: NCD-Case 2.net

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

Link - Node Table:

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----------------------------------------------------------------
Link           Start          End                Length  Diameter
ID             Node           Node                   m        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
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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 ID	Start Node	End Node	Length m	Diameter 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-PropWM300mmHospitalService	J-45(HospitalService)	J-183	28.02	300
79-PropWM300mmHospitalService	J-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
FIRESERVICEMETER2	688-A	688-B	#N/A	300 Valve
FIRESERVICEMETER1	691-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 ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
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 ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
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 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	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

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******************************************************************
*                           E P A N E T                          *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                         Version 2.2                            *
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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-PropWM300mmHospital	J-2	J-3	44.3429614279853	300
32-PropWM300mmRdL	J-12	J-13	8.10	300
21-ExWM400mmCarlingAve	R-2	J-E1	148.67	1000
20-ExWM400mmCarlingAve	J-E1	J-E2	72.06	400
16-ExWM400mmCarlingAve	J-E4	J-E3	53.8905996515422	400
8-ExWM400mmCarlingAve	J-E8	J-E7	30.3005394242057	400
45-PropWM300mmHospital	J-E1	J-1	20.64	300
19-PropWM150mmResearchB	J-E2	J-22	30.3462421119232	150
15-PropWM150mmCarlingV-T#3	J-E4	J-21	30.9676844497797	150
9-PropWM150mmCarlingV-T#2	J-E7	J-20	31.0736886830009	150
7-PropWM150mmCarlingV-T#1	J-E8	J-19	31.2526179381906	150
23-PropWM300mmRdA	J-18	H-1	8.34306529014965	300
24-PropWM300mmRdA	H-1	J-17	26.2370276682741	300
37-PropWM300mmRdD	J-6	H-4	14.21	300
36-PropWM300mmRdD	H-4	J-7	59.70	300
28-PropWM300mmRdB	H-2	J-25	47.92	300
30-PropWM300mmRdB	J-25	H-5	42.00	300
29-PropWM150mmPGService	J-25	J-26(PGService)	16.98	150
14-ExWM400mmCarlingAve	366028H031	J-E4	29.2340814798819	400
17-ExWM400mmCarlingAve	366028H029	J-E3	35.0957871684793	400
18-ExWM400mmCarlingAve	J-E2	366028H029	54.4871678813318	400
10-ExWM400mmCarlingAve	J-E7	J-E6	86.5525765463542	400
13-ExWM400mmCarlingAve	J-E6	366028H031	7.73250133830889	400
11-ExWM150mmCarlingAve	J-E6	J-E5	7.45726728454382	150
12-ExWM150mmCarlingAve	J-E5	366028H030	90.9465713866359	150
6-ExWM400mmCarlingAve	J-E9	J-E8	0.382945097269914	400
4-ExWM150mmPrestonSt	J-E9	366028H219	40.1973470697933	150
31-PropWM300mmRdB	J-14	H-5	22.94	300
25-PropWM300mmRdA	J-17	J-16	62.29	300
40-PropWM300mmHospital	J-4	H-15	91.57	300
39-PropWM300mmHospital	H-15	J-5	24.29	300

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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
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Link - Node Table: (continued)
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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
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34-PropWM300mmRdE(2)	J-183	J-24	34.93	300
76-PropWM300mmHospitalService	J-45(HospitalService)	J-183	28.02	300
79-PropWM300mmHospitalService	J-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
FIRESERVICEMETER2	688-A	688-B	#N/A	300 Valve
FIRESERVICEMETER1	691-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 ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
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 ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
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	Velocity m/s	Unit 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 Hospital 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

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

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
SUBMISISON: 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. (mm)	Diameter Actual	Slope (%)	Length (m)	Cap. (L/s)	Vel. (m/s)	Time of Flow (min)	Design Capacity (Q/Qfull)	Ultimate Capacity (Q/Qfull)	
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	65.5	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	67.7	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	52.5	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	3.25%	3.25%	(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	2.02	SERVICE	42	283	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%	9.86%	
	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	48	0.65	0.12	46.52%	58.72%	
	AW MHSA 28	MHSA 31	68.92	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	48.8	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	68.76	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	0.62	22.82%	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	72.11	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	66.10	65.96	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)

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

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	29.78	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

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	2.024	ha
(TA-SAN-1)	42	283	Beds
MAIN ENTRY	0.560	0.560	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	2.266	2.266	ha
(TB-SAN-2)	38	38	Beds
PODIUM 2	2.504	2.504	ha
(TB-SAN-3)	43	43	Beds

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

*From info received from Parkin 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)	0.70 (ha)	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	38.36%
	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

Location: Street Name or Description	Location: From	Location: To	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
Tower A South S3	Mechanical Connection 8	SWM TANK 203	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%
West Side (Tower A North) S4	Mechanical Connection 7	SWM TANK 203	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%
	SWM TANK 203	AW MHST 146	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%
Middle Hospital S7, 54A, 54B	Mechanical Connection 14	MHST 203	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%
	MHST 203	MHST 205	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%
Middle Hospital S8	Mechanical Connection 15	MHST 204	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%
	MHST 204	MHST 205	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%
	MHST 205	MHST 206		0.00	0.92	10.32			CONC	675	686	72.94	72.91		29.0				
Tower B (Front of Hospital) S9	Mechanical Connection 16	CBMH 208	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%
	CBMH 208	CBMH 209		0.00	0.15	10.05		0.00	PVC	375	381	73.41	73.35		19.5				
	CBMH 209	MHST 206	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%
	MHST 206	SWM TANK 202	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%
	SWM TANK 202	AW MHST 144	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%
CUP North S1	Mechanical Connection 1	AW MHST 141	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%
CUP South S2	Mechanical Connection 2	AW MHST 158	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%
Hospital South West S5	Mechanical Connection 12	MHST 218	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%
	MHST 218	SWM TANK 204	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%
Ambulance Garage S12	Mechanical Connection 9	SWM TANK 204	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%
South (Hospital South East, Road E) S6	Mechanical Connection 10	SWM TANK 204	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%
	SWM TANK 204	AW MHST 141	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%
59A	Trench Drain 1	MHST 221	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											
59C	Trench Drain 2	MHST 221	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%
	MHST 221	Pumping Station	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%
	Pumping Station	MHST 212	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%
Loading Dock (Tower B South) S11, S11A, S11B	Mechanical Connection 22	MHST 213	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%
	MHST 213	MHST 214	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%
	MHST 214	SWM TANK 201	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%
	SWM TANK 201	MHST 212	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%
	MHST 212	AW MHST 130	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%
S10 - Tower B East	Mechanical Connection 24	MHST 211	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%
	MHST 211	SWM TANK 201	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%
	CB111	AW MHST 150	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%
	CB110	AW MHST 151	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%
	CB112	Pumping Station 3	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%
	Pumping Station 3	AW MHST 147	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%
UOHI S13	CAP 001	MHST 220	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

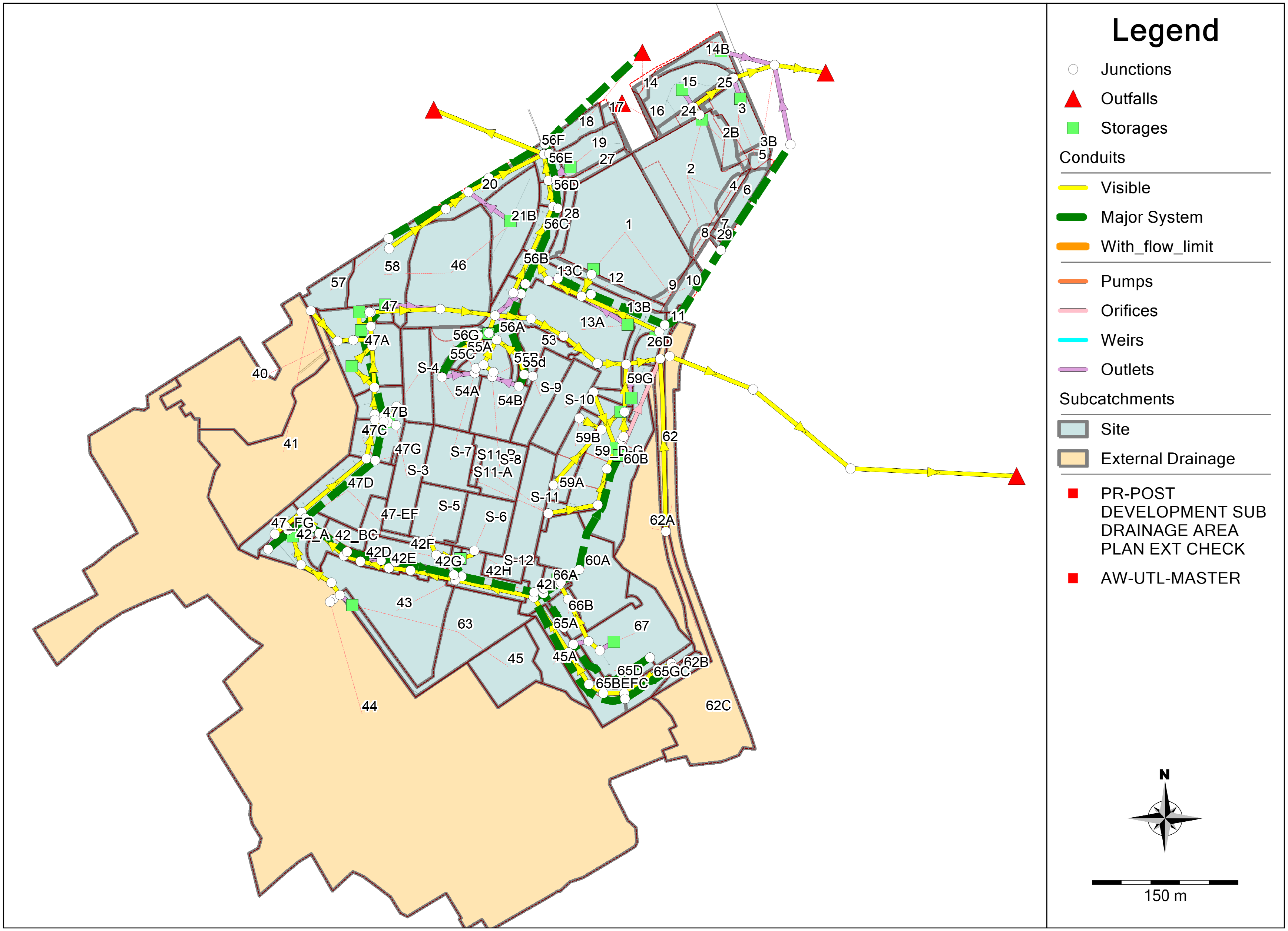
5-Year	a= 998.071	b= 0.814	c= 6.053
10-Year	a= 1174.184	b= 0.816	c= 6.014
25-Year	a= 1402.884	b= 0.819	c= 6.018
50-Year	a= 1569.580	b= 0.820	c= 6.014
100-Year	a= 1735.688	b= 0.820	c= 6.014

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	

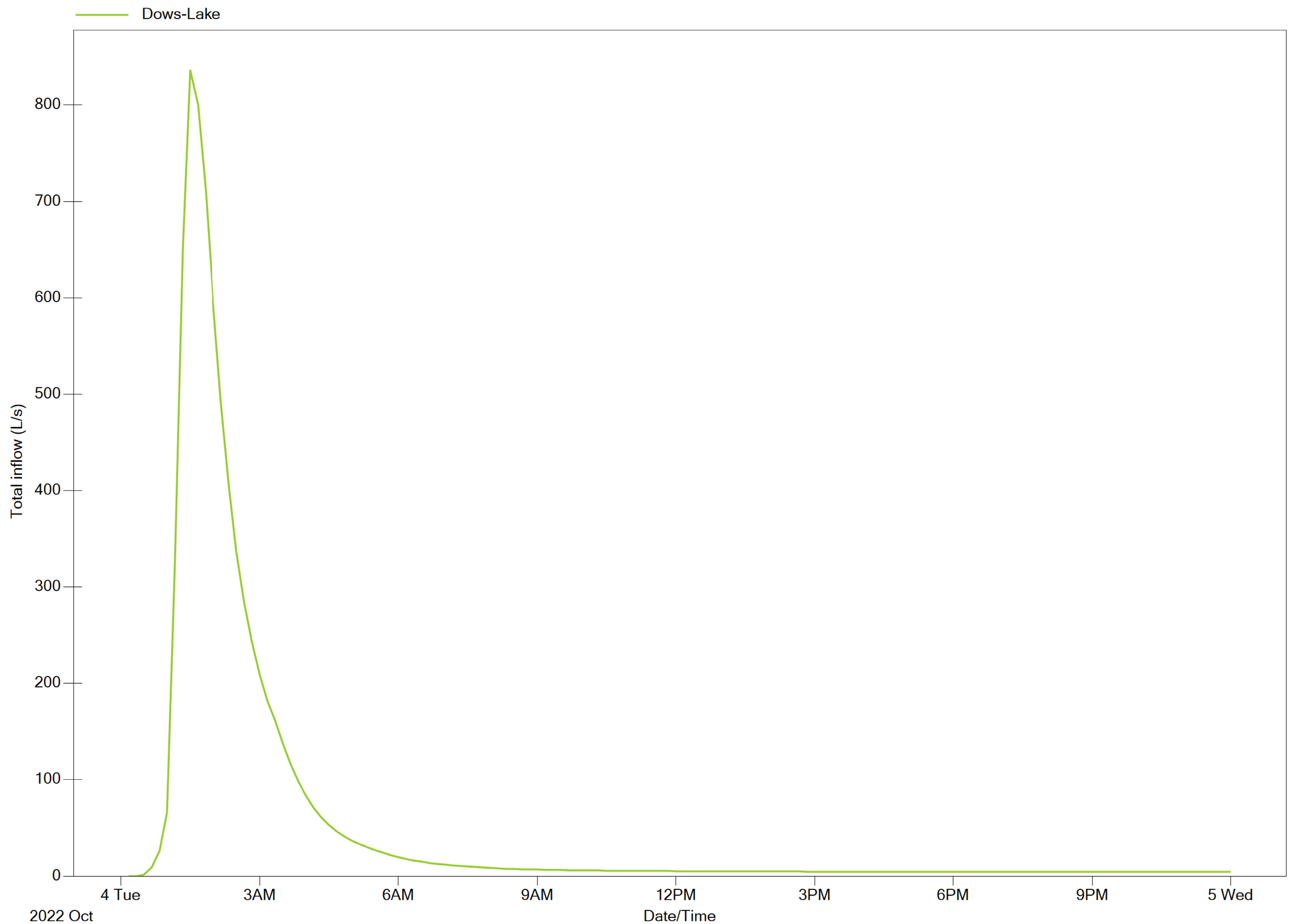
Notes:
The slope of open channels will depend on various factors including roadway longitudinal grade and natural topography;
The minimum allowable ditch/swale slope is 0.5% (1% is desirable);
For Runoff Coefficient (C), grassed area = 0.2, ballast = 0.7, paved area = 0.9
Also for C, add 10% for 25-year 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.

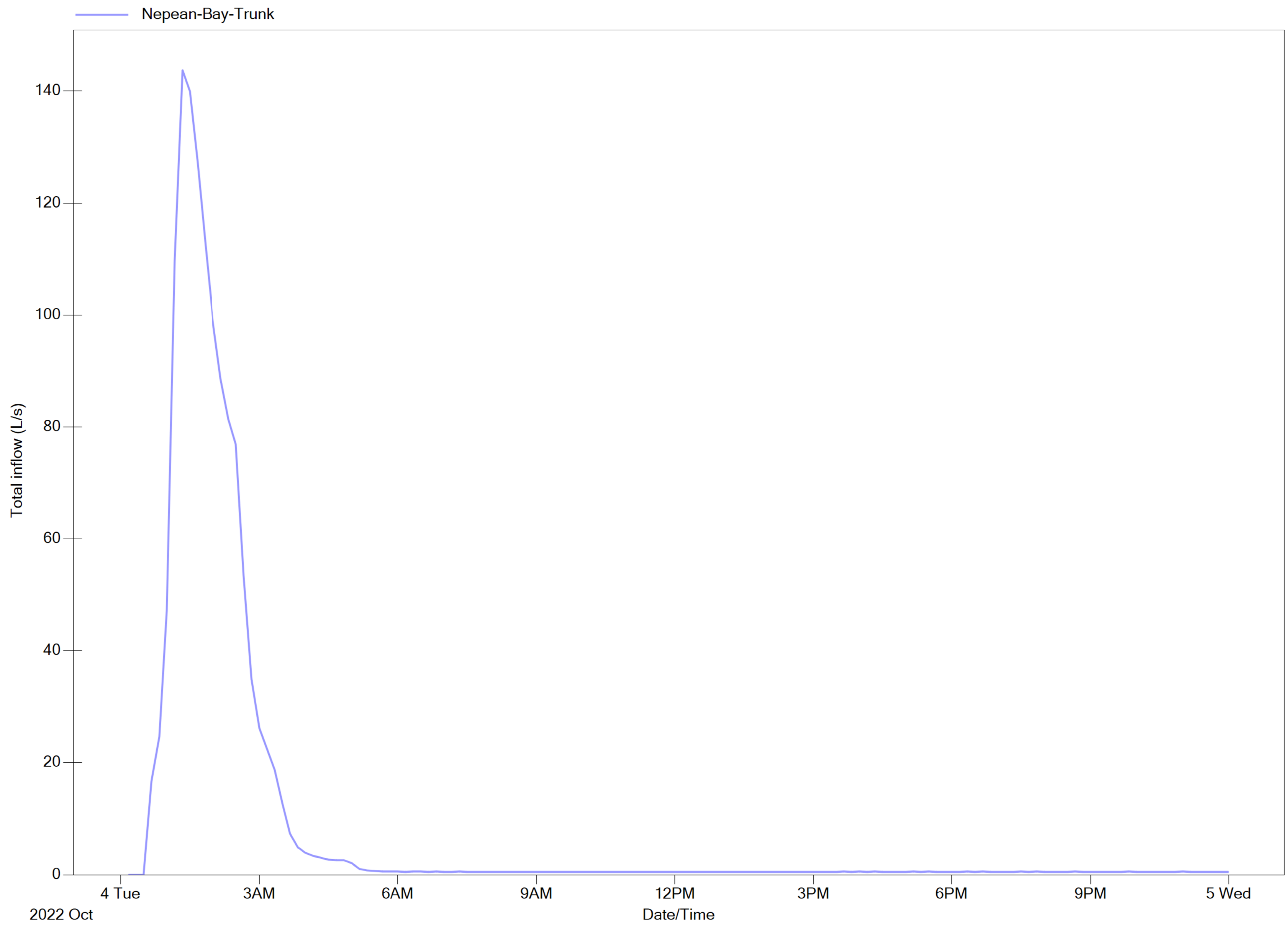
APPENDIX I: PCSWMM MODEL OUTPUT

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
14B
14
15
25
3
17
16
24
2B
3B
5
18
56F
19
56E
27
2
4
6
20
56D
21B
28
56C
1
8
7
29
58
46
56B
13C
12
9
10
57
47
13B
11
13A
26D
56G
56A
47A
55A
53
55C
S-4
55d
59G
54A
54B
S-9
S-10
47B
47C
59B
62
47G
S-7
S11-B
S-8
59
60B
S-3
S11-A
47D
59A
S-11
S-5
47-EF
S-6
62A
42F
42D
42E
42G
S-12
60A
42H
66A
43
66B
63
65A
67
45A
45
65D
65GC
62B
65BEFC
62C
44
40
41


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

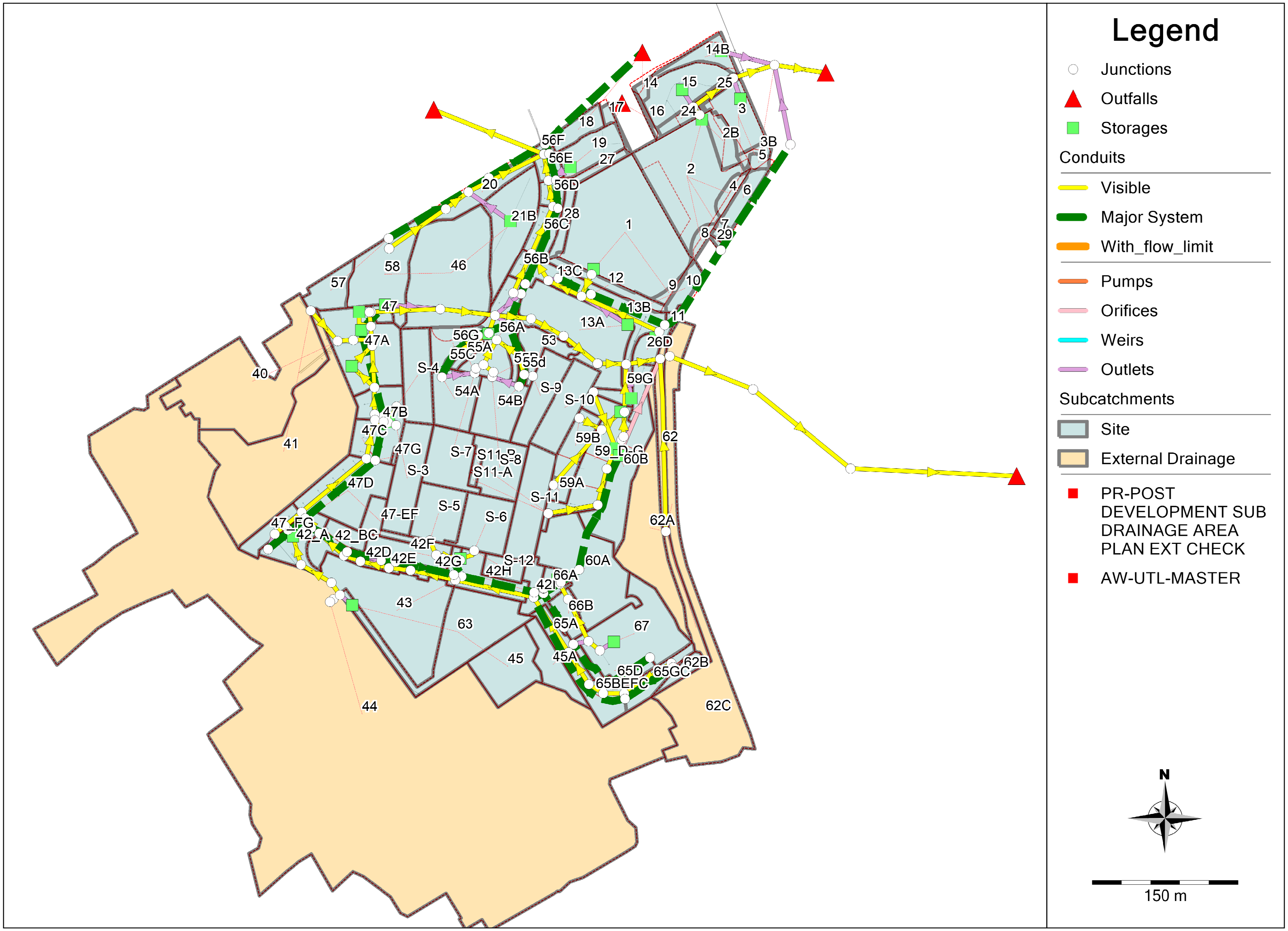
Weirs 1/1

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
14B
14
15
25
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24
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17
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56F
19
3B
56E
27
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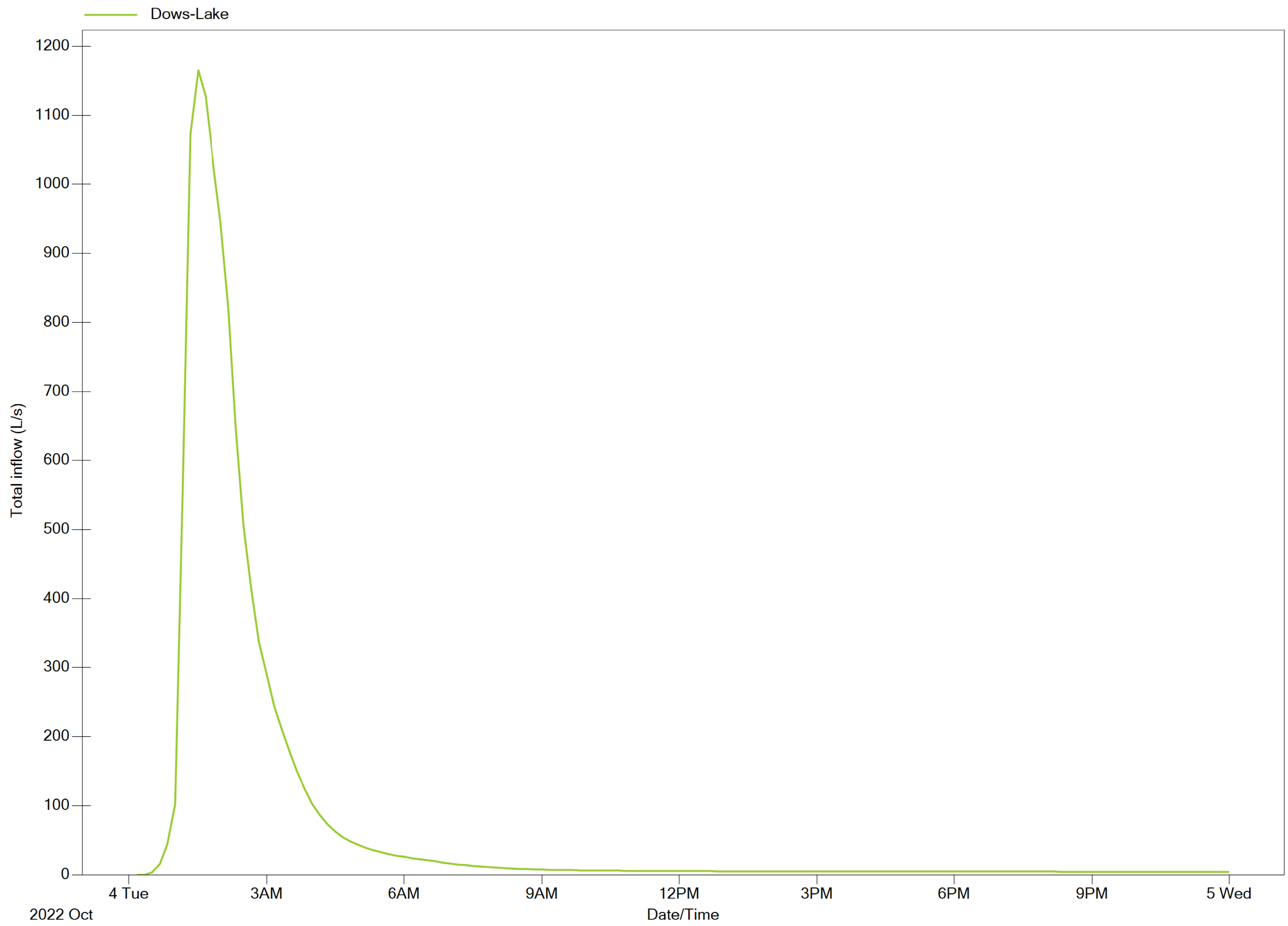
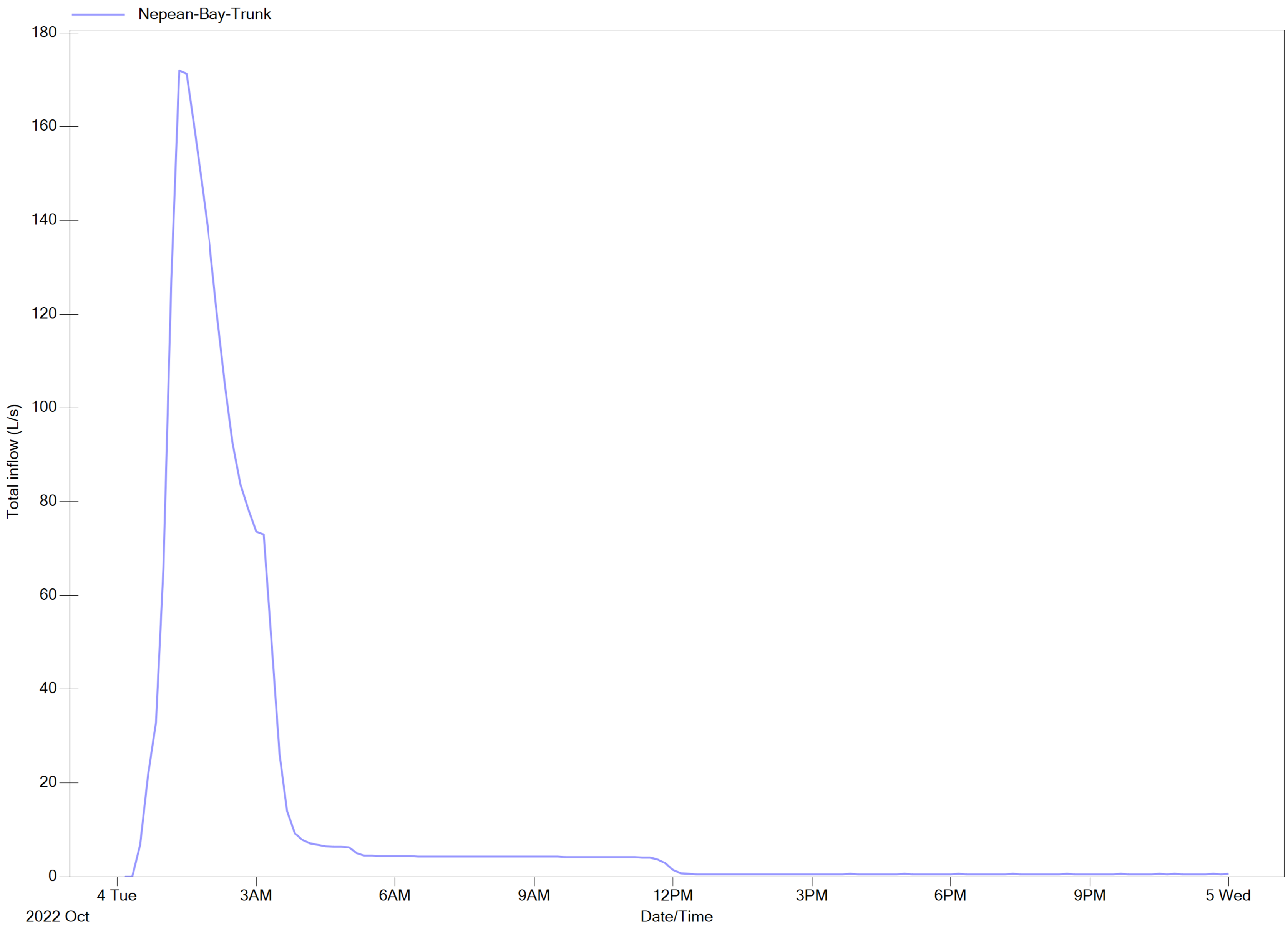
56D
4
6
21B
28
56C
1
7
8
29
58
46
56B
13C
12
57
9
10
47
13B
11
56G
56A
13A
47A
55A
53
26D
55C
55B
55d
S-4
59G
54A
54B
S-9
40
S-10
47B
47C
62
59B
41
47G
S-7
S11-B
S-8
59
D-G
60B
S-3
S11-A
47D
59A
S-11
47-EF
S-5
S-6
62A
47_FG
42_A
42_BC
42F
42D
42E
42G
S-12
60A
42H
66A
42I
43
66B
63
65A
67
45
45A
62B
65D
65GC
65BEFC
44
62C



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



Nepean-Bay-Trunk
180
160
140
120
100
80
60
40
20
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		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

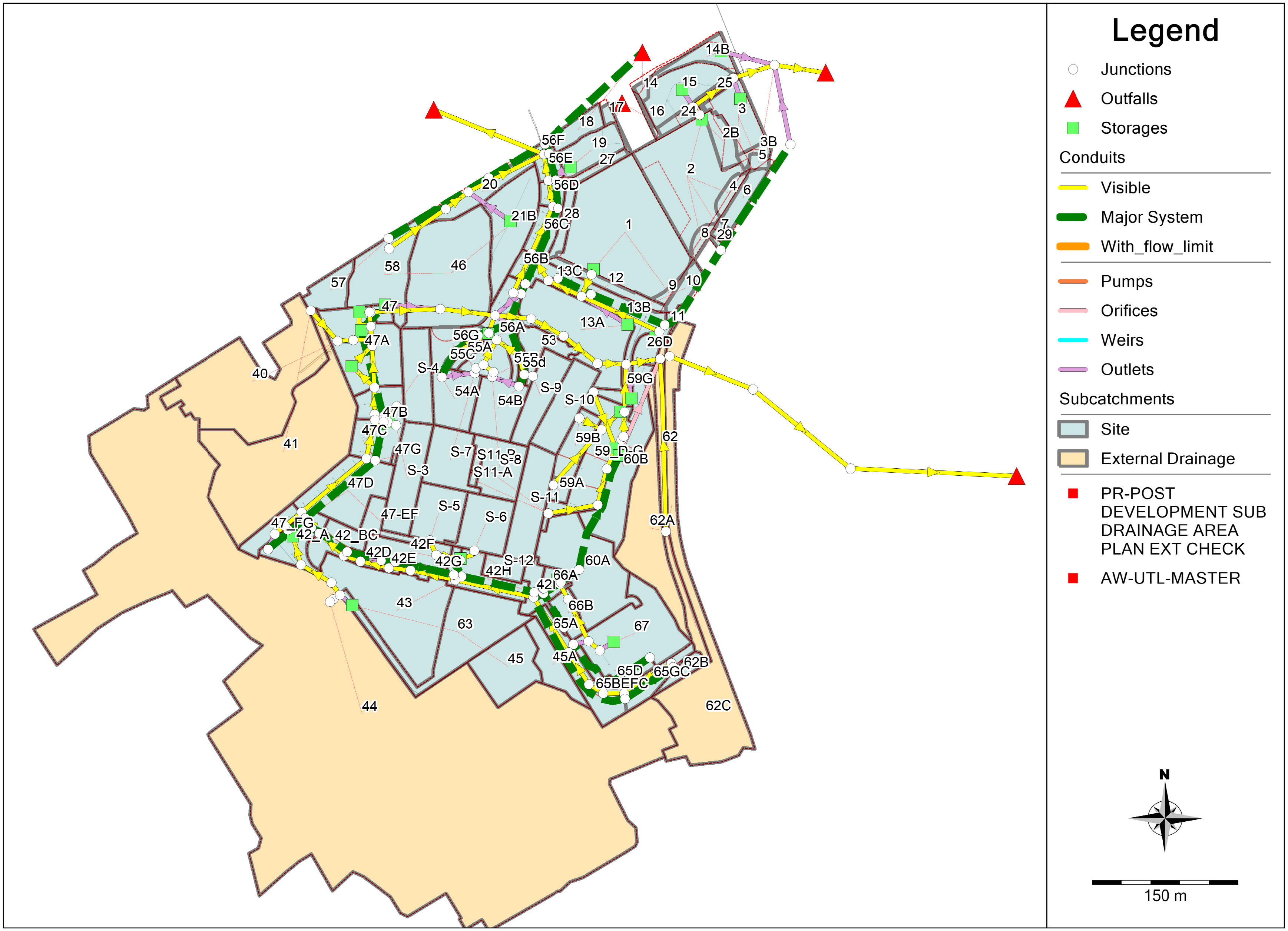
Weirs 1/1

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
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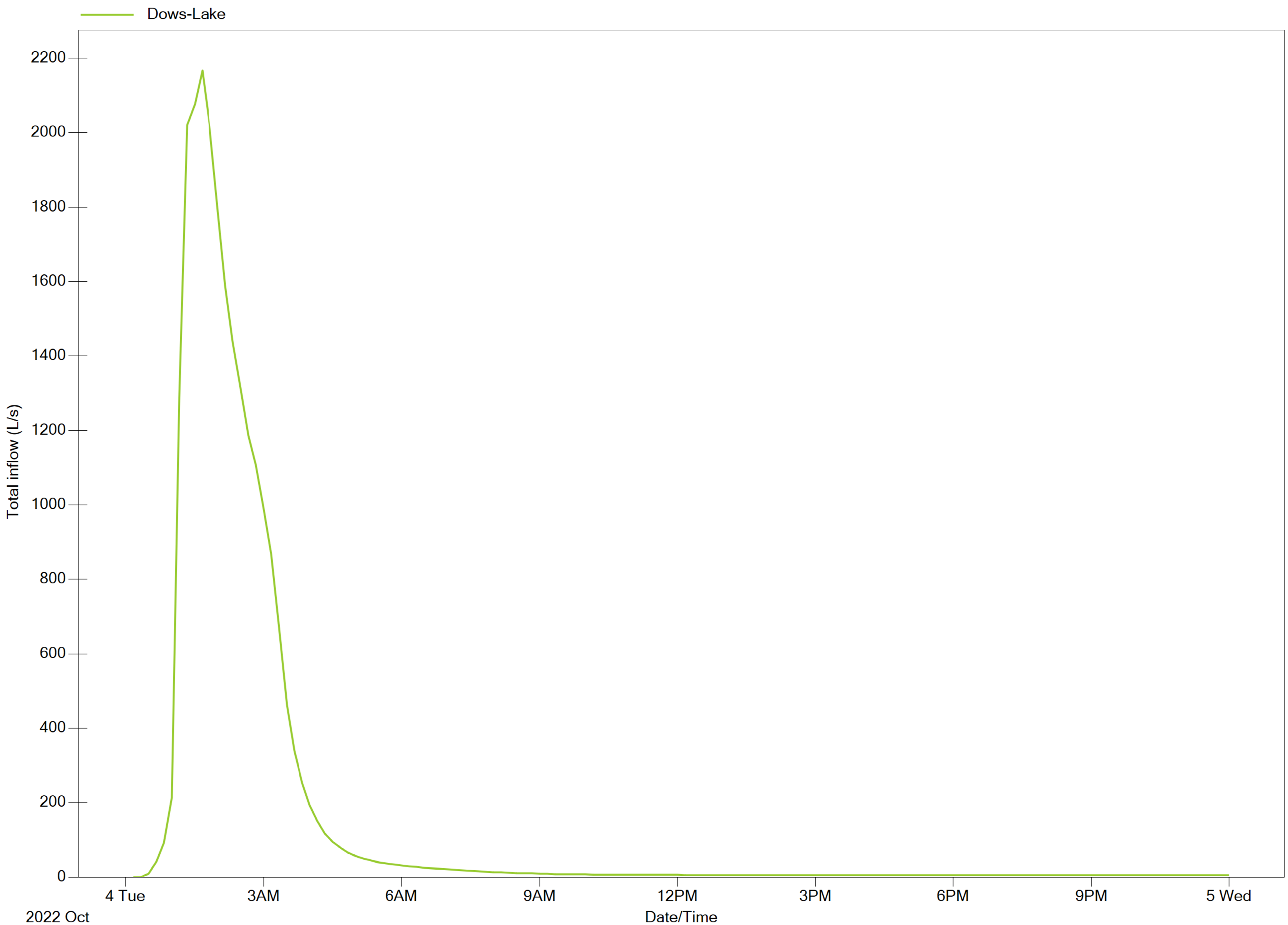
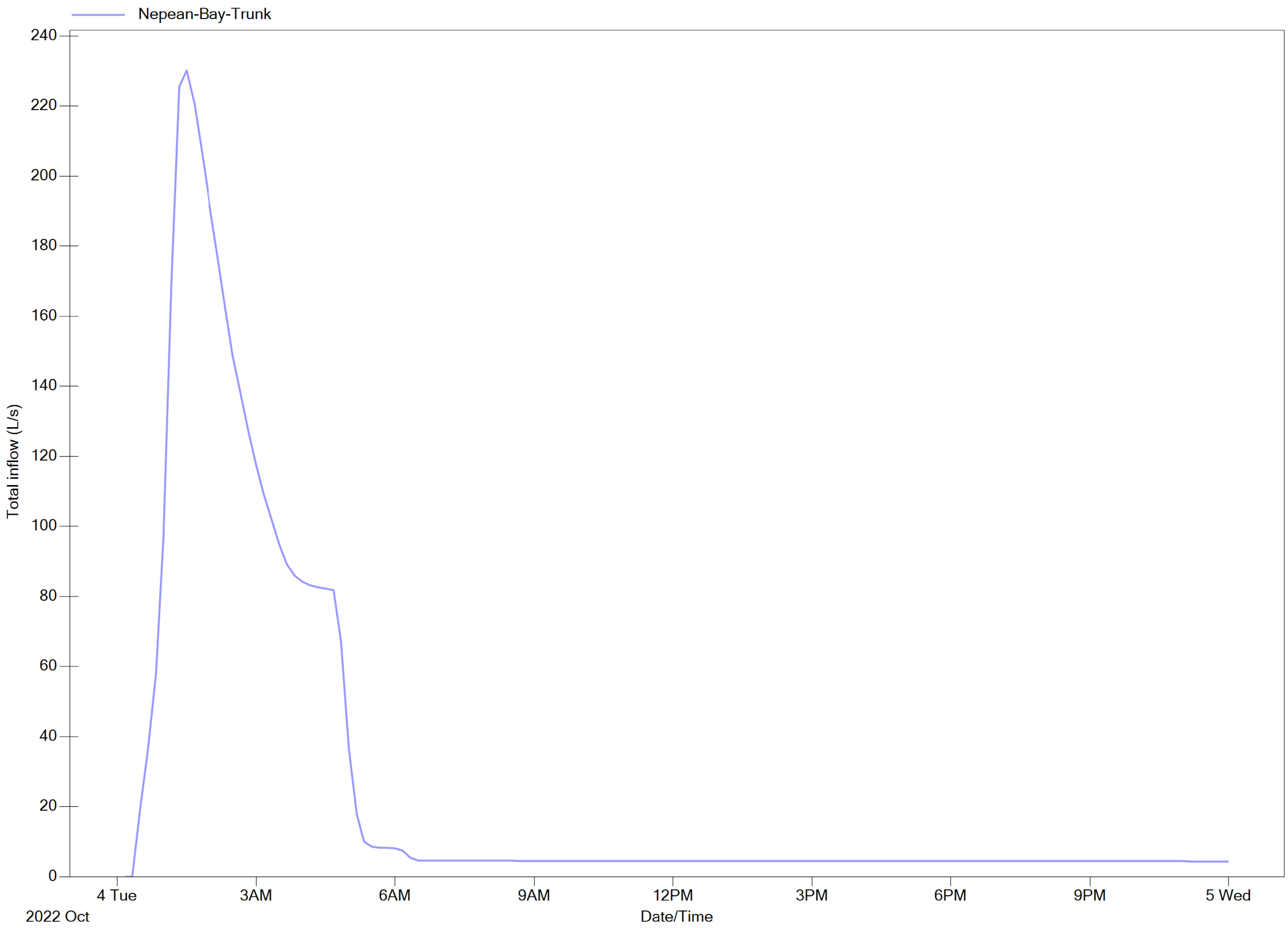
150 m



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



Nepean-Bay-Trunk
Total inflow (L/s)
0
20
40
60
80
100
120
140
160
180
200
220
240
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

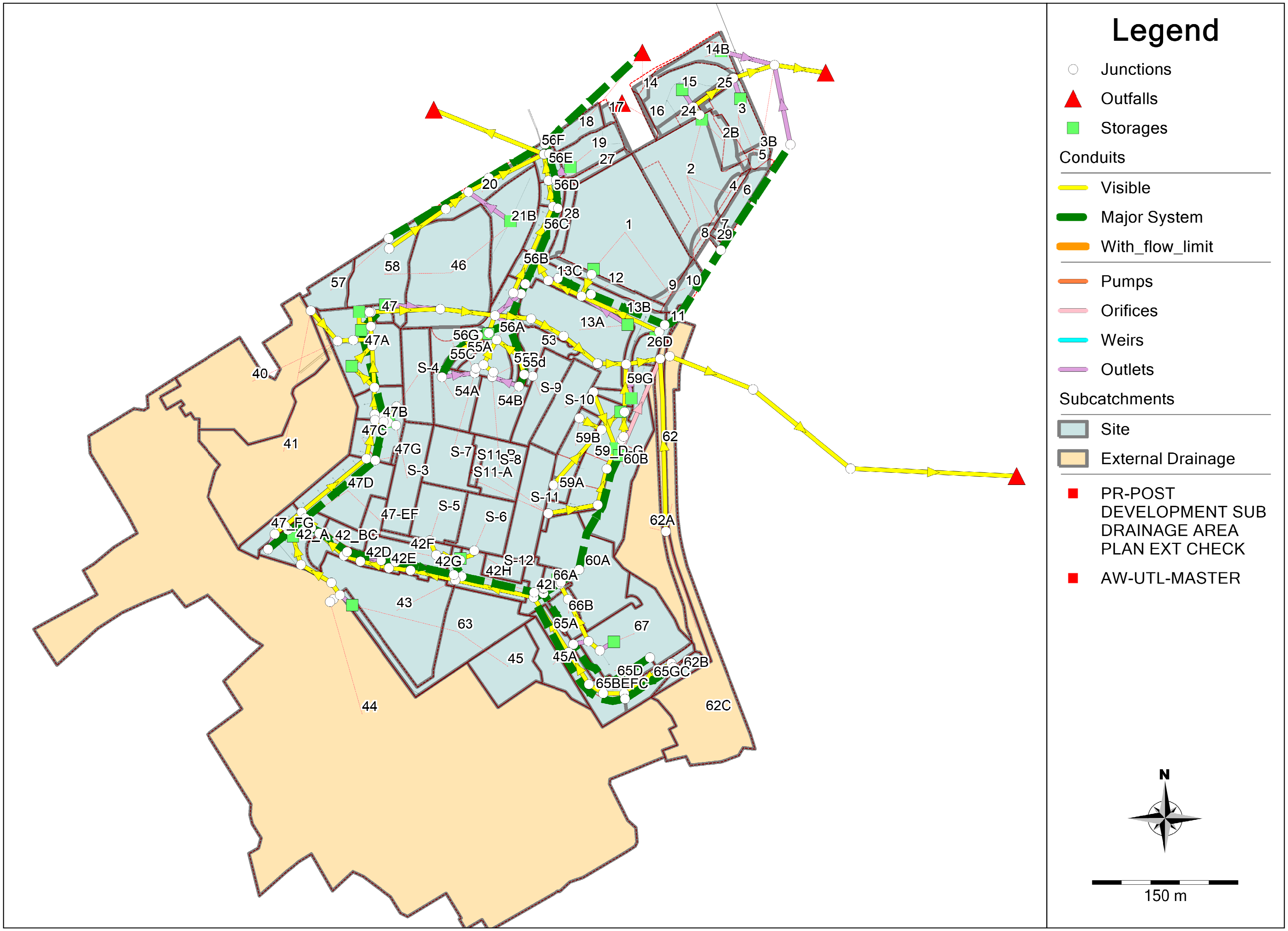
Weirs 1/1

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
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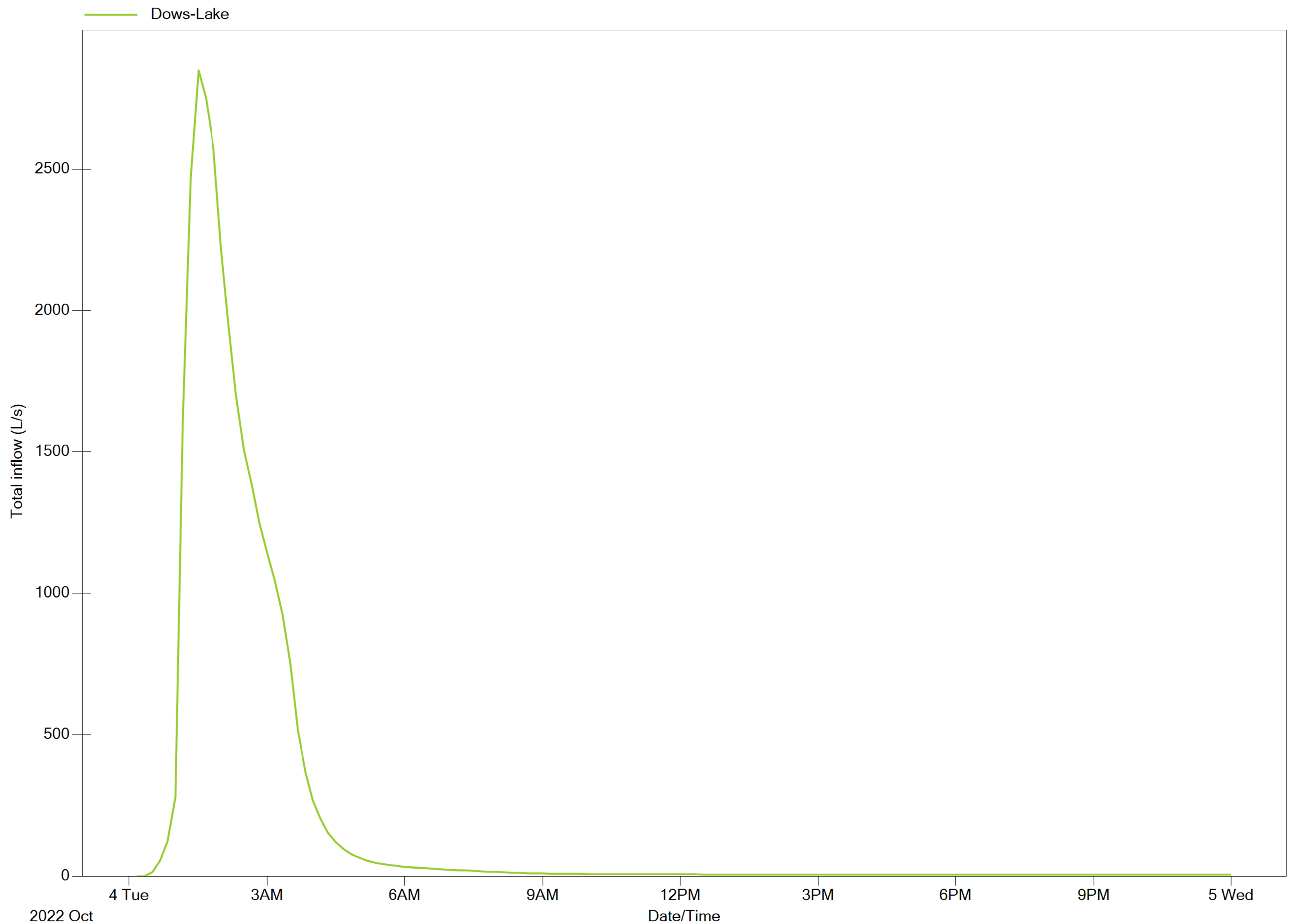
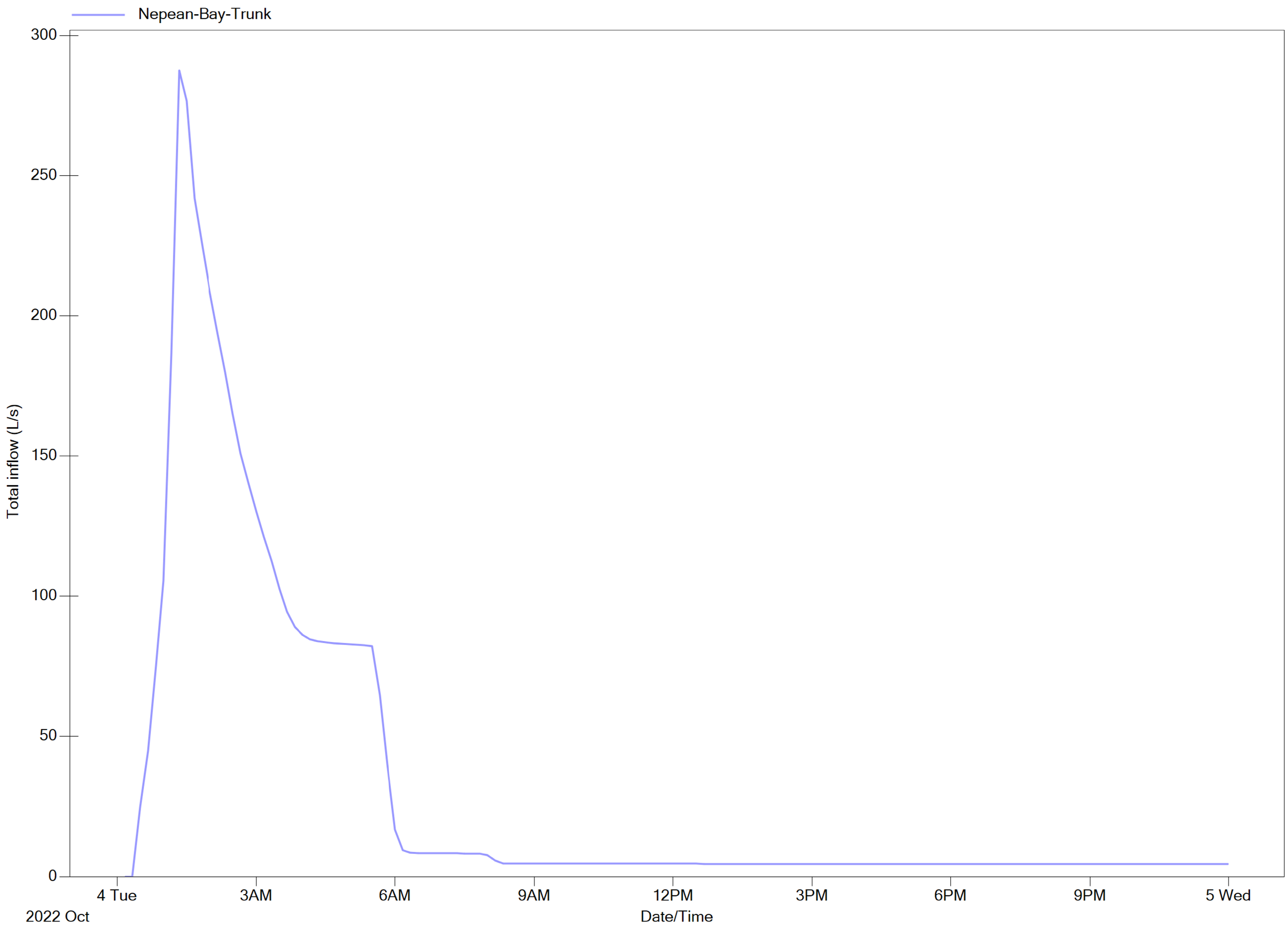
150 m



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

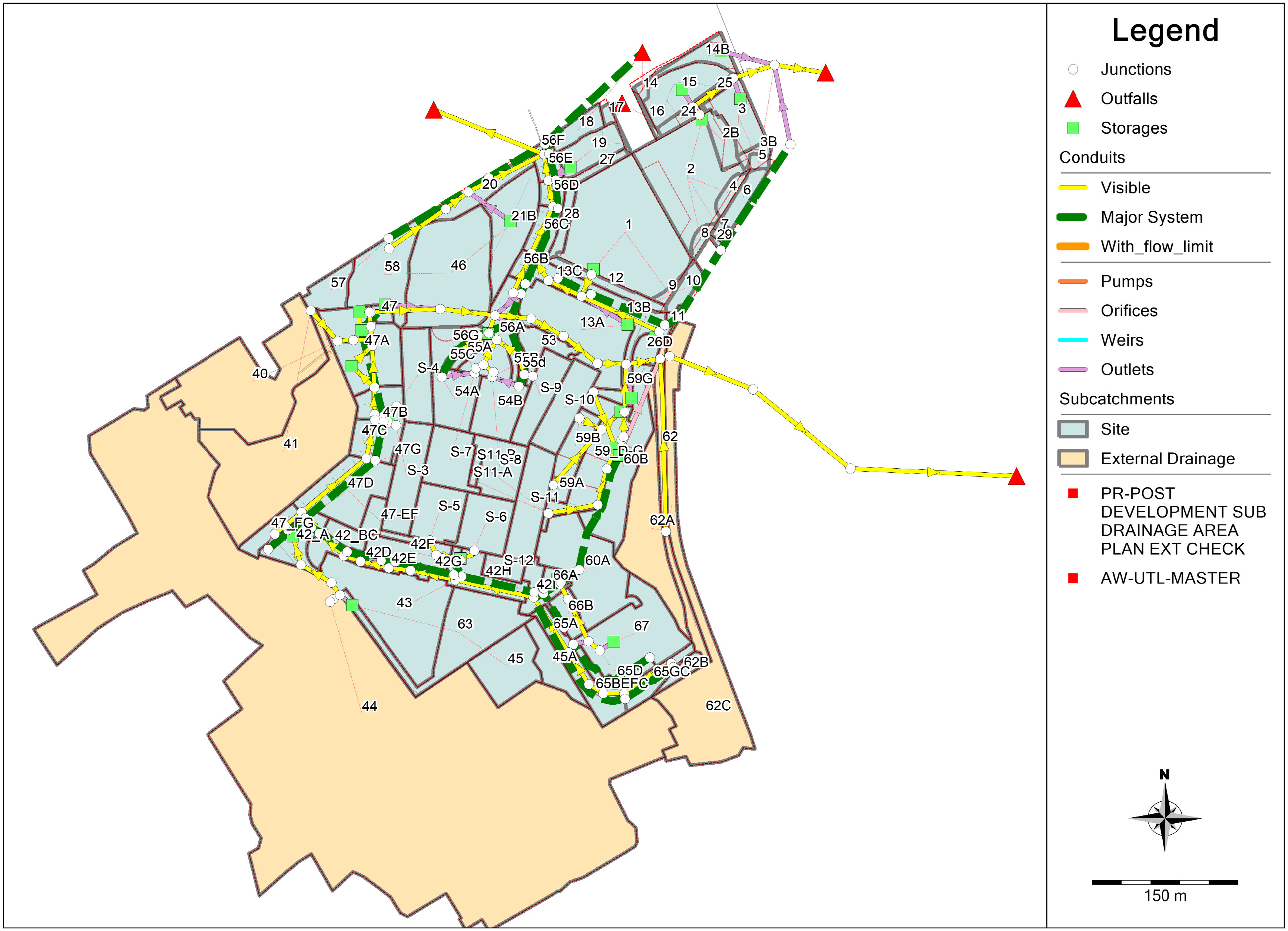
Weirs 1/1

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
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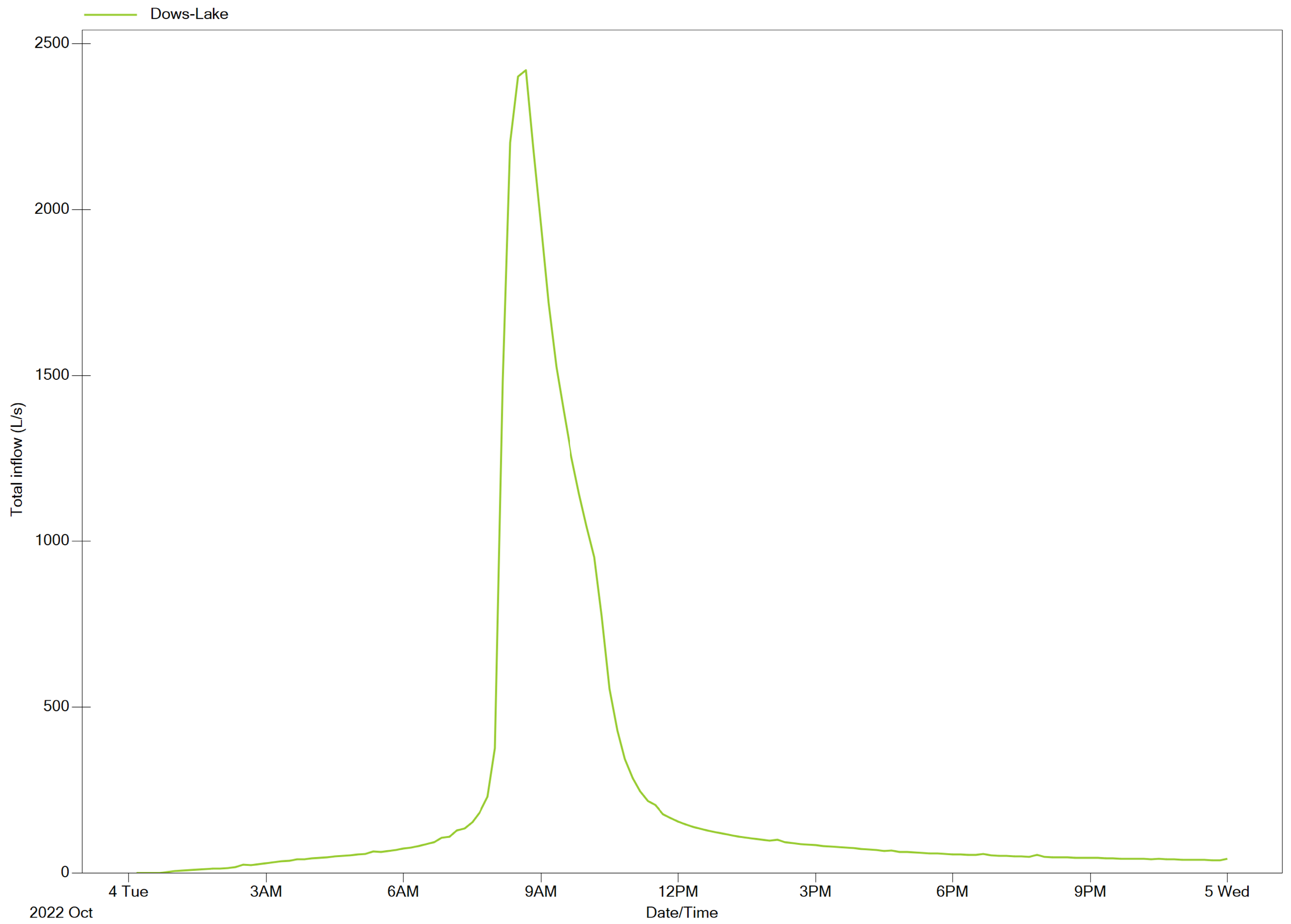
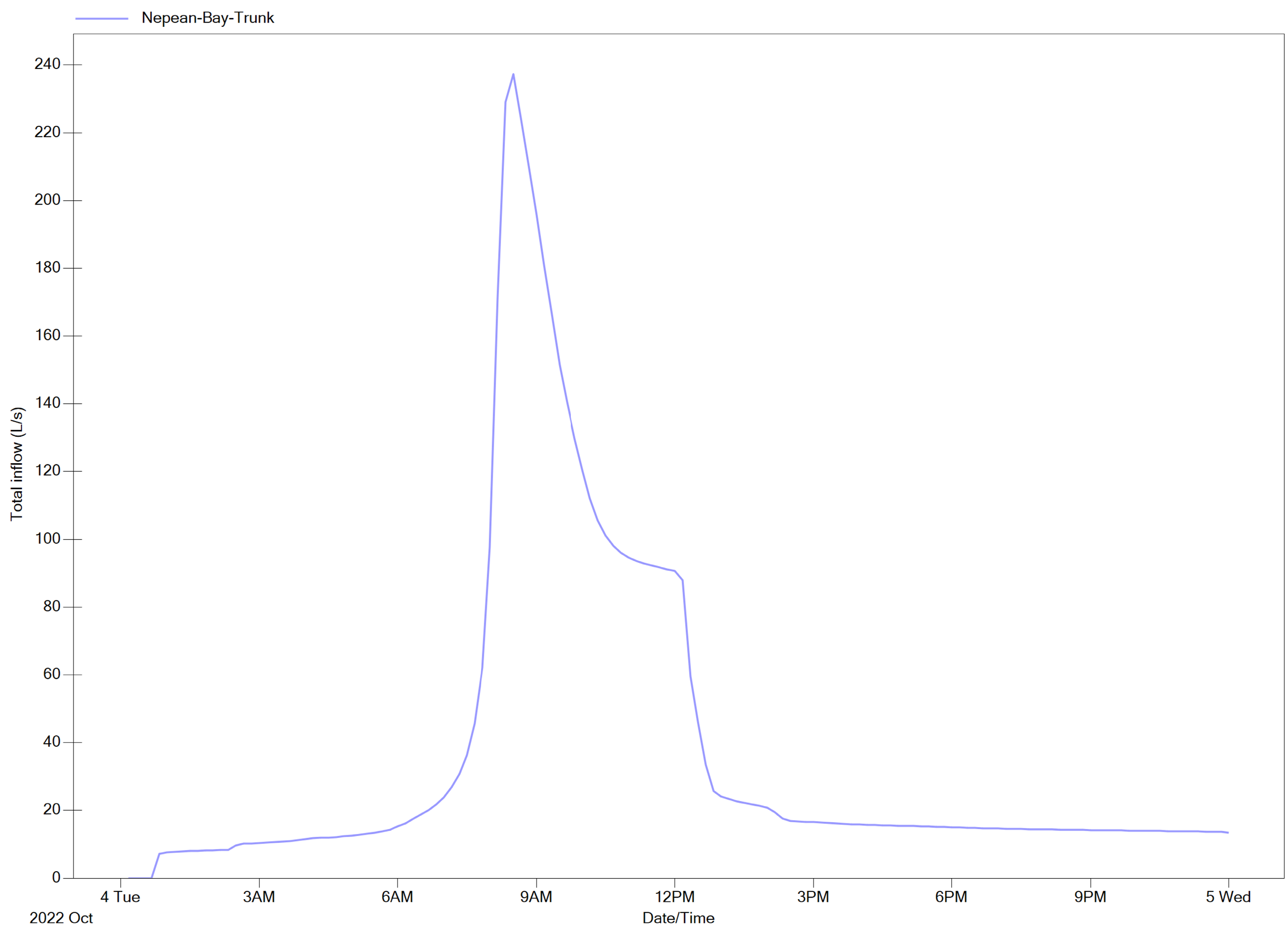
150 m



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


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

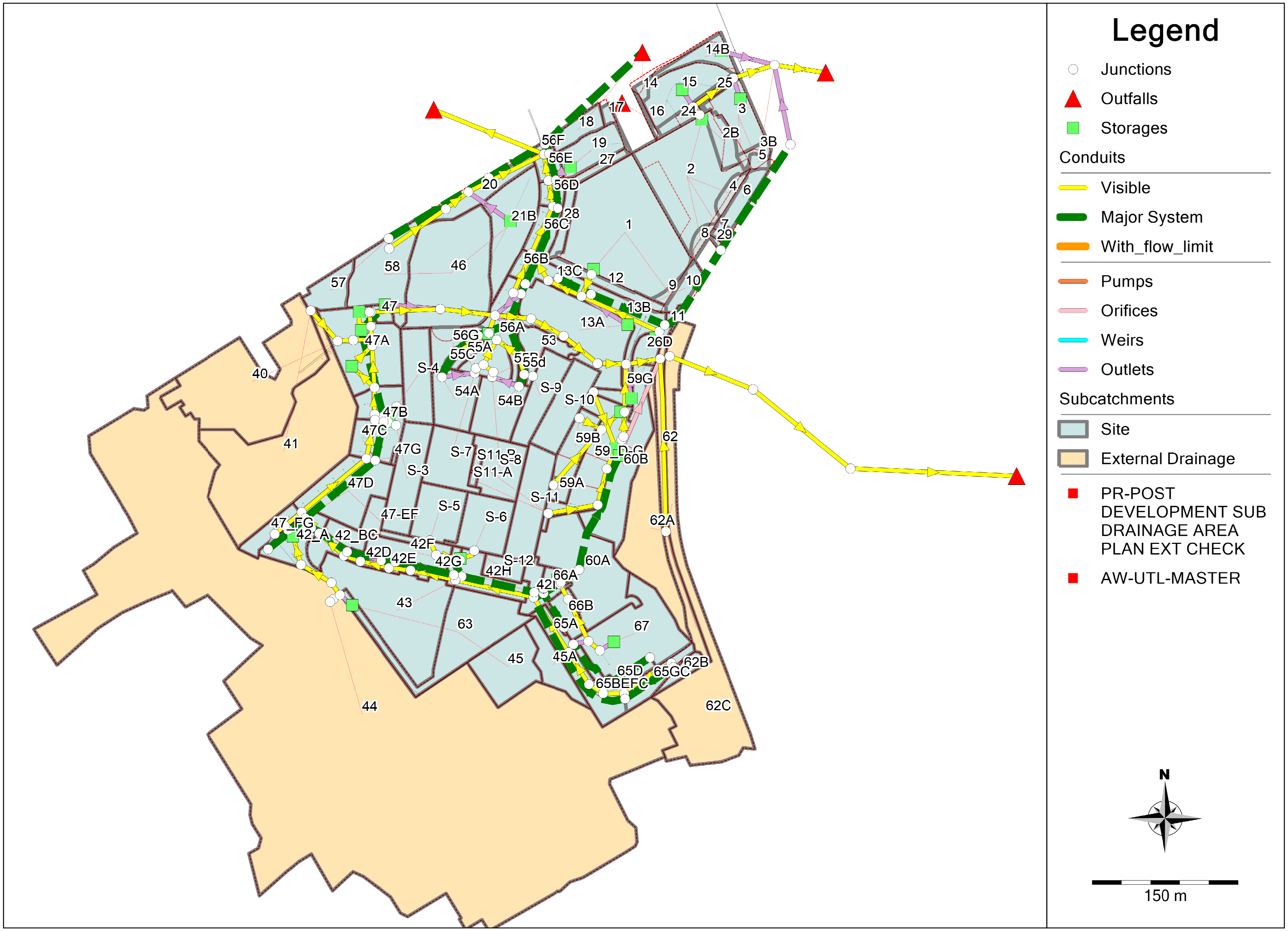
Weirs 1/1

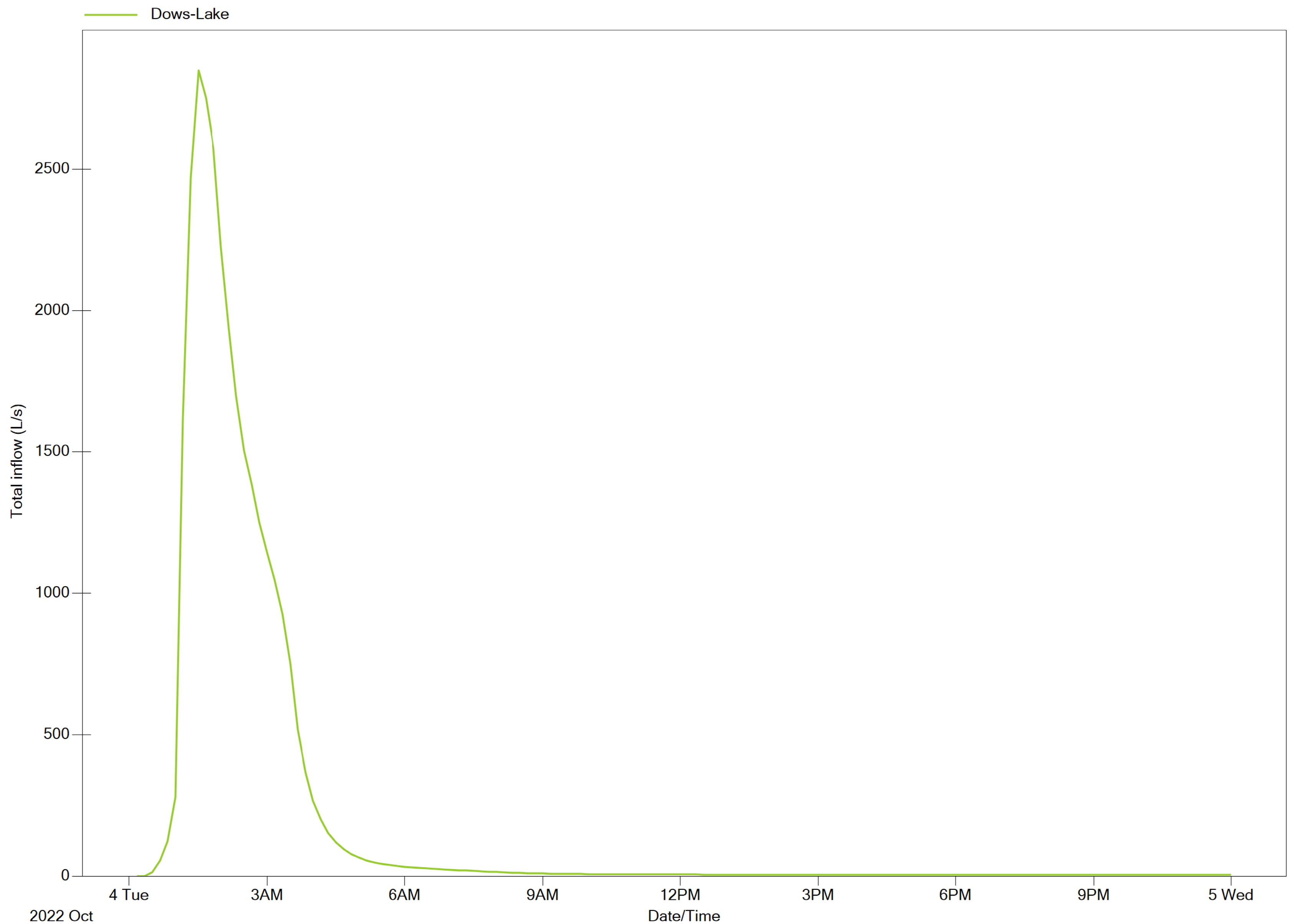
Name	Inlet Node	Outlet Node	Type	Height (m)	Length (m)	Inlet Elev. (m)	Max. |Flow| (L/s)	Time Max. Flow (M/D/Y)	Max/Full Depth	Contributing Area (ha)
ST-146_1	MHST-146	D-MHST-146_1	SIDEFLOW	1.4	1.5	70.17	2255.18	10/04/2022 08:14 AM	1	19.249
Weir-142	MHST-142	D-MHST-142	TRANSVERSE	0.5	1.4	70.7	820.35	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

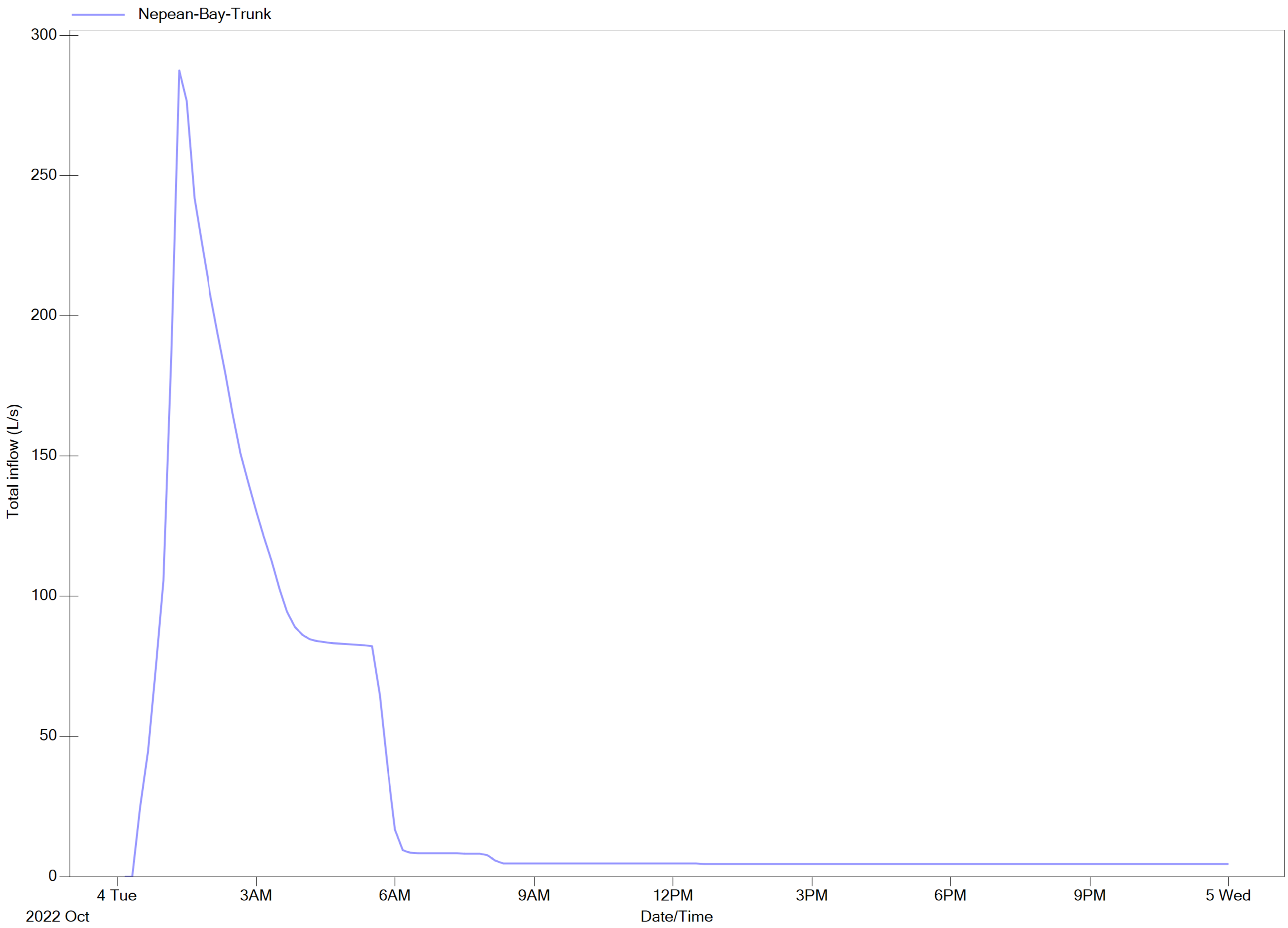
Outfalls 1/1

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
3AM
6AM
9AM
12PM
3PM
6PM
9PM
5 Wed
2022 Oct
Date/Time



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

Subject: Assessment of Bioretention Facility - Catchment 42I

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

Subject: Assessment of Bioretention Facility - Catchment 47

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

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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

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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.

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Subject: **Assessment of Bioretention Facility - Catchment 60 & 60B**

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.

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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

![wsp]	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	31

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
Total Storage	**142**	**m^3**

Depth to groundwater table from top of bank: 1.9 mbgs

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
Total Storage	**34**	**m^3**

Depth to groundwater table from top of bank: 1.2 mbgs

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 (°C)

a = an exponent derived from Heat Index (I) 1.10

$$a = 67.5 \times 10^{-8} I^3 - 77.1 \times 10^{-6} I^2 + 0.0179I + 0.492$$

I = Heat Index

$$I = \sum_{i=1}^{12} \left(\frac{T_{mi}}{5}\right)^{1.51}$$ *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	
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Subject: **SWM _ Water Balance _ Pre-development Conditions**

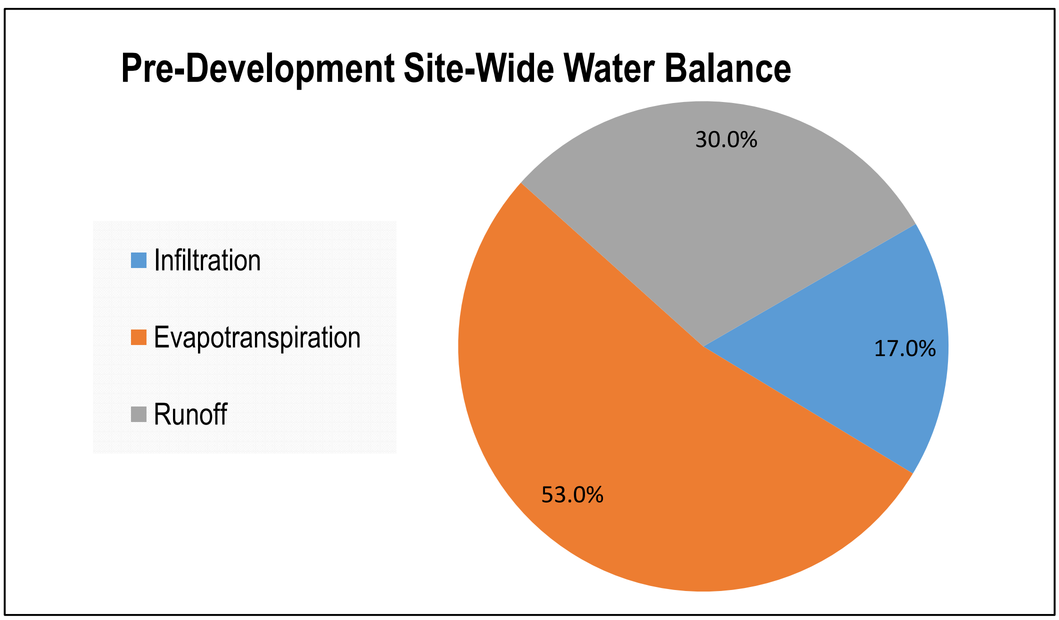
Impervious Area

	(%)	(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.

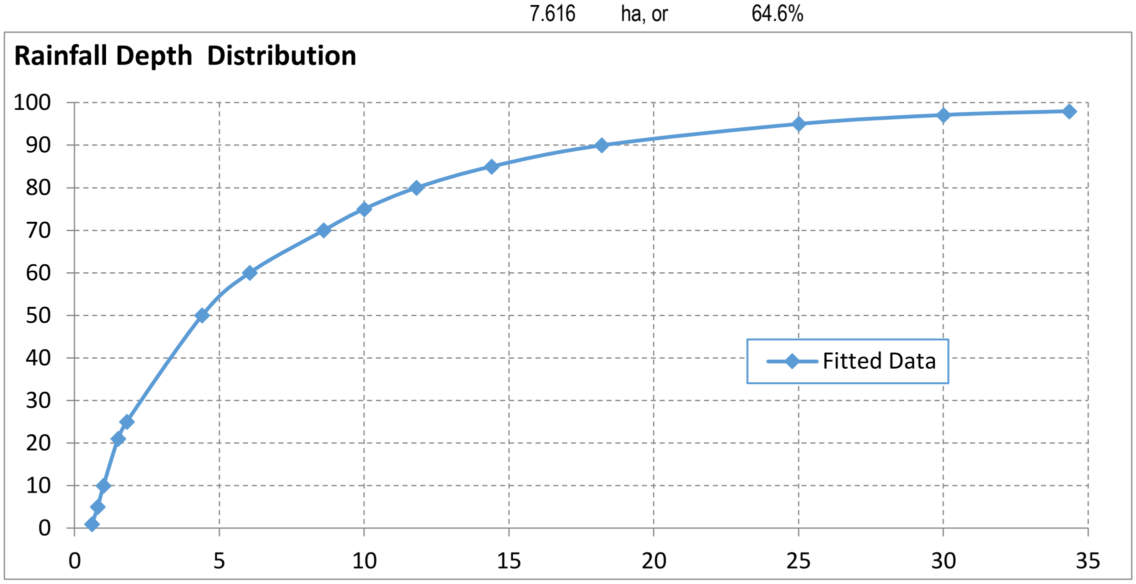
Water Balance for pervious areas follows the procedure illustrated in the WB analysis for pre-development conditions.

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.

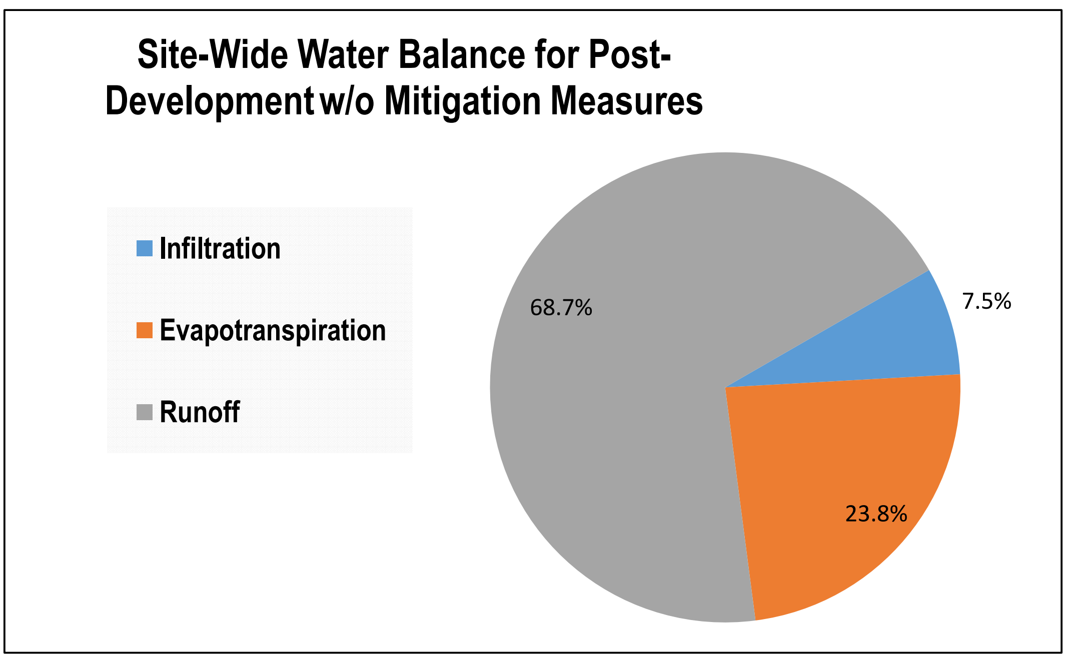
Topography Factor	0.13	for slope = 2.0% or 20 m/km
Soil Factor	0.30	for Sandy Silt
Cover	0.10	for Urban Lawn (Cultivated)
Therefore, the infiltration factor is	0.53	

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

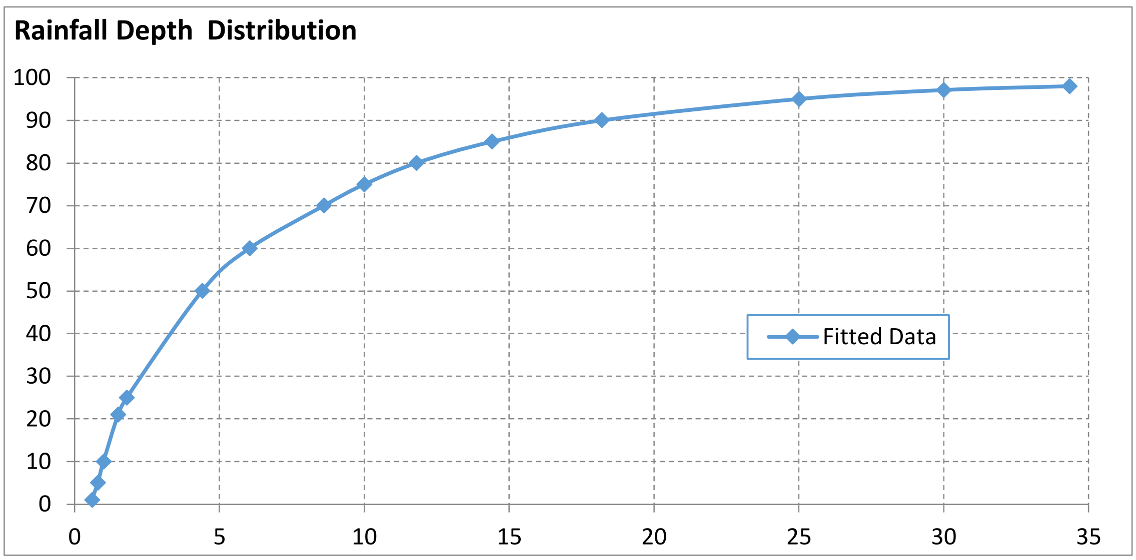
Runoff from the catchment 100 - rooftop of buildings, shall be directed to an underground chamber system for reuse.

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)	*Comments/Assumptions:*
Infiltration	21.1	193.6	3,885	*Apply pervious area relationship to 98% of area*
Evapotranspiration	60.5	556.3	11,162	
Runoff	18.4	169.6	3,403	...
Precipitation	100	919.5	18,451	

1.3.2.7.2 Intensive Green Roof

	(%)	(mm)	(m^3)	*Comments/Assumptions:*
Infiltration	0.0	0.0	0	*Intensive Green Roof can abstract first 25 mm*
Evapotranspiration	95.0	873.5	1,531	
Runoff	5.0	46.0	81	...
Precipitation	100	919.5	1,612	

1.3.2.7.2 Extensive Green Roof

	(%)	(mm)	(m^3)	*Comments/Assumptions:*
Infiltration	0.0	0.0	0	*Intensive Green Roof can abstract first 10 mm*
Evapotranspiration	75.0	689.6	6,489	
Runoff	25.0	229.9	2,163	...
Precipitation	100	919.5	8,652	

1.3.2.7.2 Impervious Area to LID

	(%)	(mm)	(m^3)	*Comments/Assumptions:*
Infiltration	91.3	839.0	24,688	*1.5 mm of rainfall (equivalent to 3.75% annual volume) is lost to initial abstraction/evaporation*
Evapotranspiration	3.8	34.5	1,015	
Runoff	5.0	46.0	1,353	
Precipitation	100	919.5	27,055	

1.3.2.7.3 Impervious Area without LID Measures

	(%)	(mm)	(m^3)	*Comments/Assumptions:*
Infiltration	0.0	0.0	0	*1.5 mm of rainfall (equivalent to 3.75% annual volume) is lost to initial abstraction/evaporation*
Evapotranspiration	3.8	34.5	324	
Runoff	96.3	885.0	19,052	
Precipitation	100	919.5	19,794	

1.3.2.7.4 All Pervious Area

Refer to Section 1.3.1.3

	(%)	(mm)	(m^3)	*Comments/Assumptions:*
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	

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

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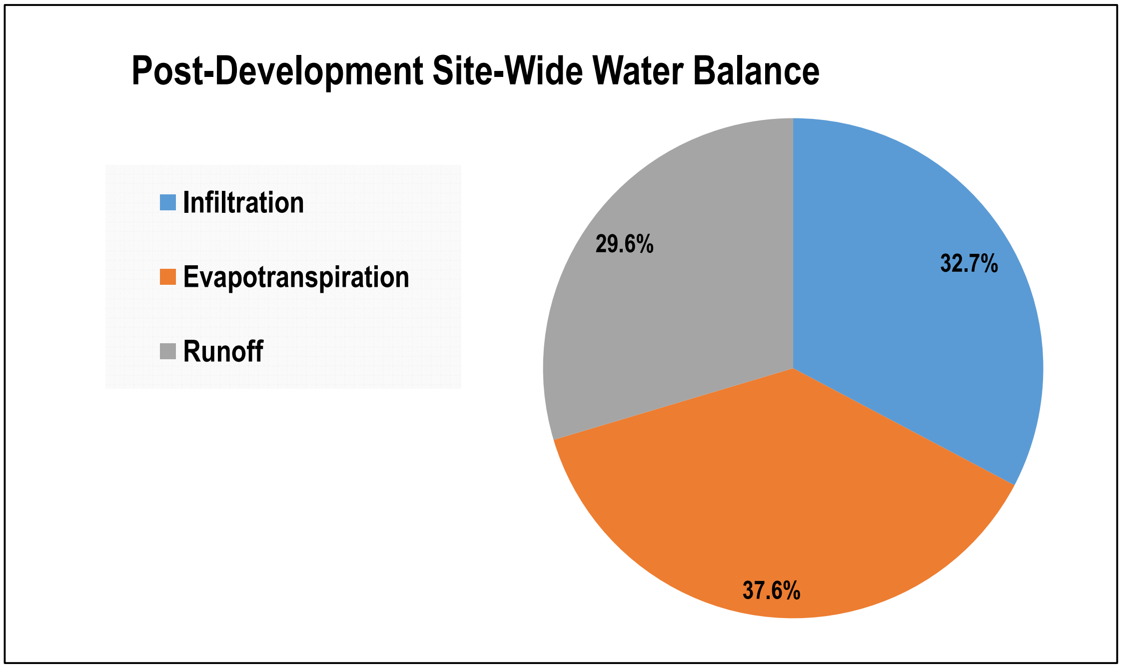
Subject: SWM _ Water Balance _ Post-development Conditions _ with Mitigation Measures



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

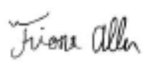
DRAFT

PROJECT NO.: CA0010209.4580
DATE: JANUARY 2025

WSP
150 COMMERCE VALLEY DRIVE WEST
THORNHILL, ON
CANADA L3T 7Z3

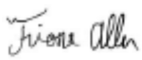
T: +1 905 882-1100
F: +1 905 882-0055
WWW.WSP.COM

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION #1	REVISION #2
Remarks			
Date	2022/03/22		
Prepared by	F. Allen		
Signature			
Checked by	A. Mohino-Barrie		
Signature			
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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1 INTRODUCTION

1.1 DISCLAIMER

The contents of this report do not necessarily represent the policies of WSP Canada Inc. Although every reasonable effort has been made to ensure the integrity of the report, WSP Canada Inc does not make any warranty or representation, expressed or implied, with respect to the accuracy or completeness of the information contained herein.

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

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

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

T +1 (613) 791-9352

WSP
2611 Queensview Drive, Suite 300
Ottawa, Ontario
K2B 8K2 Canada

wsp.com

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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)

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

Capture for Surface Inlet

Q <= y, capture = Q
Q > y, capture = min(Q, b*(Q-a)^c)

Storm Event 100

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

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

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	m^3/s	m^3/s	m		m	m^3/s	m^3/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

ADS Nyloplast

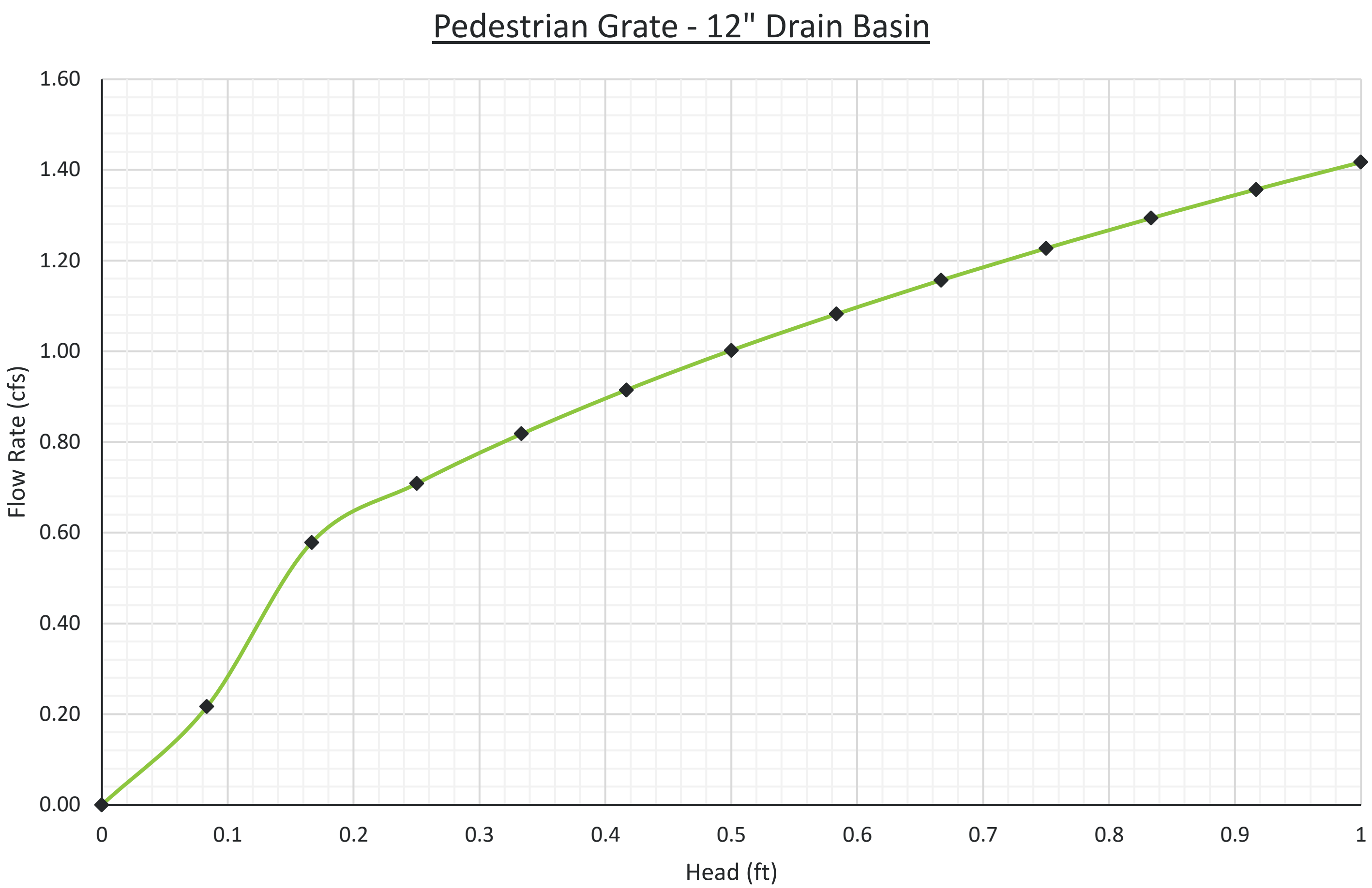
Grate Style	2ft x 2ft Road & Highway	Drop Down
Basin Size	12"	Drop Down
Clogging Factor	25%	Input

 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

ADS Nyloplast

Grate Style	Pedestrian Grate	Drop Down
Basin Size	12"	Drop Down
Clogging Factor	25%	Input



 EQUATIONS AND CALCULATIONS ARE BASED OFF USDOT/FHWA URBAN DESIGN MANUAL, HYDRAULIC ENGINEERING CIRCULAR NO. 22, THIRD EDITION, PUBLICATION NO. FHWA-NHI-10-009.

APPENDIX P: ONTARIO BUILDING CODE SANITARY CALCULATIONS BREAKDOWN

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