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Warminster Sideroad Drainage Improvements

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT REPORT

Township of Oro-Medonte

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Prepared by:

Tatham Engineering Limited
10 Diana Drive, Unit 7
Orillia, Ontario L3V 8K8

T 705-325-1753
tathameng.com

Prepared for:

Township of Oro-Medonte
148 Line 7 South
Oro-Medonte, Ontario L0L 2E0

Authored by:	Reviewed by:
DRAFT	DRAFT
Alysse Overholt, B.E.Sc., M.Eng., P.Eng. Engineer	Daniel Twigger, B.Sc.Eng., P.Eng. Manager - Water Resources

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Issue	Date	Description
0	October 31, 2023	Draft for Client Review

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1 Introduction

In 2023, the Township of Oro-Medonte (Township) retained Tatham Engineering Limited (Tatham) to undertake the Warminster Sideroad Drainage Improvements Municipal Class Environmental Assessment (MCEA). The assessment is being undertaken in accordance with the Schedule 'B' Municipal Class Environmental Assessment process outlined in the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment Document (October 2000, as amended in 2007, 2011, 2015, and 2023). This MCEA details the drainage deficiencies and issues identified in the study area, alternative solutions considered to address these deficiencies/issues, and the evaluation of these alternatives towards developing a preferred alternative solution to be implemented moving forward.

1.1 STUDY AREA

The study area is the section of the Warminster Sideroad municipal right of way between 1920 Warminster Sideroad and Town Line, including the Danny McHugh Memorial Park (municipal Address 1885 Warminster Sideroad), and part of 1926 Warminster Sideroad and 3320 Town Line, as illustrated on Figure 1 – Study Area Location Plan provided overleaf. Drainage improvements are being considered in the study area to reduce the frequency and severity of flooding along this section of Warminster Sideroad. Alternative solutions being considered include modifications which potentially impact pedestrian traffic, recreational space, or require land acquisition.

1.2 BACKGROUND

The Township has reported ongoing drainage issues along Warminster Sideroad within the study area including:

- frequent overtopping of driveways and road shoulders, causing washout and damage;
- culvert deterioration;
- severe erosion of roadside ditches; and
- poor ditch grading.

Additionally, the Township has reported public safety concerns associated with the road's narrow shoulders, depth and slope of some sections of roadside ditch and excessive flows observed through overland flow routes.

In 2022, the Township retained Tatham to complete a drainage assessment for the Warminster area and to provide drainage improvement recommendations for Warminster Sideroad between

Warminster Sideroad Drainage Improvements Municipal Class EA Study

Figure 1 - Study Area Location Plan

Township of Oro-Medonte
Proud Heritage, Exciting Future

Highway 12 and Town Line, as well as Town Line between Warminster Sideroad and Merrington Avenue. Tatham identified the drainage deficiencies and developed drainage improvement solutions to satisfy the design objectives established for the project. After reviewing the existing deficiencies, no clear solution to address all design objectives was determined for the section of Warminster Sideroad within the study area which is the subject of this report. Six improvement alternatives were developed as part of the *Warminster Sideroad Drainage Improvements Project Preliminary Design Report* (Tatham, 2023). The recommended drainage improvement alternative was Option 5 – construction of a new conveyance channel through 1922 Warminster Sideroad and 3320 Town Line. This alternative will require land acquisition and consequently requires completion of an EA under Schedule 'B' of activities subject to the screening process per the MCEA guidelines.

1.3 PROJECT TEAM

The project team is responsible for the preparation of this report and the supporting documentation is comprised of the following:

- The Township of Oro-Medonte (Township);
- Tatham Engineering Limited (Tatham) – Engineering;
- Cambium Inc. (Cambium) –Natural Heritage; and
- Archeoworks Inc. (Archeoworks) – Archeological.

1.4 MUNICIPAL CLASS EA PROCESS

This Municipal Class Environmental Assessment has been developed in accordance with the Schedule 'B' Municipal Class Environmental Assessment process (provided overleaf) outlined in the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment Document (October 2000, as amended in 2007, 2011, 2015 and 2023). It considers all aspects of the environment: physical, natural, social, cultural and economic, and involves consultation with the public, affected parties and review agencies throughout the process.

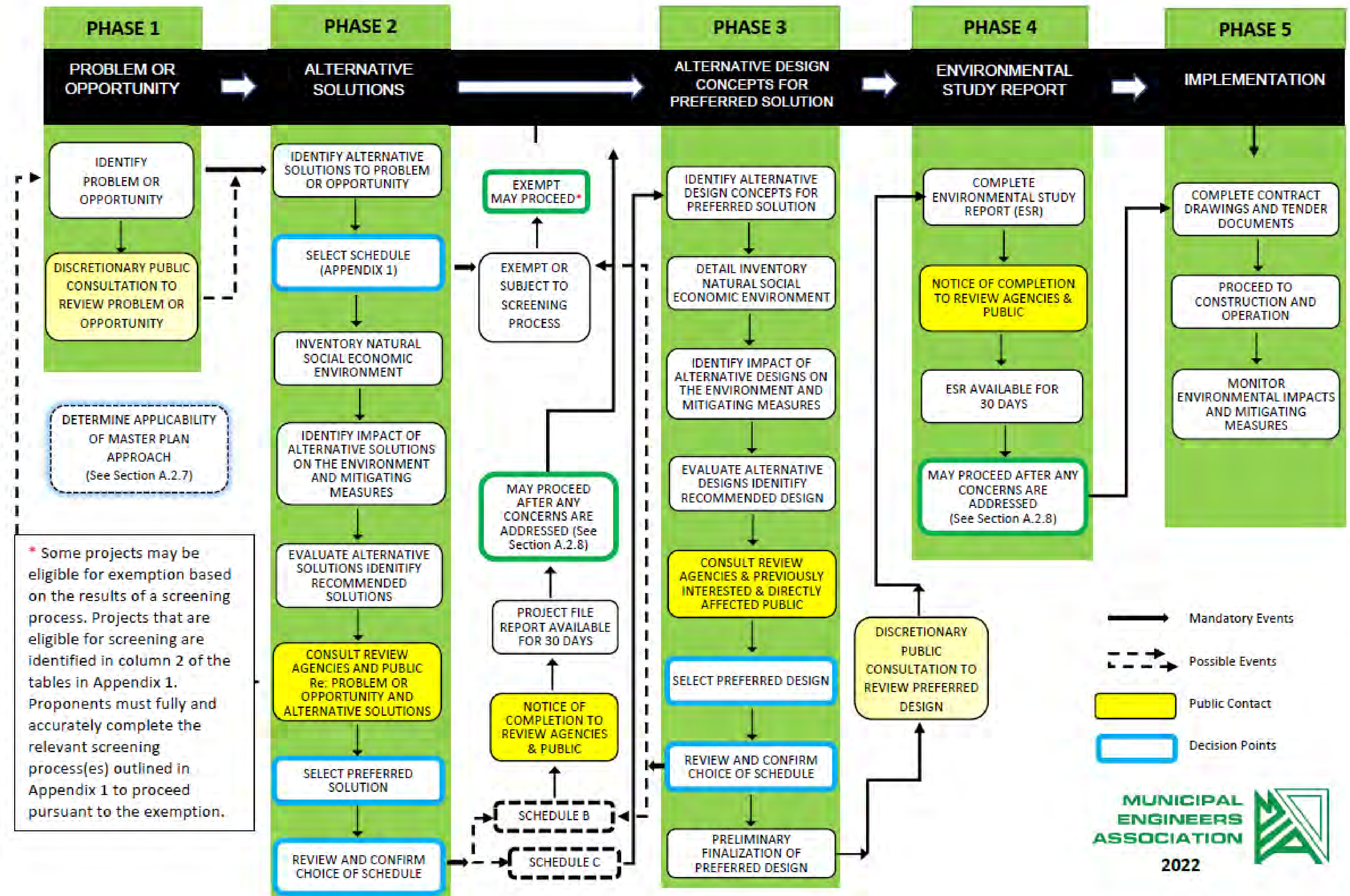
This Municipal Class Environmental Assessment is proceeding through Phases 1 and 2 of the Class EA process as follows:

Phase 1: Identify the Problem.

Phase 2: Identify and assess, at a strategic level, alternative solutions to the identified problem, then recommend the preferred solution that can be implemented as a separate subsequent project.

EXHIBIT A.2. MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

NOTE: This flow chart is to be read in conjunction with Part A of the MCEA



This document has been prepared in support of public consultation as part of Phase 2 of the Class EA process and made available for public comment prior to being approved and adopted by the Township.

1.5 EXISTING POLICIES

There are several polices, regulations and guidelines which are to be adhered to as part of the proposed improvement alternatives within the study area. The most recent versions of these documents include the following:

1.5.1 The Township of Oro-Medonte Official Plan (2023)

The Official Plan (OP) outlines the goals, objectives and policies for land use and development within the Township of Oro-Medonte. The OP provides the Township direction for controlling growth, implementing by-laws and making public and private development decisions as a means of ensuring a healthy community. The OP provides guidance for land use changes, municipal initiatives and the provision of public works. As such, the OP provides policies for the effective management of stormwater, natural heritage features and functions, as well as historic landscapes and cultural heritage features.

1.5.2 Township of Oro-Medonte Development Engineering Policies, Process and Design Standards (2023)

The Township of Oro-Medonte *Development Engineering Policies, Process and Design Standards* provide direction for the effective management of stormwater in the Township. The guidelines provide uniform minimum standards and objectives for the planning process and stormwater infrastructure design. The document includes the Township's guidelines regarding environmental protection (water quality, water quantity, etc.), stormwater conveyance design, stormwater management facility design, and urban design concepts including traditional concepts and low impact development (LID) techniques. Generally, these guidelines include the mandates of the other policies, regulations and guidelines discussed in this section. As such, these guidelines act as the basis for the development of the drainage improvement solutions.

As per the Township's guidelines, the minor drainage system (storm sewers, catchbasins, driveway culverts, and surface swales) shall be designed to convey the 1:5-year (minimum) design storm peak flow. The major drainage system (overland) shall be designed to convey the 1:100-year design storm peak flow. Flooding of existing buildings and/or property shall be eliminated where feasible. Warminster Sideroad is a collector road which culvert crossings and road elevations must satisfy the 1:50-year design flood frequency criteria.

1.5.3 South Georgian Bay and Lake Simcoe Source Protection Plan (2022)

As the study area is part of the Severn Sound Source Protection Area, the South Georgian Bay and Lake Simcoe Source Protection Plan policies will apply for this study. The priority of the Source Protection Plan is to protect and restore the long-term ecological health of the South Georgian Bay watersheds of Severn Sound, Nottawasaga Valley and Lake Simcoe. The objective of this document is to provide the policies to protect existing and future municipal drinking water sources.

1.5.4 Provincial Policy Statement (2020)

The *Provincial Policy Statement* was developed as a regulatory policy for land use planning and development. The *Provincial Policy Statement* supports the protection of public health and safety, the natural environment and the resources of provincial interest while providing for appropriate development. The policy identifies the natural and built features to be protected and the areas where development and site alteration are restricted. Key requirements of this policy are as follows:

- Development and site alteration are restricted on lands adjacent to natural heritage features unless it is demonstrated that the natural features and their ecological functions are not negatively impacted;
- Development and site alteration are restricted on lands adjacent to sensitive surface water and groundwater features unless mitigative measures or alternate development approaches protect these natural features; and
- Significant built heritage features are to be conserved.

1.5.5 Growth Plan (2020)

Under the *Places to Grow* Act, 2020 the *Growth Plan* for the Greater Golden Horseshoe is a framework for building stronger, prosperous communities by implementing Ontario's vision for managed growth in the region. The Plan provides direction for planning, housing, natural heritage, environmental protection, infrastructure and transportation decisions considering the region as a whole while recognizing the unique characteristics, strengths and economy of each individual community.

1.5.6 NVCA Natural Hazards Technical Guide (2013)

The study area is located in the Nottawasaga Valley watershed and falls under the general authority of the Nottawasaga Valley Conservation Authority (NVCA). The principal mandate of the NVCA is to protect public health and safety, prevent property damage and prevent social disruption caused by natural hazards while conserving, protecting and managing natural resources within the Nottawasaga Valley watershed. Complementing the Planning Act, the NVCA administers the *Development, Interference with Wetlands and Alterations to Shorelines and Watercourse Regulation (Ontario Regulation 179/06)* under Section 28 of the *Conservation Authorities Act*. Development within the NVCA Regulation Limits is subject to NVCA review and approvals allowing the NVCA to ensure development proposals have regard for the existing natural hazards.

The *NVCA Natural Hazards Technical Guide* outlines the stormwater management and watershed development policies aimed to protect the environmental integrity of the Nottawasaga Valley watershed. The Guide provides direction on land use and development considering natural hazards, natural heritage features, and the natural environment to protect public health and safety, prevent property damage and social disruption.

1.5.7 NVCA Stormwater Technical Guide (2013)

Similar to the Ministry of the Environment (MOE) *Stormwater Management Planning and Design Manual* and Oro-Medonte *Development Engineering Policies, Process and Design Standards*, the *NVCA Stormwater Technical Guide* provides planning and design direction for the effective management of stormwater in the Nottawasaga Valley watershed.

1.5.8 Low Impact Development Stormwater Management Planning and Design Guide (2010)

The Credit Valley Conservation Authority (CVC) and Toronto and Region Conservation Authority (TRCA) developed the *Low Impact Development Stormwater Management Planning and Design Guide* which speaks to the importance of at source SWM controls versus typical end-of-pipe facilities. The advantages of the low impact development approach include:

- Reduction in overall runoff volume;
- Reduction in phosphorus discharge; and
- Reduced long term operation and maintenance.

As such, implementing low impact development measures where feasible will help reduce flooding and improve overall water quality. On this basis, all future development should evaluate the use of low impact development principles as part of the stormwater management design.

1.5.9 Ministry of Environment, Conservation and Parks (Formerly MOE) Stormwater Management Planning and Design Manual (2003)

The *Stormwater Management Planning and Design Manual* evolved from the MECP *Stormwater Quality Best Management Practices* manual (June 1991) in response to evolving stormwater management practices to provide an integrated approach to effective stormwater management planning and design focused on water quality, water quantity and erosion control. The Planning and Design Manual is a tool, not a rulebook, providing practical guidance for the effective design of lot level, conveyance, and end-of-pipe stormwater practices. The objectives of the Planning and Design Manual are to apply an integrated treatment train approach to manage stormwater, maintain the hydrologic cycle, protect water quality and prevent increased erosion and flooding.

2 Problem / Opportunity Statement

The *Warminster Sideroad Drainage Improvements Project Preliminary Design Report* (Tatham, 2023) was reviewed in detail to clearly identify the drainage issues and deficiencies in the study area which need to be addressed. The Problem and Opportunity Statements for this MCEA are provided in the following sections.

2.1 PROBLEM STATEMENT

Currently, Warminster Sideroad experiences flooding during both minor and major storms. Frequent flooding of private and municipal property during minor and major storms has been documented due to insufficient culvert and roadside ditch capacities. The flooding has caused damage to both private and municipal property, additional maintenance efforts and costly repairs for the Township, and may even cause degradation to the downstream drainage system through excess erosion and sedimentation. The existing conditions also cause concern for public safety.

2.2 OPPORTUNITY STATEMENT

An opportunity exists to improve the drainage conditions through Warminster Sideroad, to reduce the severity and frequency of flooding within the study area. There is also an opportunity to reduce erosion, reduce maintenance requirements, and reduce public safety hazards through improvements to the drainage system through the study area. As such, the Township has initiated this MCEA to identify and evaluate alternative solutions to the identified problems based on their impacts on the physical, natural, social, cultural and economic environments. A preferred solution(s) having the greatest positive impact will be the end product of this study.

3 Existing Systems Analysis

The Warminster Sideroad drainage system conveys major and minor flows from a total drainage area of approximately 125.7 ha to Town Line. This drainage area includes 75.3 ha of mostly residential runoff and 50.4 ha of mostly agricultural runoff. The roadside ditches along Warminster Sideroad are deep with steep side slopes showing evidence of severe erosion, including damage to the root systems of the mature treeline. Driveway and road crossing culverts show signs of aging, damage and are partially filled with sediment.

The Township has reported ongoing drainage issues along Warminster Sideroad through the study area including frequent overtopping of driveways and the road shoulder causing washout and damage, culvert deterioration, severe erosion of roadside ditches and poor ditch grading. Additionally, the Township has reported public safety concerns associated with the depth and slope of some sections of roadside ditch and excessive flows observed through overland flow routes.

As part of this MCEA, the preliminary hydrologic and hydraulic assessment of the study area in support of the *Warminster Sideroad Drainage Improvements Project Preliminary Design Report* (Tatham, 2023) was reviewed. The results of the assessment are summarized in the following sections and detailed in the *Warminster Sideroad Drainage Improvements Project Preliminary Design Report* (Tatham, 2023) included in Appendix A for reference.

3.1 HYDROLOGIC AND HYDRAULIC ASSESSMENT

A hydrologic model was developed to assess the drainage system through Warminster Sideroad between Highway 12 to Town Line in support of the *Warminster Sideroad Drainage Improvements Project Preliminary Design Report* (Tatham, 2023). The drainage system was divided into ten sections to assess the existing culvert capacities against Township Standards. The hydrologic model was reviewed and confirmed to reflect the latest existing conditions and the sections applicable to this MCEA are summarized as follows:

- Section D: Warminster Sideroad from the bend at Danny McHugh Memorial Park to Culvert D;
- Section E: Warminster Sideroad from Culvert D to Galrich Court;
- Section F: Warminster Sideroad from Galrich Court to 2005 Warminster Sideroad;
- Section G: Warminster Sideroad from 2005 Warminster Sideroad to 2029 Warminster Sideroad; and
- Section H: Warminster Sideroad from 2029 Warminster Sideroad to Town Line.

Storm sewers, driveway culverts, local road culvert crossings, and collector road culvert crossings were analyzed using the 1:5-year, 1:25-year, 1:50-year and 1:100-year return frequency design storms, as outlined in Township Standards. Recognizing the scale of this study a simplified approach to evaluate the hydraulic characteristics of the drainage system was undertaken. The Manning's Equation was considered an appropriate method to provide conservative existing driveway culvert capacity estimates, and for evaluating culvert size recommendations. A summary of peak flows through the various sections within the study area for this MCEA are summarized in Table 1.

Table 1: Driveway Culvert Summary (North and South Side of Warminster Sideroad)

STORM	DRIVEWAY CULVERT CAPACITY/PEAK FLOW (m^3/s)							
	SECTION E		SECTION F		SECTION G		SECTION H	
	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
Existing Capacity	0.87	0.08	0.87	0.08	1.19	0.11	1.19	0.16
1:5-year	**1.79**	**0.07**	**1.96**	**0.11**	**2.10**	**0.14**	**2.25**	**0.16**
1:25-year	3.21	0.12	3.54	0.17	3.84	0.23	4.11	0.26
1:100-year	5.37	0.17	5.94	0.26	6.35	0.34	6.72	0.39

Note: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards.

The *Warminster Sideroad Drainage Improvements Project Preliminary Design Report* (Tatham, 2023) describes three road crossing culverts within the study area for this MCEA as follows:

- Culvert D: Immediately west of the driveway to 1945 Warminster Sideroad, a 900 mm diameter (approximate) CSP culvert conveys runoff north to the Warminster Sideroad north roadside ditch;
- Culvert F: West of Galrich Court, flows drain to a ditch inlet catch basin on the south side of Warminster Sideroad and cross Galrich Court via a 500 mm diameter storm sewer, which daylights east of 1981 Warminster Sideroad; and
- Culvert G: At Town Line, the north roadside ditch of Warminster Sideroad and the west roadside ditch of Town Line converge and drain south under Warminster Sideroad via a 900 mm diameter (approximate) CSP culvert.

The HY-8 Culvert Hydraulic Analysis program was used to determine more detailed existing road crossing culvert capacities. A summary of the peak flows and the existing road crossing culvert capacities within the study area are summarized in Table 2.

Table 2: Road Crossing Culvert Summary

STORM	ROAD CROSSING CULVERT PEAK FLOWS (m^3/s)		
	Culvert D	Culvert F	Culvert G
Existing Capacity	1.46	0.12*	0.90
1:25-year	2.79	**0.12**	4.37
1:50-year	**3.33**	0.14	**5.69**
1:100-year	3.91	0.17	7.19

Note 1: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards. (*) Culvert F via storm sewer and governed by DICB inlet capacity.

3.2 EXISTING DRAINAGE DEFICIENCIES

The existing hydraulic assessment results of the Warminster Sideroad drainage system through the study area are detailed in the *Warminster Sideroad Drainage Improvements Project Preliminary Design Report* (Tatham, 2023) enclosed in Appendix A and are summarized as follows:

- the maximum existing capacity of the Warminster Sideroad north roadside ditch is 1.19 m^3/s which is less than the 1:5-year return frequency design storm peak flow. Flows will overtop driveways and begin to spill over the road crown and onto private properties fronting Warminster Sideroad during storm events larger than the 1:5-year return frequency;
- Culvert D has a conveyance capacity of 1.81 m^3/s which is approximately the 1:5-year return frequency design storm peak flow. The depth of road overtopping during the Regulatory Storm is 0.41 m; and
- Culvert G has a conveyance capacity of 0.90 m^3/s which is less than the 1:2-year return frequency design storm peak flow. The depth of road overtopping during the Regulatory Storm is 0.58 m.

Culvert D and G do not provide safe access egress through the study area. Currently there are three points of access (Warminster Sideroad from east, Warminster Sideroad from west, and Galrich Court) to the 39 properties within this section of Warminster Sideroad. However, during minor and major storms, the number of access points is reduced to one, via Galrich Court. This poses a public safety hazard for local residents.

More general deficiencies across the study area are noted as follows:

- ditches require sediment clean out, regrading, and erosion protection to ensure full flow capacity is maintained through the drainage system;
- culverts have limited cover which can cause damage and increased maintenance of the drainage system;
- culverts require upsizing/replacement to satisfy Township standards or require clean out due to sediment accumulation or damage;
- some downstream sections have smaller culvert sizes than upstream culverts, which limits the capacity of the drainage system;
- depth and side slopes of north roadside ditch are a public safety concern;
- flows through north roadside ditch causing erosion;
- narrow road shoulders; and
- flooding reported on private property.

4 Project Environment

This section provides a description of the existing physical, natural, social, cultural and economic environments within the study area. The detailed description of the project environment has been developed from a review of the available background information as well as from information gathered during recent field investigations.

4.1 PHYSICAL ENVIRONMENT

The section of Warminster Sideroad through the study area is approximately 750 m in length. The majority of the municipal right of way is local residential with crowned roads and roadside ditches, with the exception of the daylight triangle at the intersection of Galrich Court and Warminster Sideroad with mountable curb and gutter. Town Line represents the boundary between Oro-Medonte and Severn Township with the west roadside ditch owned and maintained by the Township of Oro-Medonte.

The section through the bend between 1920 Warminster Sideroad and 1944 Warminster Sideroad is 30 m wide with an asphalt surface of approximately 6.3 m. The municipal right of way from 1944 Warminster Sideroad to Town Line is 20 m wide with an asphalt surface of approximately 6.5 m. The boulevard on the north side of Warminster Sideroad is approximately 6.5 m wide from edge of asphalt to property line. A mature tree line is present approximately 5.0 m from the edge of asphalt. The north roadside ditch between 1944 Warminster Sideroad and Town Line is approximately 0.75 m to 0.95 m deep with steep side slopes between 1:1 (H:V) to 2:1(H:V) and showing signs of severe erosion. The boulevard on the south side of Warminster Sideroad is approximately 7.0 m wide from edge of asphalt to property line. A mature tree line is present approximately 5.0 m from the edge of asphalt. The south roadside ditch between 1945 Warminster Sideroad and Town Line is approximately 0.50 m to 0.75 m deep with side slopes between 2.5:1 (H:V) to 3:1(H:V). There are very narrow to virtually no gravel shoulders through this section of Warminster Sideroad, with 0.75 m to 1.0 m rounding from edge of asphalt to top of bank for roadside ditches.

4.1.1 Drainage Infrastructure

Roadside ditches collect and convey surface water east along Warminster Sideroad. All upstream drainage is conveyed in the south roadside ditch to 1945 Warminster Sideroad where, immediately west of the driveway to 1945 Warminster Sideroad, a 900 mm diameter (approximate) CSP culvert (Culvert D) conveys runoff north under Warminster Sideroad to the north roadside ditch at 1944 Warminster Sideroad. All upstream drainage is then conveyed from 1944 Warminster Sideroad to Town Line within the north roadside ditch.

Local drainage from residential lots fronting the north side of Warminster Sideroad drain to the north roadside ditch moving east. Most driveway culverts through this section are damaged and partially obstructed with sediment. At Town Line, the north roadside ditch of Warminster Sideroad and the west roadside ditch of Town Line converge and cross south under Warminster Sideroad via a 900 mm diameter (approximate) CSP culvert (Culvert G) which is damaged and partially obstructed with sediment.

Local drainage from residential lots fronting the south side of Warminster Sideroad drain to the south roadside ditch moving east to Town Line. The driveway culverts through this section are partially to fully buried. Flows from west of Galrich Court drain to a ditch inlet catch basin and cross Galrich Court via a 500 mm diameter storm sewer (Culvert F), which daylights east of 1981 Warminster Sideroad where the south roadside ditch continues to Town Line.

All stormwater from the Warminster Sideroad drainage system is routed south on Town Line from Warminster Sideroad to Merrington Avenue via the west roadside ditch. Frequent and widespread flooding including overtopping of driveways and the road crown has caused damage to both private and municipal property and has raised concern for public safety.

4.1.2 Existing Infrastructure (Sanitary, Water and Utilities)

In addition to storm drainage infrastructure, sanitary, water and utility infrastructure is present in the study area. Properties fronting Warminster Sideroad are on individual private septic systems.

The study area is serviced with potable water by water mains within the boulevard along the north side of Warminster Sideroad through the study area.

There are several utilities within the study area including hydro, gas, and telecommunications. Overhead hydro, gas main, and buried telecommunication lines run within the boulevard along the south side of Warminster Sideroad through the study area.

4.1.3 Transportation System

In support of a recent study completed to support the need for intersection improvements at the intersection of Warminster Sideroad and Highway 12, Tatham prepared a traffic review to establish the traffic volumes and operations of the existing road network and the impacts of future development within Warminster. For the study, traffic counts were obtained from MTO for the intersection of Warminster Sideroad with Highway 12, conducted on:

- November 13, 2019 from 7:00 to 9:00, 11:00 to 14:00 and 15:00 to 18:00; and
- April 29, 2016 from 7:00 to 9:00 and 15:00 to 19:00.

Traffic volumes for the existing 2021 horizon and future 2026 horizon were estimated based on the following:

- 2019 traffic count;
- background growth rate; and
- additional development growth realized over the period of 2019 to 2021.

Table 3 summarizes the weekday traffic volumes counted and projected for Warminster Sideroad from the traffic review. Although these records are just outside of the study area for this report, the data provides a general sense of the number of travelers who stand to be impacted by this project.

Table 3: Weekday Peak Hour Traffic Counts and Projections for Warminster Sideroad

LOCATION		WEEKDAY PEAK HOUR VEHICULAR VOLUMES[1]							
		2016		2019		2021[2]		2026[2]	
		AM	PM	AM	PM	AM	PM	AM	PM
Warminster Sideroad 1:5-year	west leg	59	47	59	88	65	100	80	120
	east leg	27	49	23	112	35	125	35	140
Total		**86**	**96**	**82**	**200**	**100**	**225**	**115**	**260**

[1]per *Warminster Sideroad & Highway 12 Intersection Review* (Tatham, 2021)
[2]projected volumes.

As part of the assessment, the Ministry of Transportation installed a portable CCTV camera from October 5th, 2020 to November 30th 2020 to observe the Highway 12 and Warminster Sideroad intersection operations where pedestrian crossover was monitored. Results of the monitoring were tabulated for the period from October 5th, 2020 to November 2nd, 2020 and are summarized in Table 4. The majority of pedestrians using the crosswalk are children going to Warminster Elementary School. Although these records are just outside of the study area for this report, the data provides a general sense of the number of pedestrians who stand to be impacted by this project. Projections for future pedestrian traffic volumes were not provided in the study.

Table 4: Number of Pedestrians Crossing Highway 12 from Warminster Sideroad

LOCATION	PEDESTRIAN VOLUMES[1]	
	OCTOBER 2, 2020 TO NOVEMBER 2, 2020	AVERAGE DAILY
AM (8:15 – 9:15)	197	7
PM (15:00 – 16:00)	215	8
Total	**412**	**15**

[1]per *Warminster Sideroad & Highway 12 Intersection Review* (Tatham, 2021)

The drainage improvements will result in isolated temporary disturbances to vehicular traffic and pedestrian movement along Warminster Sideroad. As such, the impact of each alternative solution has on the transportation system is an important consideration for this study.

The results of the assessment are detailed in the *Warminster Sideroad & Highway 12 Intersection Review* included in Appendix B for reference.

4.2 NATURAL ENVIRONMENT

In support of this study, Cambium Inc. completed a high-level assessment of the existing natural heritage features throughout the study area. The assessment was completed to characterize the terrestrial habitat along Warminster Sideroad and the lands adjacent to it. The natural heritage features were assessed through a review of the available background information and site investigations. The results of the assessment are summarized in the following sections and detailed in the *Natural Heritage Evaluation – Warminster Sideroad Drainage Improvements* included in Appendix C for reference.

4.2.1 Surface Water, Drainage Features and Wetland Habitat

No watercourses or fish habitat are present within the study area. An unnamed watercourse is mapped outside of the 120 m adjacent lands boundary which crosses Town Line approximately 770 m southeast of the study area and flows eastward to a mapped wetland.

No wetlands are mapped throughout the study area, and no wetlands were identified throughout the study area during the field investigation.

An unevaluated wetland is mapped on adjacent lands, within 120 m of the study area, located immediately east of Town Line, south of the study area. The Marchmont Swamp Provincially Significant Wetland is mapped outside of the 120 m adjacent lands boundary.

4.2.2 Terrestrial Habitat

No provincially rare vegetation communities were observed within the study area or adjacent lands. No at risk or provincially rare species were identified, overall the floristic quality of vegetation identified throughout the study area was low.

There are no mapped significant woodlands or valleylands throughout the study area or on adjacent lands.

The study area has potential to provide habitat for the threatened Eastern Whip-poor-will and the following bat species:

- Eastern Small-footed Myotis;
- Little Brown Myotis;
- Norther Myotis; and
- Tri-colours Bat.

To minimize the potential for negative impacts to wildlife habitat the number of trees trimmed or removed for drainage improvements should be minimized. Where tree trimming or clearing is required, standard industry best management practices and mitigation measures are recommended such as completing work outside the migratory bird window (September 1 to March 31). Additionally, consideration should be made for the Township Site Alteration By-Law (2016-056) Policy 2.4 regarding the alteration, injury or destruction of municipal trees. Restoration planting should be considered to regain existing canopy cover and biodiversity if significant tree removal is anticipated.

4.3 SOCIAL ENVIRONMENT

4.3.1 Property Value

Existing flooding can negatively impact property values and the Township's ability to improve existing drainage infrastructure. As such, any improvement alternative that will prevent or reduce flooding on private property would be a positive improvement.

4.3.2 Public Safety

The existing drainage infrastructure in the study area operates at levels below current Township design standards resulting in flooding of municipal and private property. The flooding presents a public safety concern as pedestrian and vehicular access, including emergency vehicle access, will be obstructed or eliminated along Warminster Sideroad. The conveyance of both the minor and major storm flows and compliance with the Provincial Policy Statement in this regard is an important consideration in the review of alternative solutions.

4.3.3 Additional Social Impacts

In addition to potential impacts on property values and public safety, impacts to the recreational facility, Danny McHugh Memorial Park, is an important consideration in the review of alternatives. Construction activities will create impacts related to noise, pedestrian access, recreational amenities, traffic movement and local business which must be considered as well.

4.4 ECONOMIC ENVIRONMENT

4.4.1 Construction Costs

Each alternative solution has an upfront capital cost to construct. Project cost estimates have been prepared for each alternative solution to aid in the evaluation of the economic impacts to implement each solution. The project cost estimates have been developed using recent tender pricing received on similar projects completed by Tatham Engineering Limited. The unit rates used reflect professional judgment based on industry experience.

4.4.2 Life Cycle Costs

Each alternative solution also has a life cycle cost associated with maintenance (culvert crossing cleanouts, erosion repairs, sediment cleanout, etc.) and future infrastructure replacement costs. Life cycle costs for each alternative solution have been considered to aid in the evaluation of the economic impacts to implement each solution.

4.4.3 Property Acquisition Costs

The Township may wish to acquire lands or interests therein (easements) where it is in the Township's interest to do so. Future development lands may be dedicated to the Township through a Subdivision Agreement or Site Plan Conditions. Existing properties, or portions of the properties, may be acquired through negotiations with the landowner or under the worst-case scenario through expropriation.

4.5 CULTURAL HERITAGE ENVIRONMENT

Cultural heritage resources include archaeological resources, built heritage resources and cultural heritage resources.

4.5.1 Archaeological Resources

A Stage 1 Archaeological Assessment (AA) was undertaken by Archeoworks Inc. in support of this MCEA. A Stage 1 AA consists of a review of geographic, land use and historical information for the property and the relevant surrounding area, a property visit to inspect its current conditions and contacting the Ministry of Heritage, Sport, Tourism and Culture Industries to find out whether, or not, there are any known archaeological sites on or near the property. Its purpose is to identify areas of archaeological potential and further archaeological assessment (e.g. Stage 2 – 4) as necessary. The *Stage 1 Archeological Assessment for Warminster Drainage Improvements* is included in Appendix D for reference.

Stage 1 AA background research established elevated potential for the recovery of archaeologically significant materials within the study area due to the presence of secondary water sources. Review of aerial photographs, orthophotographs, supplemented by on-site property inspection determined that much of the study area is within disturbed areas. The area within Danny McHugh Memorial Park and a portion of the agricultural land within the 3320 Town Line property retain their archaeological potential. Considering these findings, the following recommendations are presented:

1. Parts of the study area that were identified as having archaeological potential removed, are exempt from requiring Stage 2 AA. No further work is recommended in this area.
2. Parts of the study area that were identified as having no or low archaeological potential are exempt from requiring Stage 2 AA. No further work is recommended in this area.
3. All areas identified as retaining archaeological potential must be subjected to a Stage 2 AA. These areas must be subjected to either pedestrian survey at five-meter intervals or test pit survey at five-metre intervals.
4. Should construction activities extend beyond the assessed limits of the study area, further archaeological investigation will be required to assess the archaeological potential of these lands.

No construction activities shall take place within the study area prior to the Ministry of Heritage, Sport, Tourism and Culture Industries (Archaeology Program Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

A Stage 2 AA will be undertaken should the preferred alternative identified through the evaluation of alternatives be within a zone identified as having archaeological potential and that will be impacted by the preferred solution as early as possible during detailed design.

4.5.2 Built Heritage Resources and Cultural Heritage Landscapes

The screening checklist (Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes), developed by the Ministry of Heritage, Sport, Tourism and Culture Industries, was completed as part of the EA. The study area was determined to have low potential for built heritage resources and cultural heritage landscapes. Therefore, no technical cultural heritage studies have been undertaken.

5 Alternative Solutions

Integral to the planning process is the consideration and evaluation of alternatives to address the problem statement and where possible correct the noted deficiencies. The improvement alternatives developed as part of this study are described in the following sections and illustrated on Figures provided in Appendix E of this report.

5.1 EXISTING (BASELINE) CONDITIONS

5.1.1 Alternative 1 – Do Nothing

The "Do Nothing" alternative allows for the consideration of not making any changes to the Warminster Sideroad drainage system. This alternative is being considered to provide a benchmark to gauge the physical, natural, social, cultural and economic implications of the other alternatives. Under Alternative 1, the existing culverts and roadside ditches will remain unchanged from existing conditions.

5.2 HYDRAULIC IMPROVEMENTS

5.2.1 Alternative 2 – Increase Conveyance Capacity of North Roadside Ditch

There is an opportunity to improve the conveyance capacity of the north roadside ditch along Warminster Sideroad by widening and lowering the roadside ditch and replacing the existing road crossing and driveway culverts with larger culverts. The south roadside ditch of Warminster Sideroad would remain undisturbed under this alternative.

5.2.2 Alternative 3 – Increase Conveyance Capacity of South Roadside Ditch

There is an opportunity to improve the conveyance capacity of the south roadside ditch along Warminster Sideroad by widening and lowering the roadside ditch and replacing the existing road crossing and driveway culverts with larger culverts. The north roadside ditch of Warminster Sideroad would remain undisturbed under this alternative.

5.3 FLOW ATTENUATION

5.3.1 Alternative 4 – Dry Pond SWMF Attenuation in Park Block

There is an opportunity to reduce the peak flows through the roadside ditches along Warminster Sideroad by constructing a SWM facility within the Danny McHugh Memorial Park designed to attenuate peak flows generated west of Richelieu Road. The north and south roadside ditch of Warminster Sideroad would remain undisturbed under this alternative.

5.4 FLOW DIVERSION

5.4.1 Alternative 5 – Conveyance Channel

There is an opportunity to reduce the peak flows through the roadside ditches along Warminster Sideroad by regrading a new conveyance channel along the south property limit of 1922 Warminster Sideroad and 3320 Town Line. The new conveyance channel can redirect drainage from the Kayley Estates development, the soccer pitches, and from the west along the rear of lots 1944 Warminster Sideroad to the west roadside ditch of Town Line. The roadside ditch system of Warminster Sideroad would remain undisturbed and continue to convey local drainage under this alternative.

5.5 HYDRAULIC IMPROVEMENTS PLUS ROAD RECONSTRUCTION

5.5.1 Alternative 6 – Storm Sewer

There is an opportunity to improve the drainage capacity by installing a new storm sewer system from 1944 Warminster Sideroad to Town Line. Under this alternative, the north roadside ditch of Warminster Sideroad would be regraded to convey local drainage and the south roadside ditch of Warminster Sideroad would remain undisturbed. This alternative will require full road reconstruction of Warminster Sideroad through the study area.

6 Alternative Solutions Assessment

To assess the effectiveness of the alternative solutions considered, the existing condition hydrologic model and hydraulic assessments of the Warminster Sideroad drainage system were revised to include the proposed improvements. The results of the analysis, specifically the reduction in the frequency of flooding, culvert sizes, private property and infrastructure impacts and costs are discussed in the subsequent sections.

6.1 EXISTING (BASELINE) CONDITIONS

6.1.1 Alternative 1 – Do Nothing

Alternative 1 represents the “do nothing” alternative and generally does not meet the Township of Oro-Medonte design standards. The Culvert D and G crossings do not satisfy the Township’s design flood frequency criteria (1:50-year return frequency design storm conveyance capacity). The conveyance capacity of the roadside ditches is also limited; generally having a conveyance capacity less than the culvert crossings.

Under this alternative, flooding on private property will remain. Insufficient cover over driveway culverts will be maintained and may lead to a shortened lifespan of the drainage system. Erosion in the roadside ditches will continue to cause sediment transport downstream, and over time, may strip the cover from mature tree roots and utilities. Public safety concerns regarding the steep ditch side slopes, depth of ditches, and narrow road shoulder widths will not be addressed. There will also continue to be public safety concerns regarding safe access egress, and Township maintenance requirements will likely increase.

6.2 HYDRAULIC IMPROVEMENTS

6.2.1 Alternative 2: Increase Conveyance Capacity of North Roadside Ditch

Under Alternative 2, Culvert D can be replaced with an 1880 x 1260 mm diameter CSPA culvert, which will provide a 1:50-year design storm peak flow conveyance capacity as required for Warminster Sideroad (collector road). The capacity of the north roadside ditch can be increased to the greatest extent possible within the municipal right-of-way by removing the mature trees on the north side of Warminster Sideroad and regrading the roadside ditch from property line down at 2:1 (H:V) side slopes to a depth of 1.12 m. The roadside ditch with a 0.9 m bottom width can be regraded from bottom of ditch up at 2:1 (H:V) side slopes to edge of gravel. The gravel shoulder can be maintained with a 0.5 m width. Driveway culverts on the north side of Warminster Sideroad can be replaced with 750 mm diameter HDPE culverts.

Under this alternative, the capacity of the north roadside ditch will be increased from 0.9 m^3/s to 1.4 m^3/s which equates to less than a 1:5-year design flood frequency. There will be a minor reduction in flooding on private property. Sufficient cover over the driveway culverts will be provided, although the culverts will not achieve the minimum hydraulic capacities as per Section 3.7.12 of the Township Standards. Erosion in the roadside ditches will be reduced as a result of an enlarged ditch cross section. However, the mature trees on the north side of Warminster Sideroad will require removal and existing hydrants, transformers, hydro poles, signs, services, utilities, etc. will required relocation. Public safety concerns regarding the depth of ditches and narrow road shoulder widths will not be addressed. The estimated construction costs for Alternative 2 are moderate compared against the other alternatives. A summary of peak flows through the various sections within the study area under this alternative are summarized in Table 5. Supporting calculations are provided in Appendix F for reference.

Table 5: Driveway Culvert Summary (North and South Side of Warminster Sideroad)

STORM	DRIVEWAY CULVERT CAPACITY/PEAK FLOW (m^3/s)							
	SECTION E		SECTION F		SECTION G		SECTION H	
	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
Proposed Capacity	1.58	0.08	1.58	0.08	1.58	0.11	1.58	0.16
1:5-year	**1.79**	**0.07**	**1.96**	**0.11**	**2.10**	**0.14**	**2.25**	**0.16**
1:25-year	3.21	0.12	3.54	0.17	3.84	0.23	4.11	0.26
1:100-year	5.37	0.17	5.94	0.26	6.35	0.34	6.72	0.39

Note: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards.

A summary of the peak flows and the proposed road crossing culvert capacities under this alternative are summarized in Table 6.

Table 6: Road Crossing Culvert Summary

STORM	ROAD CROSSING CULVERT PEAK FLOWS (m^3/s)		
	Culvert D	Culvert F	Culvert G
Proposed Capacity	3.65	0.12*	5.30
1:25-year	2.79	**0.12**	4.37
1:50-year	**3.33**	0.14	**5.69**
1:100-year	3.91	0.17	7.19

Note 1: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards. (*) Culvert F via storm sewer and governed by DICB inlet capacity.

6.2.2 Alternative 3: Increase Conveyance Capacity of South Roadside Ditch

Under Alternative 3, Culvert D can be replaced with an 1880 x 1260 mm diameter CSPA culvert, which will provide a 1:50-year design storm peak flow conveyance capacity as required for Warminster Sideroad (collector road). The capacity of the south roadside ditch can be increased to the greatest extent possible within the municipal right-of-way by removing the mature trees on the south side of Warminster Sideroad and regrading the roadside ditch from property line down at 2:1 (H:V) side slopes to a depth of 1.1 m. The roadside ditch with a 1.1 m bottom width can be regraded from bottom of ditch up at 2:1 (H:V) side slopes to edge of gravel. The gravel shoulder can be maintained with a 1.5 m width. Driveway culverts on the south side of Warminster Sideroad can be replaced with 1030 mm x 740 mm CSPA culverts.

Under this alternative, the capacity of the south roadside ditch will increase from 0.2 m^3/s to 0.7 m^3/s. However, the capacity of the north roadside ditch will remain 0.90 m^3/s, less than the reduced 1:5-year design storm peak flow of 1.9 m^3/s. There will be a minor reduction in flooding on private property. Sufficient cover over the driveway culverts will be provided through the south roadside ditch, although the cover over culverts through the north roadside ditch will remain insufficient. The mature trees on the south side of Warminster Sideroad will require removal and existing hydrants, transformers, hydro poles, signs, services, utilities, etc. will required relocation. Erosion in the roadside ditches will be reduced as a result of an enlarged ditch cross section through the south roadside ditch and reduced peak flows through the north roadside ditch. Public safety concerns regarding the steep ditch side slopes, depth of ditches, and narrow road shoulder widths will not be addressed, and additional public safety concerns may stem from the proposed flow routing and regrading of the south roadside ditch. The estimated construction costs for Alternative 3 are moderate compared against the other alternatives.

A summary of peak flows through the various sections within the study area under this alternative are summarized in Table 7. Supporting calculations are provided in Appendix F for reference.

Table 7: Driveway Culvert Summary (North and South Side of Warminster Sideroad)

STORM	DRIVEWAY CULVERT CAPACITY/PEAK FLOW (m^3/s)							
	SECTION E		SECTION F		SECTION G		SECTION H	
	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
Proposed Capacity	0.87	0.69	0.87	0.69	1.19	0.69	1.19	0.69
1:5-year	**1.48**	**0.38**	**1.65**	**0.42**	**1.79**	**0.45**	**1.94**	**0.47**
1:25-year	2.90	0.43	3.23	0.48	3.53	0.54	3.80	0.57
1:100-year	5.06	0.48	5.63	0.57	6.04	0.65	6.41	0.70

Note: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards.

A summary of the peak flows and the proposed road crossing culvert capacities under this alternative are summarized in Table 8.

Table 8: Road Crossing Culvert Summary

STORM	ROAD CROSSING CULVERT PEAK FLOWS (m^3/s)		
	Culvert D	Culvert F	Culvert G
Proposed Capacity	3.65	0.94	5.30
1:25-year	2.79	**0.60**	4.37
1:50-year	**3.33**	0.63	**5.69**
1:100-year	3.91	0.70	7.19

Note 1: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards. (*) Culvert F via storm sewer and governed by DICB inlet capacity.

6.3 FLOW ATTENUATION

6.3.1 Alternative 4: Dry Pond SWMF Attenuation in Park Block

Under Alternative 4, a dry pond with an approximate footprint of 0.7 ha and 10,650 m^3 of active storage can be constructed in the southwest corner of Danny McHugh Memorial Park and designed to collect and control drainage from west of Richelieu Road. A new storm sewer from

Warminster Sideroad, aligned east of Oro-Medonte Fire Station 5, is required to convey surface runoff from Warminster Sideroad to the SWM facility for peak flow attenuation. A swale can be graded to convey flows from Highway 12 to the dry pond and an outlet swale can be graded around the baseball diamond to tie into the south roadside ditch of Warminster Sideroad west of 1945 Warminster Sideroad. A summary of the peak flow attenuation provided by the dry pond SWM facility is summarized in Table 9. Supporting calculations are provided in Appendix F for reference.

Table 9: Summary of Peak Flow Attenuation for Alternative 4 Dry Pond

STORM	PEAK FLOWS (m^3/s)					
	4-HOUR CHICAGO			24-HOUR SCS		
	INLET	OUTLET	PERCENT REDUCTION	INLET	OUTLET	PERCENT REDUCTION
1:5-Year	0.68	0.17	75%	0.82	0.28	66%
1:25-Year	1.18	0.32	72%	1.87	0.75	60%
1:50-Year	1.46	0.40	72%	2.45	1.25	49%
1:100-Year	1.70	0.60	65%	2.93	1.62	45%

Culvert D can be replaced with a 1150 x 820 mm CSPA culvert, which will provide a 1:50-year design storm peak flow conveyance capacity for Warminster Sideroad (collector road).

Under this alternative, peak flows to the north roadside ditch will be decreased from 2.2 m^3/s to 1.4 m^3/s for the 1:5-year design storm peak flow. However, the capacity of the north roadside ditch will remain 0.90 m^3/s. There will be a moderate reduction in flooding on private property. Insufficient cover over driveway culverts will be maintained and may lead to a shortened lifespan of the drainage system. Erosion in the roadside ditches will be reduced as a result of the peak flow attenuation provided by the SWM facility. The mature trees in the southeast corner of the park block will require removal. Public safety concerns regarding the steep ditch side slopes, depth of ditches, and narrow road shoulder widths will not be addressed, and additional public safety concerns may stem from the proposed flow routing and construction of a pond and outlet swale within the park block. The estimated construction costs for Alternative 4 are high compared against the other alternatives.

A summary of peak flows through the various sections within the study area under this alternative are summarized in Table 10. Supporting calculations are provided in Appendix F for reference.

Table 10: Driveway Culvert Summary (North and South Side of Warminster Sideroad)

STORM	DRIVEWAY CULVERT CAPACITY/PEAK FLOW (m^3/s)							
	SECTION E		SECTION F		SECTION G		SECTION H	
	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
Proposed Capacity	0.87	0.08	0.87	0.08	1.19	0.11	1.19	0.16
1:5-year	**0.84**	**0.07**	**1.06**	**0.11**	**1.22**	**0.14**	**1.37**	**0.16**
1:25-year	2.29	0.12	2.62	0.17	2.84	0.23	3.06	0.26
1:100-year	3.97	0.17	4.55	0.26	4.96	0.34	4.32	0.39

Note: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards.

A summary of the peak flows and the proposed road crossing culvert capacities under this alternative are summarized in Table 11.

Table 11: Road Crossing Culvert Summary

STORM	ROAD CROSSING CULVERT PEAK FLOWS (m^3/s)		
	Culvert D	Culvert F	Culvert G
Proposed Capacity	2.68	0.12*	5.30
1:25-year	1.74	**0.12**	4.37
1:50-year	**1.96**	0.14	**5.69**
1:100-year	3.03	0.17	7.19

Note 1: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards. (*) Culvert F via storm sewer and governed by DICB inlet capacity.

6.4 FLOW DIVERSION

6.4.1 Alternative 5: Conveyance Channel

Under Alternative 5, a new conveyance channel can be constructed through 1922 Warminster Sideroad and 3320 Town Line, along the rear of lots 1944 Warminster Sideroad to the Town Line roadside ditch. A 12 m wide drainage easement obtained through property acquisition will be required. The north conveyance channel can be graded to maintain a 4.0 m bottom width trapezoidal channel, with a depth of 1.0 m, with 2.5:1 (H:V) side slopes and a longitudinal slope of 1.0%. All drainage from the Kayley Estates development, soccer pitches and from the west can be routed through the north conveyance channel via twin 900 mm HDPE diameter culverts crossing Warminster Sideroad from Danny McHugh Memorial Park to 1922 Warminster Sideroad. Culvert D can be replaced with a 900 mm diameter HDPE culvert, which will provide a 1:50-year design storm peak flow conveyance capacity for Warminster Sideroad (collector road).

Under Alternative 5, the capacity of the new conveyance channel will be 5.8 m^3/s which equates to a 1:100-year design flood frequency and includes 0.30 m of freeboard to the top of banks.

Peak flows to the north roadside ditch will be decreased from 2.2 m^3/s to 0.6 m^3/s . The capacity of the north roadside ditch will remain 0.90 m^3/s and will be sufficient to convey roughly the 1:25-year design storm peak flow. There will be a major reduction in flooding on private property and this alternative will also address the nuisance rear yard ponding through 2008 Warminster Sideroad to 2048 Warminster Sideroad. The proposed north conveyance channel will require land acquisition through 1922 Warminster Sideroad and 3320 Town Line along the rear of lots 1944 Warminster Sideroad to the Town Line roadside ditch. A new road crossing at 1922 Warminster Sideroad may require hydro pole and utility relocation and limited tree clearing. Erosion in the roadside ditches will be reduced as a result of reduced peak flows through the north roadside ditch. Public safety concerns regarding the steep ditch side slopes, depth of ditches, and narrow road shoulder widths will not be addressed. However, the 1:5-year peak flow rate to the north roadside ditch will be decreased by approximately 74% and the conveyance capacity will be increased to roughly the 1:25-year design storm peak flow. The estimated construction costs for Alternative 5 are moderate compared against the other alternatives.

A summary of peak flows through the various sections within the study area under this alternative are summarized in Table 12. Supporting calculations are provided in Appendix F for reference.

Table 12: Driveway Culvert Summary (North and South Side of Warminster Sideroad)

STORM	DRIVEWAY CULVERT CAPACITY/PEAK FLOW (m^3/s)							
	SECTION E		SECTION F		SECTION G		SECTION H	
	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
Proposed Capacity	0.87	0.08	0.87	0.08	1.19	0.11	1.19	0.16
1:5-year	**0.49**	**0.07**	**0.52**	**0.11**	**0.55**	**0.14**	**0.58**	**0.16**
1:25-year	0.88	0.12	0.93	0.17	0.98	0.23	1.06	0.26
1:100-year	1.23	0.17	1.28	0.26	1.34	0.34	1.41	0.39

Note: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards.

A summary of the peak flows and the proposed road crossing culvert capacities under this alternative are summarized in Table 13.

Table 13: Road Crossing Culvert Summary

STORM	ROAD CROSSING CULVERT PEAK FLOWS (m^3/s)		
	Culvert D	Culvert F	Culvert G
Existing Capacity	1.74	0.12*	5.30
1:25-year	0.83	**0.12**	4.37
1:50-year	**1.01**	0.14	**5.69**
1:100-year	1.18	0.17	7.19

Note 1: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards. (*) Culvert F via storm sewer and governed by DICB inlet capacity.

6.5 HYDRAULIC IMPROVEMENTS PLUS ROAD RECONSTRUCTION

6.5.1 Alternative 6: Storm Sewer

Under Alternative 6, a new storm sewer can be installed from 1944 Warminster Sideroad to the west roadside ditch of Town Line designed to convey the 1:100-year design storm peak flow. Storm sewer pipe sizes will range between 1350 mm diameter to 1500 mm diameter. Culvert D can be replaced with double ditch inlet catchbasins to tie into the new storm sewer. The north roadside ditch can be regraded to convey local flows, and inlet structures can be installed at the upstream side of each driveway. Full road reconstruction along this section of Warminster Sideroad is required under this drainage improvement alternative.

Under this alternative, the storm sewer will provide a 1:100-year design storm peak flow conveyance capacity through this section of Warminster Sideroad. The proposed storm sewer will provide a peak flow capacity of 5.9 m^3/s and the regraded north roadside ditch will provide a peak flow capacity of 0.6 m^3/s for local drainage. There will be a major reduction in flooding on private property. Erosion in the roadside ditches will be reduced as a result of reduced peak flows through the north roadside ditch. The size of the storm sewers and road reconstruction through this section of Warminster Sideroad will be costly. To address the public safety concerns regarding the steep ditch side slopes, some mature trees on the north side of Warminster Sideroad will require removal and some existing hydrants, transformers, hydro poles, signs, services, etc. will required relocation. Other public safety concerns including depth of ditches and narrow road shoulder widths will not be fully addressed. The estimated construction costs for Alternative 6 are major compared against the other alternatives.

A summary of peak flows through the various sections within the study area under this alternative are summarized in Table 14. Supporting calculations are provided in Appendix F for reference.

Table 14: Driveway Culvert Summary (North and South Side of Warminster Sideroad)

STORM	STORM SEWER CAPACITY/PEAK FLOW (m^3/s)			
	SECTION E	SECTION F	SECTION G	SECTION H
Proposed Capacity	7.28	7.83	6.75	14.81
1:5-year	**1.79**	**1.96**	**2.10**	**2.43**
1:25-year	3.21	3.54	3.84	4.37
1:100-year	5.37	5.94	6.35	7.19

Note: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards.

Existing road crossing culverts would be removed and replaced with storm sewer under this alternative.

6.6 PROJECT COSTS SUMMARY

Upfront capital costs associated with each alternative solution were prepared to support the assessment of alternatives. The upfront capital cost for Alternative 1 is the cost to replace the existing infrastructure like-for-like. All costs are high-level estimates based on preliminary designs and exclude HST. The cost estimates are included in Appendix G for reference. A summary of the estimated costs is provided in Table 15.

Table 15: Summary of Drainage Improvements Estimated Construction Costs

ALTERNATIVE ID	PROPERTY ACQUESITION COSTS	UPFRONT CAPITAL COST	TOTAL UPFRONT PROJECT COST
1	$0	$945,600*	$945,600*
2	$0	$1,002,900	$1,002,900
3	$0	$1,024,400	$1,024,400
4	$0	$1,690,700	$1,690,700
5	$90,000	$710,300	$800,300
6	$0	$3,031,800	$3,031,800

Note: (*) denotes cost to replace the existing infrastructure like-for-like.

7 Alternative Solutions Evaluation

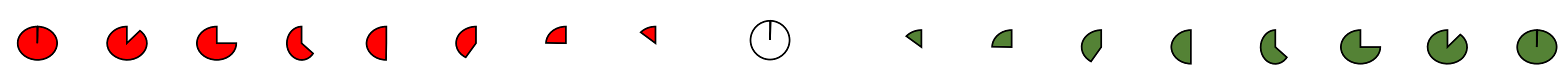
The improvement alternatives developed in Section 5 of this report have been evaluated with respect to their impact on the physical, natural, social, cultural and economic environments presented in Section 4.

The evaluation of the alternative solutions as previously described is descriptive or qualitative in nature allowing for a comparative evaluation of the pros and cons associated with each alternative. The evaluation is focussed on the ability of the alternatives to adequately address the problem statement, and in doing so, provide a solution that is consistent with the requirements of the governing policies. The evaluation of each improvement alternative is provided in Table 16.

Table 16: Preliminary Alternative Solutions Evaluation Summary

Recommended Solution	Not Recommended/Not Feasible Solution

Alternative ID	Description	Physical Environment	Economic Environment	Social/Cultural Environment	Natural Environment	Overall Impact
1	Do Nothing	Frequency and severity of flooding and erosion persist with no improvement in erosion along roadside ditches.	No capital costs, no net change in maintenance/life cycle costs. Existing infrastructure likely needs replacing within 25 years.	No disruptions or property impacts, no net change in public safety hazard.	No Impact	
2	Increase Conveyance Capacity of North Roadside Ditch	Minor reduction in frequency and severity of flooding with minor decrease in erosion along north roadside ditch.	Moderate capital cost, no net change in maintenance/life cycle costs.	Minor disturbance to collector road, minor improvement in public safety hazard.	Low sensitivity feature with minor removal of trees.	
3	Increase Conveyance Capacity of South Roadside Ditch	Minor reduction in frequency and severity of flooding with minor decrease in erosion along north roadside ditch.	Moderate capital cost, no net change in maintenance/life cycle costs.	Minor disturbance to collector road, slight increase in public safety hazard.	Low sensitivity feature with minor removal of trees.	
4	Dry Pond SWMF Attenuation in Park Block	Moderate reduction in frequency and severity of flooding with moderate decrease in erosion along roadside ditches. Dry pond SWMF will also provide moderate water quality benefits.	Moderate capital cost, new maintenance schedule and high life cycle costs.	Minor disturbance to collector road and park, slight increase in public safety hazard. Requires Stage II Archeological Study.	Medium sensitivity feature with major removal of trees & wildlife habitat.	
5	Conveyance Channel	Major reduction in frequency and severity of flooding with major decrease in erosion along roadside ditches. Vegetated conveyance channel will also provide minor water quality benefits.	Low capital cost, new maintenance schedule and low life cycle costs.	Multiple property acquisitions required, moderate improvement in public safety hazard. Requires Stage II Archeological Study.	Low sensitivity feature with minor removal of trees.	
6	Storm Sewer	Major reduction in frequency and severity of flooding with major decrease in erosion along roadside ditches.	Major capital costs, minor reduction in maintenance/life cycle costs.	Major disturbance to collector road, major improvement in public safety hazard.	No impact	



Greatest Negative Impact | Neutral | Greatest Positive Impact

8 Preliminary Preferred Solution

The Township should consider pursuing Alternative 5 as the preferred alternative for drainage improvements through the study area. Alternative 5 provides a major reduction in flooding on private property, as well as addresses the nuisance rear yard ponding through 2008 Warminster Sideroad to 2048 Warminster Sideroad. Public safety concerns are improved moderately through this alternative, and further improvements along Warminster Sideroad can be explored to address the remaining public safety concerns. This alternative maintains the mature tree line along Warminster Sideroad and reduces the potential for erosion in the roadside ditches.

Recognizing the Township's Capital Budget may not allow for completion of the full scope of the drainage improvements, Alternative 5 provides an opportunity to be phased over time. The Township can acquire the parcels of land from 1922 Warminster Sideroad and 3320 Town Line needed to build the ultimate conveyance channel and construct a channel sized to convey flows from the undeveloped 1922 Warminster Sideroad and 3320 Town Line properties. The flows from the soccer pitches and Kayley Estates SWMF can also be diverted to the conveyance channel, which will reduce flows contributing to the Warminster Sideroad north roadside ditch through this section.

At a future time when 1922 Warminster Sideroad and 3320 Town Line are developed, the Township can expand the size of the conveyance channel and bring flows from the west across Warminster Sideroad.

9 Public Consultation

For this Warminster Sideroad Drainage Improvements Municipal Class EA, public consultation was and will be completed in accordance with the Schedule 'B' Municipal Class Environmental Assessment process outlined in the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment Document (October 2000, as amended in 2007, 2011, 2015 and 2023). The public consultation undertaken for this study is outlined in the following section.

9.1 NOTICE OF STUDY COMMENCEMENT

A Notice of Study Commencement was mailed to agencies including the MECP, NVCA, and First Nations groups on August 3, 2023 and hand delivered to residents along Warminster Sideroad on August 8, 2023. The Notice of Study Commencement presented the MCEA process and scope of the study to stakeholders. A copy of the Notice of Study Commencement letter and a list of the stakeholders contacted is provided in Appendix H for reference.

10 Next Steps

10.1 PUBLIC CONSULTATION - PUBLIC INFORMATION CENTRE (PIC)

A Public Information Centre (PIC) will be held to present the preliminary preferred alternative solution to the identified drainage issues in the study area. Attendees will be encouraged to provide input / feedback regarding the study and the preliminary preferred alternative solution presented. Comment sheets will be provided, and attendees will be encouraged to identify their preferences regarding the alternative design solution.

Prior to the PIC, this Draft Environmental Assessment document will be made available for public review on the Township's webpage. Also, a notification letter will be distributed to local residents and stakeholders who have asked to be kept informed of the progress of the MCEA presenting the alternative drainage solution and notifying them of the PIC. The notification will include a copy of the PIC comment sheet to provide everyone with an opportunity to provide input / comments regarding the study.

Following the conclusion of the PIC, public feedback will be taken into account and the evaluation completed to identify the preferred solution will be updated accordingly. After updating the evaluation, the preferred solutions will be finalized.

10.2 IMPLEMENTATION PLAN

After finalization of the preferred solution, an implementation plan will be developed for the construction of the Warminster Sideroad drainage system including identification of further studies, land acquisitions and applications for agency approval or permitting prior to construction, as required.

10.3 CLASS EA REPORT AND NOTICE OF STUDY COMPLETION

Following development of the implementation plan, the Warminster Sideroad Drainage Improvements Drainage Class EA Report will be updated to include the implementation plan and submitted to the Township for review and approval. The final MCEA Report will then be placed on public record for the 30-day review period, and a Notice of Study Completion will be issued.

Appendix A: Warminster Sideroad Drainage Improvements Project Preliminary Design Report

TATHAM ENGINEERING

Enhancing our communities

Warminster Sideroad Drainage Improvements Project

PRELIMINARY DESIGN REPORT

Township of Oro-Medonte

File 322863 | March 24, 2023

Document Control

File:	Prepared by:	Prepared for:
322863	**Tatham Engineering Limited** 115 Sandford Fleming Drive, Suite 200 Collingwood, Ontario L9Y 5A6	**Township of Oro-Medonte** 148 Line 7 South Oro-Medonte, Ontario L0L 2E0
Date: **March 24, 2023**	**T** 705-444-2565 **tathameng.com**	

Authored by:	**Reviewed by:**
Alysse Overholt, B.E.Sc., M.Eng., P.Eng. Intermediate Engineer	Daniel Twigger, B.Sc.Eng., P.Eng. Manager - Water Resources Engineering

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Issue	**Date**	**Description**
1	March 24, 2023	Final Report

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1 Introduction

Tatham Engineering Limited (Tatham) has been retained by the Township of Oro-Medonte (Township) to complete a drainage study for the Warminster area and to provide drainage improvement recommendations for Warminster Sideroad between Highway 12 and Town Line, as well as Town Line between Warminster Sideroad to Merrington Avenue. The Township has reported ongoing drainage issues along Warminster Sideroad through the study area including:

- Frequent overtopping of driveways and road shoulders;
- Culvert deterioration;
- Severe erosion of roadside ditches; and
- Poor ditch grading.

Additionally, the Township has reported public safety concerns associated with the depth and slope of some sections of roadside ditch and excessive flows observed through overland flow routes. This report outlines the drainage assessment from Warminster Sideroad to Merrington Avenue, the development, assessment and evaluation of various improvement alternatives and the selection of the preferred recommendations for the study area.

1.1 STUDY AREA

The study area includes Warminster Sideroad, from Highway 12 to Town Line, and Town Line from Warminster Sideroad to Merrington Avenue in Warminster, Oro-Medonte as shown on Figure 1 enclosed.

1.2 OBJECTIVES

The purpose of this report is to identify the drainage deficiencies within the study area, develop, assess and evaluate various drainage improvement alternatives, and select the recommended drainage improvement(s) to address the known drainage issues in the study area for implementation moving forward.

1.3 DESIGN CRITERIA AND BACKGROUND INFORMATION

This report was prepared recognizing the pertinent Municipal and Provincial guidelines on municipal design, water resources, and the environment, as well as other relevant background reports and data including the following:

- Township of Oro-Medonte, Development Engineering Policies, Process and Design Standards, September 2019;

- C.C. Tatham and Associates Ltd., Kayley Estates Subdivision, Detailed Stormwater Management Report, January 31, 2019;
- Ontario Ministry of Natural Resources and Forestry, South Central Ontario Orthophotography (SCOOP) GIS data, 2013;
- C.C. Tatham and Associates Ltd., Isabella Estates, Final Stormwater Management Report, August 2011;
- C.C. Tatham and Associates Ltd., Homire Subdivision, Final Stormwater Management Design Report, June 2007; and
- Soil Research Institute of Canada Department of Agriculture, Soil Map of Simcoe Ontario South Sheet for Soil Survey Report No. 29, 1959.

1.4 METHODOLOGY

The following steps were completed to review the existing drainage systems and develop the drainage improvement alternatives described herein.

1. A site visit was completed to review the existing drainage conditions in the study area;
2. Drainage catchments were delineated from the background reports and available topographic mapping to establish local drainage patterns;
3. A hydrologic model was created to generate the requisite return frequency design storm peak flows to assess the existing drainage infrastructure and identify deficiencies and size the required improvements;
4. A hydraulic analysis was completed to establish the conveyance capacity of the existing drainage infrastructure and determine the required infrastructure sizes to convey the peak flows;
5. A culvert inventory and a site investigation were completed to assess the feasibility of the improvement alternatives developed; and
6. The recommended drainage improvements were finalized and evaluated based on the analysis completed and findings of our site visit.

2 Existing Conditions

2.1 HYDROLOGIC ASSESSMENT

Simcoe County 2-meter topographic contour data was used to delineate the drainage catchments of the various drainage infrastructure and key points of interest in the study area. The existing drainage patterns and catchments are illustrated on the Overall Drainage Plan (Drawing ODP-1) enclosed for reference. The existing drainage patterns are described as follows:

1. Warminster Sideroad from Highway 12 to immediately east of the driveway to Oro-Medonte Fire Station 5 is serviced by a 900 mm diameter (approximate) storm sewer located in the boulevard on the south side of Warminster Sideroad.
2. Minor local drainage from agricultural and residential areas including areas west of Highway 12 and lots fronting Wallis Street, Champlain Crescent, Georgian Drive, and Richelieu Road drain to the Warminster Sideroad storm sewer.
3. Inline catchbasins installed in the boulevard on the south side of Warminster Sideroad collect surface runoff from Warminster Sideroad and the local area and discharge the runoff into the storm sewer.
4. Area drains and a 200 mm diameter (approximate) subdrain are installed in the boulevard on the north side of Warminster Sideroad between Highway 12 and Richelieu Road which collect and convey surface runoff from Warminster Sideroad and the local area east.
5. Richelieu Road is serviced by roadside ditches that drain to Warminster Sideroad and two CSP culverts (Culverts A and B) under Warminster Sideroad that connect to the Warminster Sideroad storm sewer beneath the Oro-Medonte Fire Station 5 driveway via blind tees. Culvert A is a 900 mm diameter (approximate) CSP culvert and Culvert B is a 600 mm diameter (approximate) CSP culvert.
6. The Warminster Sideroad storm sewer daylights east of the Oro-Medonte Fire Station 5 driveway and roadside ditches collect and convey surface water east along Warminster Sideroad east of the storm sewer outlet and Richelieu Road.
7. The roadside ditches become more defined east of Oro-Medonte Fire Station 5 to the bend in Warminster Sideroad at Danny McHugh Memorial Park.
8. The south roadside ditch along Warminster Sideroad from Oro-Medonte Fire Station 5 to the driveway at 1945 Warminster Sideroad is lined with riprap to mitigate erosion and the culverts are partially filled with sediment (obstructed).

9. The north roadside ditch along Warminster Sideroad drains east from Richelieu Road to a 500 mm diameter (approximate) CSP culvert (Culvert C) fronting 1916 Warminster Sideroad which is severely damaged at its downstream end and conveys runoff under Warminster Sideroad to the south roadside ditch.
10. Immediately west of the driveway to 1945 Warminster Sideroad, a 900 mm diameter (approximate) CSP culvert (Culvert D) conveys runoff north under Warminster Sideroad to the Warminster Sideroad north roadside ditch.
11. Stormwater runoff from southwest of Highway 12 and Warminster Sideroad flows overland and crosses Highway 12 via an existing 1800 x 1200 mm concrete box culvert (Culvert E) south of Warminster Sideroad and continues east as sheet flow across Danny McHugh Memorial Park to Culvert D.
12. Stormwater runoff from the soccer pitches north of Warminster Sideroad as well as discharge from the Kayley Estates stormwater management pond, which services Demont Drive and Cheslock Crescent, is conveyed south via a storm sewer and overland to the north roadside ditch of Warminster Sideroad at 1944 Warminster Sideroad.
13. Stormwater is conveyed east in the north roadside ditch along Warminster Sideroad from 1944 Warminster Sideroad to Town Line.
14. Local drainage from residential lots fronting the north side of Warminster Sideroad drain into the north roadside ditch as it moves east.
15. The north roadside ditch between 1944 Warminster Sideroad and Town Line is approximately 0.75 m to 0.95 m deep with steep side slopes and shows signs of severe erosion.
16. The gravel shoulder on the north side of Warminster Sideroad between 1944 Warminster Sideroad and Town Line is narrow, next to a steep slope and relatively deep ditch, which poses a public safety concern.
17. Stormwater runoff from the agricultural properties north of Warminster Sideroad drains overland as sheet flow to the rear yards of 1944 Warminster Sideroad through 2048 Warminster Sideroad.
18. The lot grading plans for 2008 through 2048 Warminster Sideroad identify a 0.15 m deep rear yard swale within a 6 m easement at the rear of the lots which is to discharge at the Town Line roadside ditch. It is unclear if the rear yard swale was sized to convey external drainage or lot drainage only however, the Township reports frequent complaints of nuisance rear yard ponding on these lots and from field investigations, the rear yard swale is not continuous and obstructed by sheds and landscaping.

19. The south roadside ditch along Warminster Sideroad from 1949 Warminster Sideroad to Town Line conveys local drainage from residential lots fronting the south side of Warminster Sideroad east. Flows from west of Galrich Court drain to a ditch inlet catch basin and cross Galrich Court via a 500 mm diameter storm sewer (Culvert F), which daylights east of 1981 Warminster Sideroad. The driveway culverts through this section are partially to fully buried.
20. At Town Line, the north roadside ditch of Warminster Sideroad and the west roadside ditch of Town Line converge and drain south under Warminster Sideroad via a 900 mm diameter (approximate) CSP culvert (Culvert G) which is damaged and partially obstructed with sediment.
21. Town Line represents the boundary between Oro-Medonte and Severn Township with the west roadside ditch being owned and operated by the Township of Oro-Medonte.
22. All stormwater from the Warminster Sideroad drainage system is routed south on Town Line from Warminster Sideroad to Merrington Avenue via the west roadside ditch.
23. Two twin 600 mm diameter HDPE culvert crossings (Culvert H) convey runoff from the west roadside ditch of Town Line south across Merrington Avenue. Downstream of Merrington Avenue, runoff continues to flow south for approximately 30 m to a triple 1000 mm diameter CSP culvert crossing of Town Line (Culvert I), which conveys drainage east into a wetland area and tributary of the North River.
24. The Merrington Avenue twin culvert crossings are offset from the west roadside ditch along Town Line forcing runoff to complete a circuitous route downstream, reducing the hydraulic efficiency of the crossings.

Based on Simcoe County Soil Mapping, there is one main soil type within the study area. The soils are classified as Vasey Sand Loam which has good drainage, corresponding to Hydrologic Soil Groups (HSG) AB.

A Visual OTTHYMO (VO) hydrologic model was created to generate peak flows for the 1:2-year through 1:100-year return frequency design storms for both the 24-hour SCS Type II and 4-hour Chicago design storm distributions. The Regional (Timmins) Storm was also modeled. Supporting catchment parameter calculations and the detailed VO results are included in Appendix A for reference.

2.2 HYDRAULIC ASSESSMENT

Storm sewers, driveway culverts, local road culvert crossings, and collector road culvert crossings were analyzed using the 1:5-year, 1:25-year, 1:50-year and 1:100-year return frequency design storms, as outlined in the Township Standards. Recognizing the scale of this study a simplified approach to evaluate the hydraulic characteristics of the drainage system was undertaken. The Manning's Equation was considered an appropriate method to provide conservative existing culvert capacity estimates and for evaluating culvert size recommendations.

The peak flows and existing driveway culvert capacities are summarized in Table 1 through Table 3 for the north and south roadside ditches of Warminster Sideroad and the west side of Town Line, respectively.

The study area was divided into ten sections to review the existing culvert and storm sewer capacities against Township Standards as follows:

- Section A: Warminster Sideroad from Highway 12 to Wallis Street;
- Section B: Warminster Sideroad from Wallis Street to Richelieu Road;
- Section C: Warminster Sideroad from Richelieu Road to the bend at Danny McHugh Memorial Park;
- Section D: Warminster Sideroad from the bend at Danny McHugh Memorial Park to Culvert D;
- Section E: Warminster Sideroad from Culvert D to Galrich Court;
- Section F: Warminster Sideroad from Galrich Court to 2005 Warminster Sideroad;
- Section G: Warminster Sideroad from 2005 Warminster Sideroad to 2029 Warminster Sideroad;
- Section H: Warminster Sideroad from 2029 Warminster Sideroad to Town Line;
- Section I: Town Line from Warminster Sideroad to Merrington Avenue; and
- Section J: Town Line from Merrington Avenue to Culvert I.

Table 1: Driveway Culvert Summary (North Side of Warminster Sideroad)

STORM	DRIVEWAY CULVERT CAPACITY/PEAK FLOW (m^3/s) SECTION							
	A	B	C	D	E	F	G	H
Existing Capacity	0.05	0.09	0.08	-	0.87	0.87	1.19	1.19
1:5-year	**0.12**	**0.12**	**0.07**	-	**1.79**	**1.96**	**2.10**	**2.25**
1:25-year	0.19	0.19	0.12	-	3.21	3.54	3.84	4.11
1:100-year	0.26	0.26	0.18	-	5.37	5.94	6.35	6.72

Note: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards.

Table 2: Driveway Culvert Summary (South Side of Warminster Sideroad)

STORM	DRIVEWAY CULVERT CAPACITY/PEAK FLOW (m^3/s) SECTION							
	A*	B*	C	D	E	F	G	H
Existing Capacity	1.82	2.53	2.39	-	0.63	0.63	0.90	1.27
1:5-year	**0.36**	**0.42**	**1.23**	-	**0.73**	**0.11**	**0.14**	**0.16**
1:25-year	0.61	0.75	2.21	-	0.12	0.17	0.23	0.26
1:100-year	0.85	1.03	3.07	-	0.17	0.26	0.34	0.39

Note: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards; (*) Denotes storm sewer system.

Table 3: Driveway Culvert Summary (West Side of Town Line)

STORM	DRIVEWAY CULVERT CAPACITY/PEAK FLOW (m^3/s)	
	SECTION	
	I	J
Existing Capacity	1.64	1.64
1:5-year	**2.57**	**2.57**
1:25-year	4.65	4.65
1:100-year	7.53	7.53

Note: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards.

Table 4 summarizes the peak flows and the existing road crossing culvert capacities within the study area. Culvert E and Culvert I were not assessed as they are outside of the study area. Detailed design calculations and HY-8 culvert reports are included in Appendix B for reference.

Table 4: Road Crossing Culvert Summary

STORM	ROAD CROSSING CULVERT PEAK FLOWS (m^3/s)						
	Culvert A	Culvert B	Culvert C	Culvert D	Culvert F	Culvert G	Culvert H
Existing Capacity	1.23	0.45	0.21	1.81	0.12	0.90	1.98
1:25-year	1.35	0.12	0.11	2.79	**0.12**	4.37	**4.65**
1:50-year	**1.60**	**0.14**	**0.13**	**3.33**	0.14	**5.69**	5.98
1:100-year	1.86	0.18	0.17	3.91	0.17	7.19	7.53

Note 1: Bolded values represent required conveyance capacity to satisfy design flood frequency criteria per Township Standards. (*) Culvert F via storm sewer and governed by DICB Inlet capacity.

2.3 EXISTING DRAINAGE DEFICIENCIES

General deficiencies across the study area are noted as follows:

- Ditches require sediment clean out, regrading, and erosion protection to ensure full flow capacity is maintained through the drainage system;
- Culverts have limited cover which can cause damage and increased maintenance of the drainage system;

- Culverts require upsizing/replacement to satisfy Township standards or require clean out due to sediment accumulation or damage; and
- Some downstream sections have smaller culvert sizes than upstream culverts, which limits the capacity of the drainage system.

The study area was divided into three sections to review the existing drainage deficiencies and for developing the drainage improvement alternatives as follows:

- Section 1: Warminster Sideroad from Highway 12 to 1920 Warminster Sideroad;
- Section 2: Warminster Sideroad from 1920 Warminster Sideroad to Town Line; and
- Section 3: Town Line from Warminster Sideroad to Culvert I.

Specific deficiencies within these sections are described in the following sections.

2.3.1 Section 1 – Warminster Sideroad from Highway 12 to 1920 Warminster Sideroad

- Sections of the roadside ditches are nonexistent or are poorly defined;
- Area drains reported to clog often;
- Culvert ends damaged and partially to fully obstructed;
- Minimum cover over road crossing and driveway culverts;
- Narrow road shoulders; and
- Overland flow reported to spill across Fire Station driveway to Danny McHugh Memorial Park.

2.3.2 Section 2 – Warminster Sideroad from 1920 Warminster Sideroad to Town Line

- Depth and side slopes of north roadside ditch a public safety concern;
- Flows through north roadside ditch causing erosion;
- Some culverts damaged and partially obstructed;
- Narrow road shoulders; and
- Flooding reported on private property.

2.3.3 Section 3 – Town Line from Warminster Sideroad to Merrington Avenue

- Sections of roadside ditch top of bank are poorly defined;
- Culvert at Warminster Sideroad damaged and partially obstructed; and

- Culverts at Merrington Avenue offset from west roadside ditch along Town Line causing circuitous flow route and hydraulic inefficiencies.

3 Drainage Improvement Design Objectives

Based on the background information collected for the study area, discussions and on-site meetings with the Township and our analysis of this information, a clear understanding of the project objectives was gained. The following design objectives have been identified for consideration in the development of proposed drainage improvement solutions:

- Achieve minimum driveway and road culvert sizes and hydraulic capacities as per Section 3.7.12 of the Township Standards;
- Reduce flooding on private property to the greatest extent possible;
- Mitigate erosion in the roadside ditches;
- Protect treelines to the greatest extent possible;
- Reduce the depth and slope of roadside ditches; and
- Improve public safety.

4 Drainage Improvement Alternatives

The drainage improvement alternatives developed are detailed on the Warminster Sideroad Drainage Improvement sketches enclosed for reference. The drainage improvement alternatives considered in each road section within the study area are summarized in the following sections.

4.1 SECTION 1 – WARMINSTER SIDEROAD FROM HIGHWAY 12 TO 1920 WARMINSTER SIDEROAD

After reviewing the existing deficiencies through Section 1, a clear solution to address all design criteria was identified as follows and illustrated on the Drainage Improvements Plan Warminster Sideroad (Drawing DI-1) enclosed.

South Side of Warminster Sideroad

There is an opportunity to improve drainage on the south side of Warminster Sideroad by realigning the storm sewer to incorporate a boulevard between the edge of road and the future sidewalk. A shallow roadside ditch can be graded into the boulevard above the realigned storm sewer with additional inlet structures upstream of each driveway. Replacing the storm sewer with larger size sewer will increase the capacity of the existing system from Highway 12 to the east side of the park playground entrance.

It is understood the double ditch inlet catchbasin directly east of Highway 12 may fall under Ministry of Transportation Ontario (MTO) control. Therefore, no recommendation is proposed for this structure.

A sidewalk design for Warminster Sideroad from Highway 12 to 1945 Warminster Sideroad is currently being developed. The preferred sidewalk design will maintain separation between the sidewalk and the roadway for public safety.

Additional inlet structures can be installed in the boulevard at the upstream side of each driveway on the south side of Warminster Sideroad to collect runoff and drain into the realigned storm sewer. The existing storm sewer can be replaced with 900 mm diameter to 1050 mm diameter storm sewer starting at Highway 12, to the east side of the park playground entrance. Downstream of the park playground entrance, the existing roadside ditch can to be regraded to a depth of 0.75 m with 2.5:1 (H:V) side slopes and a slope varying between 1.5% to 0.5% to the bend at 1920 Warminster Sideroad.

The proposed improvements will increase the capacity of the drainage system from approximately a 1:10-year design flood frequency to a 1:100-year design flood frequency. Improvements will reduce flooding on private property and achieve the Township Standard criteria for minor and major stormwater conveyance. The proposed regrading of the roadside ditch will minimize impact to the mature tree line. The additional inlet structures will reduce the frequency of overland flow observed through this section and mitigate erosion in the roadside ditch. Realigning the storm sewer will provide an opportunity to adjust the proposed sidewalk layout to achieve separation between the sidewalk and road shoulder, improving public safety.

North Side of Warminster Sideroad

There is an opportunity to improve drainage on the north side of Warminster Sideroad by regrading the boulevard to provide a shallow roadside ditch with new inlet structures upstream of each driveway from Highway 12 to Richelieu Road, with storm sewer leads tying into the storm sewer along Warminster Sideroad. The capacity of the Warminster Sideroad roadside ditch from Richelieu Road to 1920 Warminster Sideroad can be increased by widening and lowering the roadside ditch and replacing the existing road crossing and driveway culverts with larger culverts.

The Warminster Sideroad boulevard from Wallis Street (local road) to Richelieu Road can be regraded to include a shallow (0.3 m) roadside ditch. Catchbasins installed in this roadside ditch upstream of each driveway will collect surface runoff and drain into the storm sewer located on the south side of Warminster via catchbasin leads.

At Richelieu Road, the two existing culvert crossings (Culverts A and B) can be replaced with 900 mm diameter and 525 mm diameter HDPE culverts, respectively. The two replacement culverts will tie into the storm sewer on the south side of Warminster Sideroad. Inlet leads can tie into the storm sewer on the south side of Warminster Sideroad.

The existing roadside ditch from Richelieu Road to 1916 Warminster Sideroad can be regraded to ensure adequate depth is provided for cover over the driveway culverts. The existing driveway culverts can be replaced with 375 mm diameter HDPE culverts and Culvert C can be replaced with a 450 mm HDPE diameter culvert.

The proposed improvements will increase the capacity of the drainage system from less than a 1:5-year design flood frequency to a 1:5-year design flood frequency. The improvements will reduce flooding on private property, and achieve the Township Standard criteria for minor and major stormwater conveyance. The proposed driveway and road culverts will achieve the minimum hydraulic capacities as per Section 3.7.12 of the Township Standards and sufficient cover over the driveway culverts and road crossings will be provided. The proposed regrading of the roadside ditch will minimize impact to the mature tree line, and the additional inlet structures will reduce the frequency of overland flow observed through this section, mitigate erosion in the roadside ditch, and improve public safety.

An estimate of the probable construction costs for the proposed drainage improvements through Section 1 was prepared and is $1,819,600. The cost estimate is included in Appendix C for reference.

4.2 SECTION 2 – WARMINSTER SIDEROAD FROM 1920 WARMINSTER SIDEROAD TO TOWN LINE

As there was no clear solution to address all design criteria for Section 2, six drainage improvement alternatives were considered including the "do nothing" option. The six alternatives are described as follows and illustrated on the drainage improvement alternative sketches (Drawings OPT-1 to OPT-6) enclosed.

Alternative 1: Do Nothing

A "do nothing" option was considered with no drainage improvements proposed as a baseline condition against which the other alternatives will be compared.

Alternative 2: Increase Conveyance Capacity of North Roadside Ditch

There is an opportunity to improve the conveyance capacity of the north roadside ditch along Warminster Sideroad by widening and lowering the roadside ditch and replacing the existing road crossing and driveway culverts with larger culverts. The south roadside ditch of Warminster Sideroad would remain undisturbed under this alternative.

Alternative 3: Increase Conveyance Capacity of South Roadside Ditch

There is an opportunity to improve the conveyance capacity of the south roadside ditch along Warminster Sideroad by widening and lowering the roadside ditch and replacing the existing road crossing and driveway culverts with larger culverts. The north roadside ditch of Warminster Sideroad would remain undisturbed under this alternative.

Alternative 4: Dry Pond SWMF Attenuation in Park Block

There is an opportunity to reduce the peak flows through the roadside ditches along Warminster Sideroad by constructing a SWM facility designed to attenuate peak flows generated west of Richelieu Road. The north and south roadside ditch of Warminster Sideroad would remain undisturbed under this alternative.

Alternative 5: Conveyance Channel

There is an opportunity to reduce the peak flows through the roadside ditches along Warminster Sideroad by regrading a new conveyance channel along the south property limit of 1922 Warminster Sideroad and 3320 Town Line. The new conveyance channel can redirect drainage from the Kayley Estates development, the soccer pitches, and from Section 1 of Warminster

Sideroad along the rear of lots 1944 Warminster Sideroad to the west roadside ditch of Town Line. The roadside ditch system of Warminster Sideroad would remain undisturbed and continue to convey local drainage under this alternative.

Alternative 6: Storm Sewer

There is an opportunity to improve the drainage capacity by installing a new storm sewer system from 1944 Warminster Sideroad to Town Line. Under this alternative, the north roadside ditch of Warminster Sideroad would be regraded to convey local drainage and the south roadside ditch of Warminster Sideroad would remain undisturbed.

Assment and evaluation of the various alternatives for Section 2 of Warminster Sideroad is discussed in Section 5 and 6 of this report.

4.3 SECTION 3 – TOWN LINE FROM WARMINSTER SIDEROAD TO MERRINGTON AVENUE

After reviewing the existing deficiencies through Section 3, a clear solution to address all design criteria was identified as follows and illustrated on the Drainage Improvements Plan Town Line (Drawing DI-2) enclosed:

There is an opportunity to improve the west roadside ditch along Town Line by widening and lowering the roadside ditch and replacing the existing road crossing culverts at Warminster Sideroad with larger culverts and adding additional road crossing culverts at Merrington Avenue.

The capacity of the roadside ditch can be increased to the greatest extent possible within the municipal right-of-way through regrading. Culvert G can be replaced with three 1150 x 730 mm elliptical concrete culverts to achieve roughly the 1:50-year conveyance capacity for the collector road classification. The existing road crossing culverts (Culvert H) at Merrington Avenue can be maintained and two 890 x 610 mm CSPA culverts can be installed at the daylight of the intersection to achieve the 1:5-year conveyance capacity.

The proposed improvements will increase the capacity of the road crossings at Warminster Sideroad to satisfy design flood frequency per the road classification. The proposed crossings at Merrington Avenue will not achieve the 1:25-year conveyance capacity required to satisfy design flood frequency per road classification, however the proposed crossing will provide an improvement in conveyance capacity to the existing system. The proposed roadside ditch improvements will achieve the Township Standard criteria for minor and major stormwater conveyance through this section.

An estimate of the probable construction costs for the proposed drainage improvements through Section 3 was prepared and is $346,400. The cost estimate is included in Appendix C for reference.

5 Assessment of Drainage Improvement Alternatives – Section 2

The Visual OTTHYMO (VO) hydrologic model was revised as required to reflect the flow routing modifications for each drainage improvement alternative. Peak flows were generated for the 1:2-year through 1:100-year return frequency design storms for both the 24-hour SCS Type II and 4-hour Chicago design storm distributions. The Regional (Timmins) Storm was also modeled. A summary of the VO results is provided in Appendix D for reference.

The proposed storm sewers, driveway culverts, local road culvert crossings, and collector road culvert crossings were analyzed using the 1:5-year, 1:25-year, 1:50-year and 1:100-year return frequency design storms, as outlined in the Township Standards. Detailed calculations are included in Appendix E for reference. The results of the drainage improvements alternatives for each road section in the study area are summarized in the following sections.

The various alternatives were assessed as separate solutions to determine the effectiveness of each option; combinations of alternatives were not considered and will not be discussed in this report.

5.1 ALTERNATIVE 2: INCREASE CONVEYANCE CAPACITY OF NORTH ROADSIDE DITCH

Culvert D can be replaced with an 1880 x 1260 mm diameter CSPA culvert, which will provide a 1:50-year design storm peak flow conveyance capacity as required for Warminster Sideroad (collector road). The capacity of the north roadside ditch can be increased to the greatest extent possible within the municipal right-of-way by removing the mature trees on the north side of Warminster Sideroad and regrading the roadside ditch from property line down at 2:1 (H:V) side slopes to a depth of 1.12 m. The roadside ditch with a 0.9 m bottom width can be regraded from bottom of ditch up at 2:1 (H:V) side slopes to edge of gravel. The gravel shoulder can be maintained with a 0.5 m width. Driveway culverts on the north side of Warminster Sideroad can be replaced with 750 mm diameter HDPE culverts. Under Alternative 2, the capacity of the north roadside ditch will be increased from 0.9 m^3/s to 1.6 m^3/s which equates to less than a 1:5-year design flood frequency. Alternative 2 provides a minor improvement in flooding. The improvements proposed under Alternative 2 are illustrated on Option 2: Increase Conveyance Capacity of North Roadside Ditch (Drawing OPT-2) enclosed.

5.2 ALTERNATIVE 3: INCREASE CONVEYANCE CAPACITY OF SOUTH ROADSIDE DITCH

Culvert D can be replaced with an 1880 x 1260 mm diameter CSPA culvert, which will provide a 1:50-year design storm peak flow conveyance capacity as required for Warminster Sideroad (collector road). The capacity of the south roadside ditch can be increased to the greatest extent possible within the municipal right-of-way by removing the mature trees on the south side of Warminster Sideroad and regrading the roadside ditch from property line down at 2:1 (H:V) side slopes to a depth of 1.1 m. The roadside ditch with a 1.1 m bottom width can be regraded from bottom of ditch up at 2:1 (H:V) side slopes to edge of gravel. The gravel shoulder can be maintained with a 1.5 m width. Driveway culverts on the south side of Warminster Sideroad can be replaced with 1030 mm x 740 mm CSPA culverts. Under Alternative 3, the capacity of the north roadside ditch will remain at 0.9 m^3/s which equates to less than the 1:5-yar design flood frequency and the capacity of the south roadside ditch will be increased from 0.2 m^3/s to 0.7 m^3/s which equates to the 1:100-year design flood frequency. Alternative 3 provides a minor improvement in flooding. The improvements proposed under Alternative 3 are illustrated on Option 3: Increase Conveyance Capacity of South Roadside Ditch (Drawing OPT-3) enclosed.

5.3 ALTERNATIVE 4: DRY POND SWMF ATTENUATION IN PARK BLOCK

A dry pond with an approximate footprint of 0.7 ha and 10,650 m^3 of active storage can be constructed in the southwest corner of Danny McHugh Memorial Park and designed to collect and control drainage from west of Richelieu Road. A new storm sewer from Warminster Sideroad, aligned east of Oro-Medonte Fire Station 5, is required to convey surface runoff from Warminster Sideroad to the SWM facility for peak flow attenuation. A swale can be graded to convey flows from Culvert E to the dry pond and an outlet swale can be graded around the baseball diamond to tie into the south roadside ditch of Warminster Sideroad west of 1945 Warminster Sideroad. A summary of the peak flow attenuation provided by the dry pond SWM facility is summarized in Table 5.

Table 5: Summary of Peak Flow Attenuation for Alternative 4 Dry Pond

STORM	PEAK FLOWS (m^3/s)					
	4-HOUR CHICAGO			24-HOUR SCS		
	INLET	OUTLET	PERCENT REDUCTION	INLET	OUTLET	PERCENT REDUCTION
1:5-Year	0.68	0.17	75%	0.82	0.28	66%
1:25-Year	1.18	0.32	72%	1.87	0.75	60%
1:50-Year	1.46	0.40	72%	2.45	1.25	49%
1:100-Year	1.70	0.60	65%	2.93	1.62	45%

Culvert D can be replaced with a 1150 x 820 mm CSPA culvert, which will provide a 1:50-year design storm peak flow conveyance capacity for Warminster Sideroad (collector road). Under Alternative 4, the capacity of the north roadside ditch will remain at 0.9 m^3/s which equates to less than a 1:5-year design flood frequency. Alternative 4 provides a minor improvement in flooding. The improvements proposed under Alternative 4 are illustrated on Option 4: Dry Pond SWMF Attenuation in Park Block (Drawing OPT-4) enclosed.

5.4 ALTERNATIVE 5: CONVEYANCE CHANNEL

A new conveyance channel can be constructed through 1922 Warminster Sideroad and 3320 Town Line, along the rear of lots 1944 Warminster Sideroad to the Town Line roadside ditch. A 12 m wide drainage easement obtained through property acquisition will be required. The north conveyance channel can be graded to maintain a 4.0 m bottom width trapezoidal channel, with a depth of 1.0 m, with 2.5:1 (H:V) side slopes and a longitudinal slope of 1.0%. All drainage from the Kayley Estates development, soccer pitches and from Section 1 of Warminster Sideroad can be routed through the north conveyance channel via twin 900 mm HDPE diameter culverts crossing Warminster Sideroad from Danny McHugh Memorial Park to 1922 Warminster Sideroad. Culvert D can be replaced with a 900 mm diameter HDPE culvert, which will provide a 1:50-year design storm peak flow conveyance capacity for Warminster Sideroad (collector road). Under Alternative 5, the capacity of the new conveyance channel will be 5.8 m^3/s which equates to a 1:100-year design flood frequency and includes 0.30 m of freeboard to the top of banks. The capacity of the north roadside ditch will remain at 0.9 m^3/s which equates to roughly a 1:25-year design flood frequency. Alternative 5 provides a major improvement in flooding. The improvements proposed under Alternative 5 are illustrated on Option 5: Conveyance Channel (Drawing OPT-5) enclosed.

5.5 ALTERNATIVE 6: STORM SEWER

A new storm sewer can be installed from 1944 Warminster Sideroad to the west roadside ditch of Town Line designed to convey the 1:100-year design flood frequency. Storm sewer pipe sizes will range between 1350 mm diameter to 1500 mm diameter. Culvert D can be replaced with double ditch inlet catchbasins to tie into the new storm sewer. The north roadside ditch can be regraded to convey local flows, and inlet structures can be installed at the upstream side of each driveway. Full road reconstruction along this section of Warminster Sideroad is required under this drainage improvement alternative. Under Alternative 6, the capacity of the north roadside ditch will be 0.6 m^3/s which equates to a 1:100-year design flood frequency for local drainage. Alternative 6 provides a major improvement in flooding. The improvements proposed under Alternative 6 are illustrated on Option 6: Storm Sewer (Drawing OPT-6) enclosed.

5.6 CONSTRUCTION COST ESTIMATE

An estimate of the probable engineering and construction costs for the drainage improvements alternatives were prepared to support the assessment of alternatives. The cost estimates are included in Appendix C for reference. A summary of the estimated costs is provided in Table 6.

Table 6: Summary of Drainage Improvements Estimated Construction Costs

DESCRIPTION	ESTIMATED COST
Section 2 – Alternative 1	$0
Section 2 – Alternative 2	$947,000.00
Section 2 – Alternative 3	$968,900.00
Section 2 – Alternative 4	$1,660,200.00
Section 2 – Alternative 5	$769,100.00
Section 2 – Alternative 6	$2,998,800.00

Note: Costs exclude HST.

6 Evaluation of Drainage Improvement Alternatives – Section 2

The various drainage improvement alternatives developed for Section 2 (Warminster Sideroad from 1920 Warminster Sideroad to Town Line) were evaluated to identify the impacts each improvement alternative will have on flooding, public safety and the environment. Descriptions of the drainage improvement alternatives are summarized in the following sections.

Alternative 1: Do Nothing

With no proposed improvements, the existing capacity of the roadside ditches, 0.90 m^3/s, will be maintained at less than the 1:5-year design storm peak flow of 2.2 m^3/s. Flooding on private property will remain. Insufficient cover over driveway culverts will be maintained and may lead to a shortened lifespan of the drainage system. Erosion in the roadside ditches will continue to cause sediment transport downstream, and over time, may strip the cover from mature tree roots and utilities. Public safety concerns regarding the steep ditch side slopes, depth of ditches, and narrow road shoulder widths will not be addressed.

Alternative 2: Increase Conveyance Capacity of North Roadside Ditch

Under Alternative 2 the capacity of the north roadside ditch will increase from 0.90 m^3/s to 1.4 m^3/s, but will remain less than the 1:5-year design storm peak flow of 2.2 m^3/s. There will be a minor reduction in flooding on private property. Sufficient cover over the driveway culverts will be provided, although the culverts will not achieve the minimum hydraulic capacities as per Section 3.7.12 of the Township Standards. Erosion in the roadside ditches will be reduced as a result of an enlarged ditch cross section. However, the mature trees on the north side of Warminster Sideroad will require removal and existing hydrants, transformers, hydro poles, signs, services, utilities, etc. will required relocation. Public safety concerns regarding the depth of ditches and narrow road shoulder widths will not be addressed. The estimated construction costs for Alternative 2 are moderate compared against the other alternatives.

Alternative 3: Increase Conveyance Capacity of South Roadside Ditch

Under Alternative 3 the capacity of the south roadside ditch will increase from 0.2 m^3/s to 0.7 m^3/s. However, the capacity of the north roadside ditch will remain 0.90 m^3/s, less than the reduced 1:5-year design storm peak flow of 1.9 m^3/s. There will be a minor reduction in flooding on private property. Sufficient cover over the driveway culverts will be provided through the south roadside ditch, although the cover over culverts through the north roadside ditch will remain insufficient. The mature trees on the south side of Warminster Sideroad will require removal and existing hydrants, transformers, hydro poles, signs, services, utilities, etc. will required relocation. Erosion in the roadside ditches will be reduced as a result of an enlarged ditch cross section through the south roadside ditch and reduced peak flows through the north roadside ditch. Public safety concerns regarding the steep ditch side slopes, depth of ditches, and narrow road shoulder widths will not be addressed, and additional public safety concerns may stem from the proposed flow routing and regrading of the south roadside ditch. The estimated construction costs for Alternative 3 are moderate compared against the other alternatives.

Alternative 4: Dry Pond SWMF Attenuation in Park Block

Under Alternative 4 peak flows to the north roadside ditch will be decreased from 2.2 m^3/s to 1.4 m^3/s for the 1:5-year design storm peak flow. However, the capacity of the north roadside ditch will remain 0.90 m^3/s. There will be a moderate reduction in flooding on private property. Insufficient cover over driveway culverts will be maintained and may lead to a shortened lifespan of the drainage system. Erosion in the roadside ditches will be reduced as a result of the peak flow attenuation provided by the SWM facility. The mature trees in the southeast corner of the park block will require removal. Public safety concerns regarding the steep ditch side slopes, depth of ditches, and narrow road shoulder widths will not be addressed, and additional public safety concerns may stem from the proposed flow routing and construction of a pond and outlet swale within the park block. The estimated construction costs for Alternative 4 are high compared against the other alternatives.

Alternative 5: Conveyance Channel

Under Alternative 5 peak flows to the north roadside ditch will be decreased from 2.2 m^3/s to 0.6 m^3/s . The capacity of the north roadside ditch will remain 0.90 m^3/s and will be sufficient to convey roughly the 1:25-year design storm peak flow. There will be a major reduction in flooding on private property and this alternative will also address the nuisance rear yard ponding through 2008 Warminster Sideroad to 2048 Warminster Sideroad. The proposed north conveyance channel will require land acquisition through 1922 Warminster Sideroad and 3320 Town Line along the rear of lots 1944 Warminster Sideroad to the Town Line roadside ditch. A new road crossing at 1922 Warminster Sideroad may require hydro pole and utility relocation and limited tree clearing. Erosion in the roadside ditches will be reduced as a result of reduced peak flows through the north roadside ditch. Public safety concerns regarding the steep ditch side slopes, depth of ditches, and narrow road shoulder widths will not be addressed. However, the 1:5-year peak flow rate to the north roadside ditch will be decreased by approximately 74% and the conveyance capacity will be increased to roughly the 1:25-year design storm peak flow. The estimated construction costs for Alternative 5 are moderate compared against the other alternatives.

Alternative 6: Storm Sewer

Under Alternative 6 the storm sewer will provide a 1:100-year design storm peak flow conveyance capacity through this section of Warminster Sideroad. The proposed storm sewer will provide a peak flow capacity of 5.9 m^3/s and the regraded north roadside ditch will provide a peak flow capacity of 0.6 m^3/s for local drainage. There will be a major reduction in flooding on private property. Erosion in the roadside ditches will be reduced as a result of reduced peak flows through the north roadside ditch. The size of the storm sewers will be costly, and road reconstruction through this section of Warminster Sideroad will be required. To address the public safety concerns regarding the steep ditch side slopes, some mature trees on the north side of Warminster Sideroad will require removal and some existing hydrants, transformers, hydro poles, signs, services, etc. will required relocation. Other public safety concerns including depth of ditches and narrow road shoulder widths will not be fully addressed. The estimated construction costs for Alternative 6 are major compared against the other alternatives.

7 Recommended Solutions

We recommend beginning work at the downstream end of the study area and working upstream to ensure the downstream sections have sufficient capacity as the drainage system is improved upstream. Recommendations regarding the drainage improvements in each road section in the study area are summarized in the following sections.

7.1 SECTION 1 – WARMINSTER SIDEROAD FROM HIGHWAY 12 TO 1920 WARMINSTER SIDEROAD

It is recommended the Township proceed with the improvements described in Section 4.1 through Section 1 of Warminster Sideroad as illustrated on Drawing DI-1. The Township can proceed with construction of the proposed drainage improvements through Section 1 as the work is considered general operation and maintenance of linear paved facilities and related facilities, under Schedule A/A+ of pre-approved activities per the Municipal Class Environmental Assessment (EA) guidelines.

7.2 SECTION 2 – WARMINSTER SIDEROAD FROM 1920 WARMINSTER SIDEROAD TO TOWN LINE

The Township should consider pursuing Alternative 5 as the preferred alternative for drainage improvements through Section 2 of the study area. Alternative 5 provides a major reduction in flooding on private property, as well as addresses the nuisance rear yard ponding through 2008 Warminster Sideroad to 2048 Warminster Sideroad. Some public safety concerns are addressed through this alternative, and further improvements along Warminster Sideroad can be explored to address the remaining public safety concerns. This alternative maintains the mature tree line along Warminster Sideroad and reduces the potential for erosion in the roadside ditches.

The proposed improvements through this section will require completion of an EA, under Schedule B of activities subject to the screening process per the Municipal Class EA guidelines.

Recognizing the Township's Capital Budget may not allow for completion of the full scope of the drainage improvements, Option 5 provides an opportunity to be phased over time. The Township can acquire the parcels of land from 1922 Warminster Sideroad and 3320 Town Line needed to build the ultimate conveyance channel and construct a channel sized to convey flows from the undeveloped 1922 Warminster Sideroad and 3320 Town Line properties. The flows from the soccer pitches and Kayley Estates SWMF can also be diverted to the conveyance channel, which will reduce flows contributing to the Warminster Sideroad north roadside ditch through this section. At a future time when 1922 Warminster Sideroad and 3320 Town Line are developed, the Township can expand the size of the conveyance channel and bring flows from the Warminster Sideroad south roadside ditch through Section 1 across Warminster Sideroad.

7.3 SECTION 3 – TOWN LINE FROM WARMINSTER SIDEROAD TO MERRINGTON AVENUE

It is recommended the Township proceed with the improvements described in Section 4.3 through Section 3 of Town Line as illustrated on Drawing DI-2.The Township can proceed with construction of the proposed drainage improvements through Section 3 as the work is considered general operation and maintenance of linear paved facilities and related facilities, under Schedule A/A+ of pre-approved activities per the Municipal Class EA guidelines.

8 Next Steps

The Township can complete the detail design and tendering of Sections 1 and 3 of the study area based on the recommended drainage solutions described in this report.

As previously described, a sidewalk design for Warminster Sideroad from Highway 12 to 1945 Warminster Sideroad is currently being developed, which covers Section 1 of the study area. Tatham can include the recommended solutions described in this report for the proposed sidewalk alignment and complete the detail design and tendering for both elements of the design as one project.

The Township should begin initiation of the Environmental Assessment process for Section 2 of the study area.

9 Summary

Drainage improvement alternatives have been developed for the Warminster Sideroad/Town Line drainage system for Warminster Sideroad from Highway 12 to Town Line, and for Town Line from Warminster Sideroad to Merrington Avenue, and are presented herein. Where applicable, design calculations have been provided to support the design alternatives.

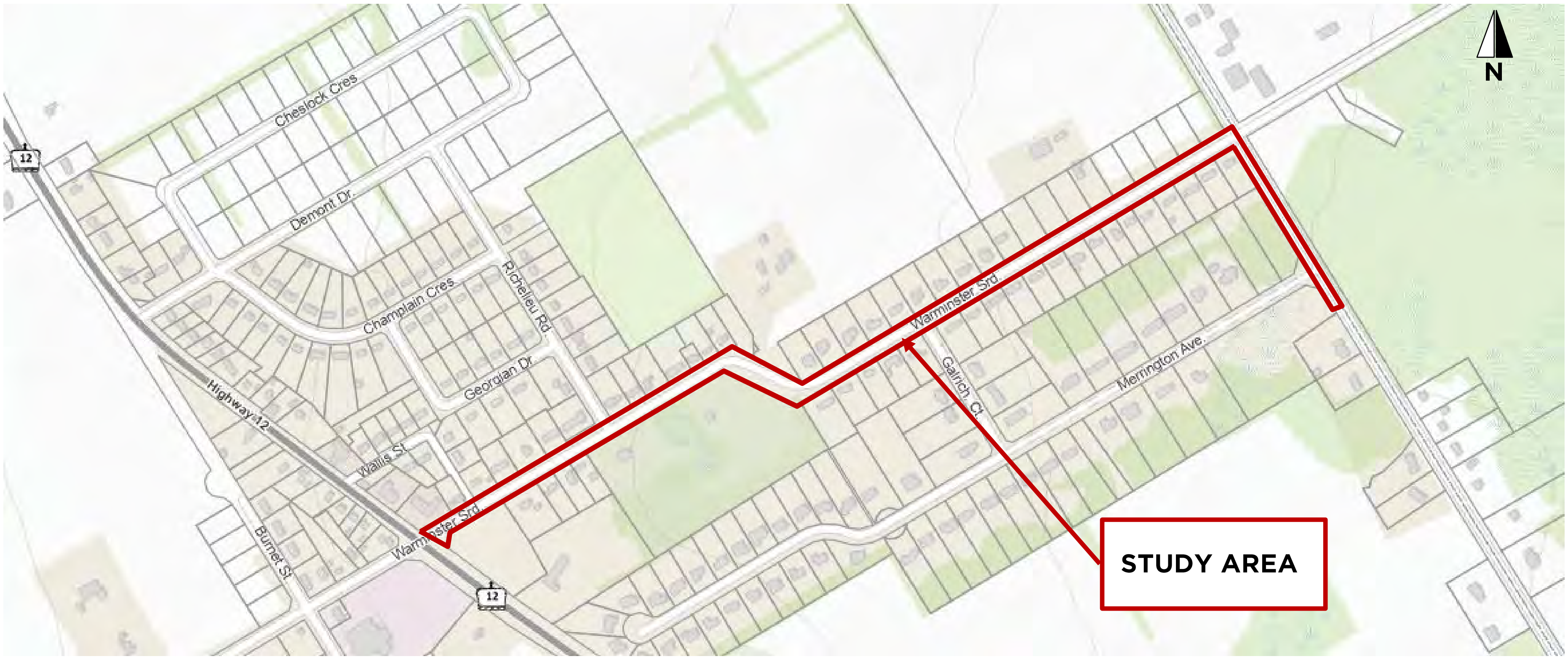
After reviewing the existing deficiencies through the Warminster Sideroad/Town Line drainage system, clear solutions to address the design criteria through Section 1 and Section 3 were identified. The recommended drainage improvements are presented on the Drainage Improvement Recommendations Maps (Drawings DI-1 and DI-2 for Sections 1 and 3, respectively).

As there was no clear solution to address all design criteria for Section 2, six drainage improvement alternatives including the "do nothing" option were assessed, which are presented on the drainage improvement alternative sketches (Drawings OPT-1 through OPT-6 for Section 2).

Preliminary cost estimates were completed and are provided for each drainage improvement alternative.

Through an evaluation of the alternatives, Option 5 was identified as the preferred alternative drainage improvement solution for Section 2.

The next steps will be for the Township to implement the recommendations for Sections 1 and 3 through the study area and initiate the Environmental Assessment process for Section 2.



322863 – WARMINSTER SIDEROAD DRAINAGE IMPROVEMENTS

Figure 1 – Study Area

LEGEND

- Ⓐ CULVERT ID
- OVERLAND FLOW DIRECTION
- CATCHMENT BOUNDARY
- 201 / 5.39 / 62.2: CATCHMENT AREA LABEL; CURVE NUMBER/IMPERVIOUS FRACTION; CATCHMENT AREA (ha.)
- EXISTING CULVERT
- EXISTING STORM SEWER

CULVERT ID	EXISTING SIZE (APPROX.)
A	900 mm Ø CSP CULVERT
B	600 mm Ø CSP CULVERT
C	500 mm Ø CSP CULVERT
D	900 mm Ø CSP CULVERT
E	1800x1200 mm CONC. BOX CULVERT
F	500 mm Ø STORM SEWER
G	890 x 610 mm CSPA CULVERT
H	4-600 mm Ø HDPE CULVERTS
I	3-1000 mm Ø CSP CULVERTS

BENCHMARKS

TBM–1: DOUBLE NAIL SPIKE IN HYDRO POLE ON SOUTH SIDE OF WARMINSTER, EAST SIDE OF DRIVEWAY AT #1949 (275.09m)

TBM–2: DOUBLE NAIL SPIKE IN HYDRO POLE ON NORTH SIDE OF WARMINSTER AT EAST PROPERTY CORNER OF #2020 (267.42m)

TBM–3: NAIL AND WASHERS SPIKE IN HYDRO POLE ON EAST SIDE OF TOWNLINE APPROXIMATELY 80m SOUTH OF INTERSECTION AT TOWNLINE AND WARMINSTER (263.31m)

NOTES

ALL PROPERTY LINES SHOWN ARE APPROXIMATE.

TOPOGRAPHIC INFORMATION FROM SURVEY BY TATHAM ENGINEERING LTD. IN OCTOBER 2021 AND JULY 2022.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	SEPT 2022
2.	2ND SUBMISSION	MAR 2023

ENGINEER STAMP

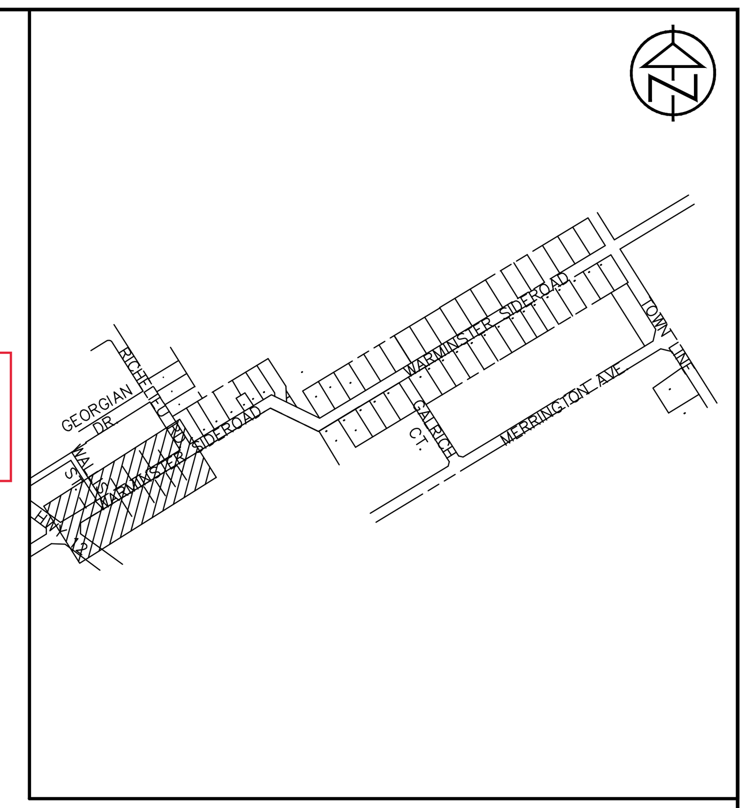
WARMINSTER SIDEROAD
DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE

TATHAM ENGINEERING

OVERALL DRAINAGE PLAN

DESIGN: ARO	FILE: 322863	DWG:
DRAWN: CW	DATE: SEPT 2022	**ODP-1**
CHECK: DRT	SCALE: 1:5000	

Drawing Name: 322863–ODP011.dwg, Plotted: Mar 15, 2023



KEY PLAN
N.T.S.

LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARKS

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DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE

TATHAM ENGINEERING

DRAINAGE IMPROVEMENTS PLAN
WARMINSTER SIDEROAD

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DRAWN: WL	DATE: JULY 2022	DI-1
CHECK: DRT	SCALE: 1:500	

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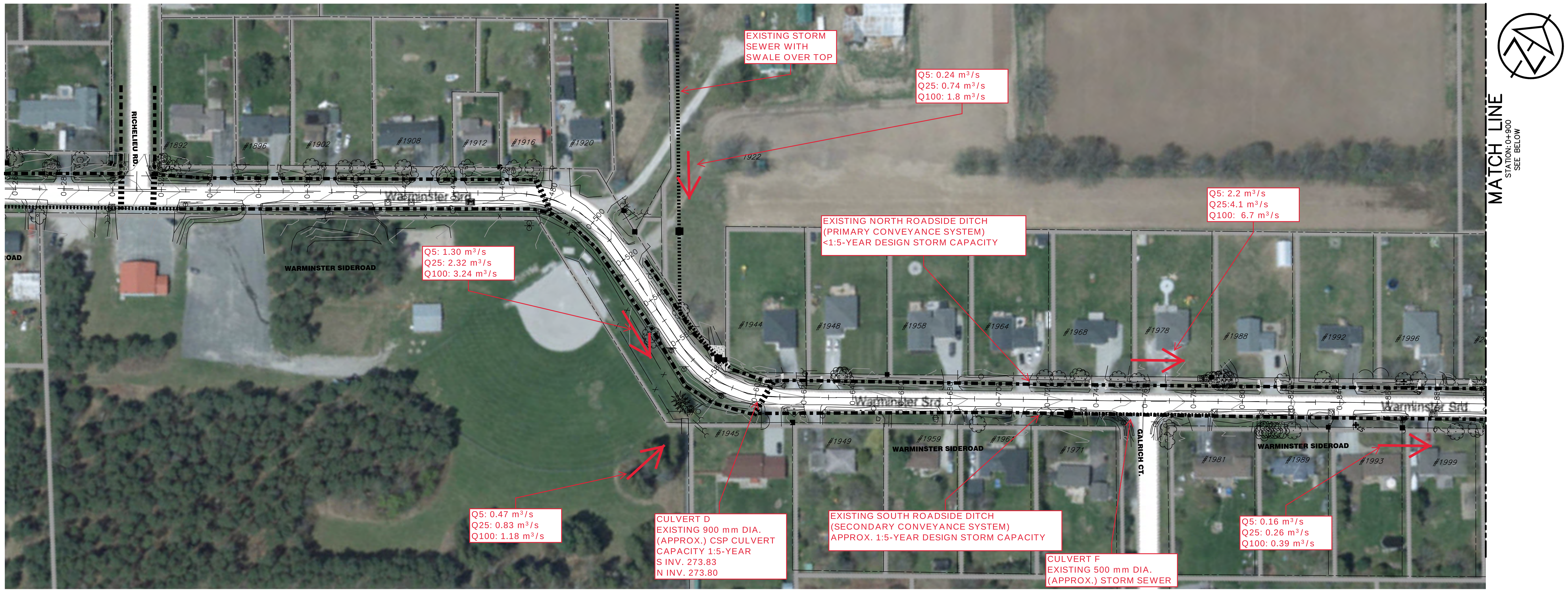

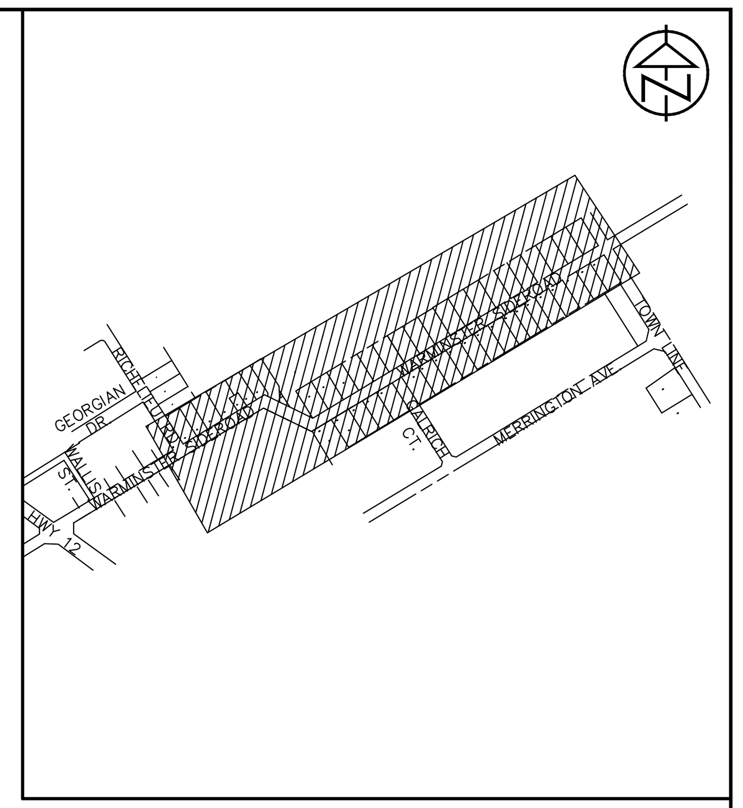

OPTION 1: "DO NOTHING" EXISTING CONDITIONS:

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 2.2 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 4.1 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.7 m³/s

1) CONVEYANCE CAPACITY <1:5-YEAR (0.9 m³/s);

2) INSUFFICIENT COVER OVER DRIVEWAY CULVERTS;

3) STEEP DITCH SIDE SLOPES POSE SAFETY HAZARDS; AND

4) EROSION IN DITCH EVIDENT.

LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

BENCHMARKS

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2.	2ND SUBMISSION	MAR 2023

ENGINEER STAMP

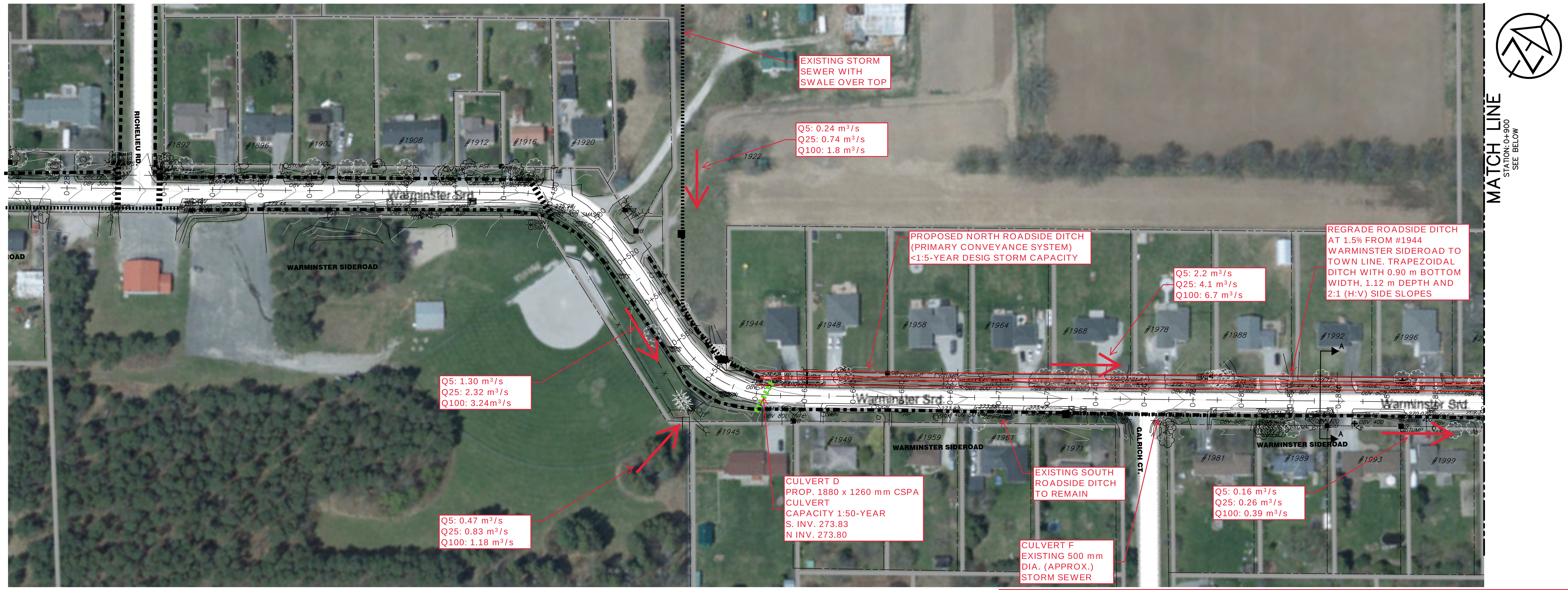
WARMINSTER SIDEROAD
DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE

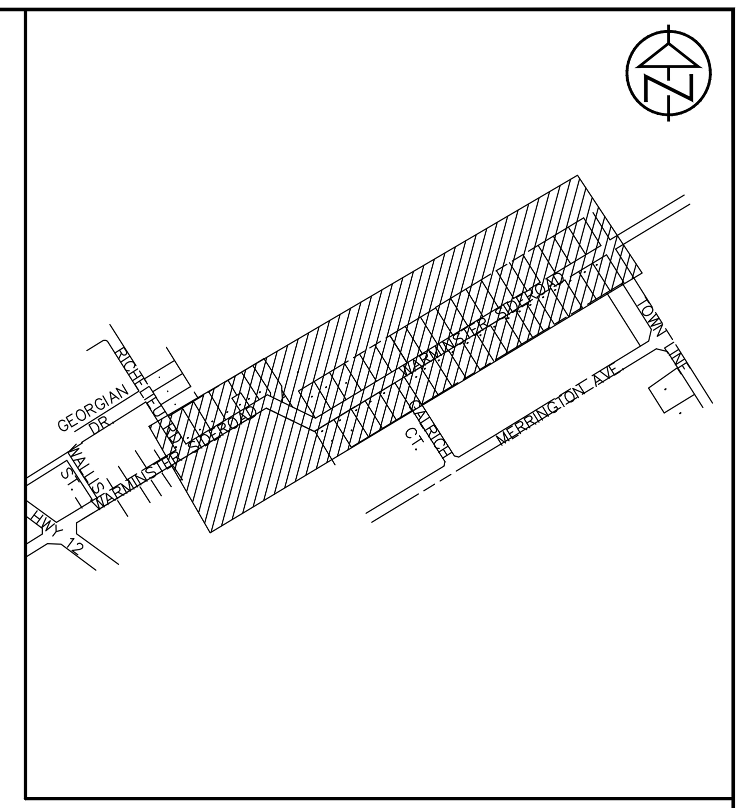
OPTION 1: DO NOTHING

TATHAM ENGINEERING

DESIGN: ARO	FILE: 322863	DWG: OPT-1
DRAWN: WL	DATE: JULY 2022	
CHECK: DRT	SCALE: 1:1000	

Drawing Name: 322863-DI01.dwg, Plotted: Sep 06, 2022





KEY PLAN
N.T.S.

OPTION 2 DESCRIPTION:
INCREASE THE CAPACITY OF THE NORTH ROADSIDE DITCH TO THE GREATEST EXTENT POSSIBLE WITHIN THE MUNICIPAL R.O.W. WHILE MAINTAINING A GRAVEL SHOULDER AND IMPROVED DITCH SIDE SLOPES

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 2.2 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 4.1 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.7 m^3/s

1) REGRADE DITCH FROM PROPERTY LINE DOWN AT 2:1 (H:V) TO 1.12 m DEPTH, REGRADE DITCH BOTTOM TO 0.90 m WIDTH, REGRADE DITCH UP AT 2:1 (H:V), MAINTAIN 0.5 m GRAVEL SHOULDER;

2) CONVEYANCE CAPACITY IMPROVED BUT REMAINS <1:5-YEAR (1.4 m^3/s);

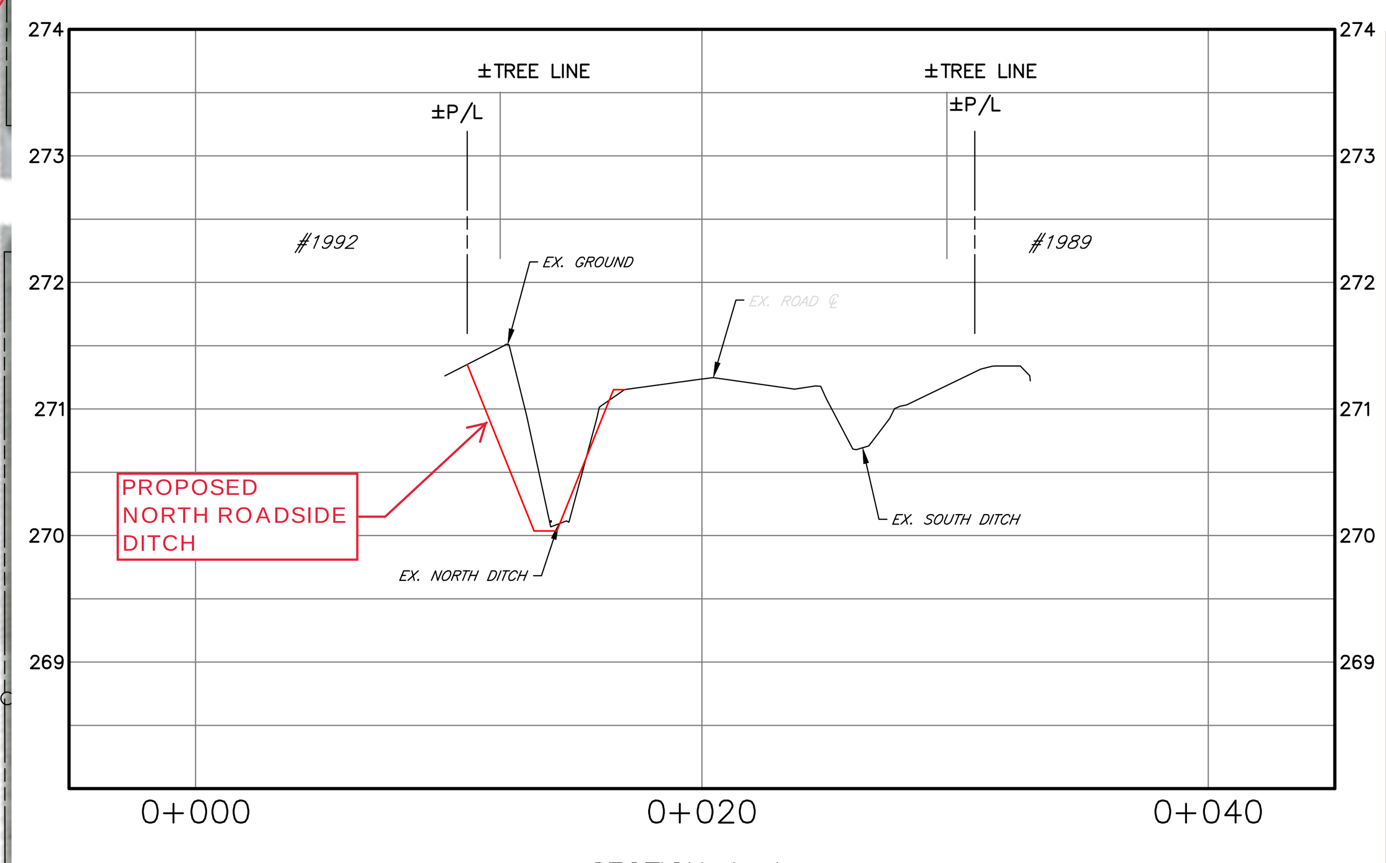
3) SEVERITY OF 1:100-YEAR FLOODING REDUCED (MINOR REDUCTION);

4) MAXIMUM CULVERT HEIGHT ACHIEVABLE APPROX. 900 mm WITH 0.30 m COVER; BOSS HDPE 750 (OUTSIDE DIA. 895 mm);

5) WILL LOSE MATURE TREES ON NORTHSIDE OF ROAD;

6) SLOPE IMPROVED FROM A SAFETY PERSPECTIVE, DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE; AND

7) EXISTING HYDRANTS, TRANSFORMERS, HYDROPOLES, SIGNS, SERVICES, ETC. MUST BE RELOCATED ON NORTH SIDE OF ROAD.



SECTION A–A
SCALE: H 1:250 V 1:50

LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
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NOTES

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ENGINEER STAMP

WARMINSTER SIDEROAD
DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE

TATHAM ENGINEERING

OPTION 2: INCREASE CONVEYANCE CAPACITY OF NORTH ROADSIDE DITCH

DESIGN: ARO	FILE: 322863	DWG:
DRAWN: WL	DATE: JULY 2022	OPT-2
CHECK: DRT	SCALE: 1:1000	

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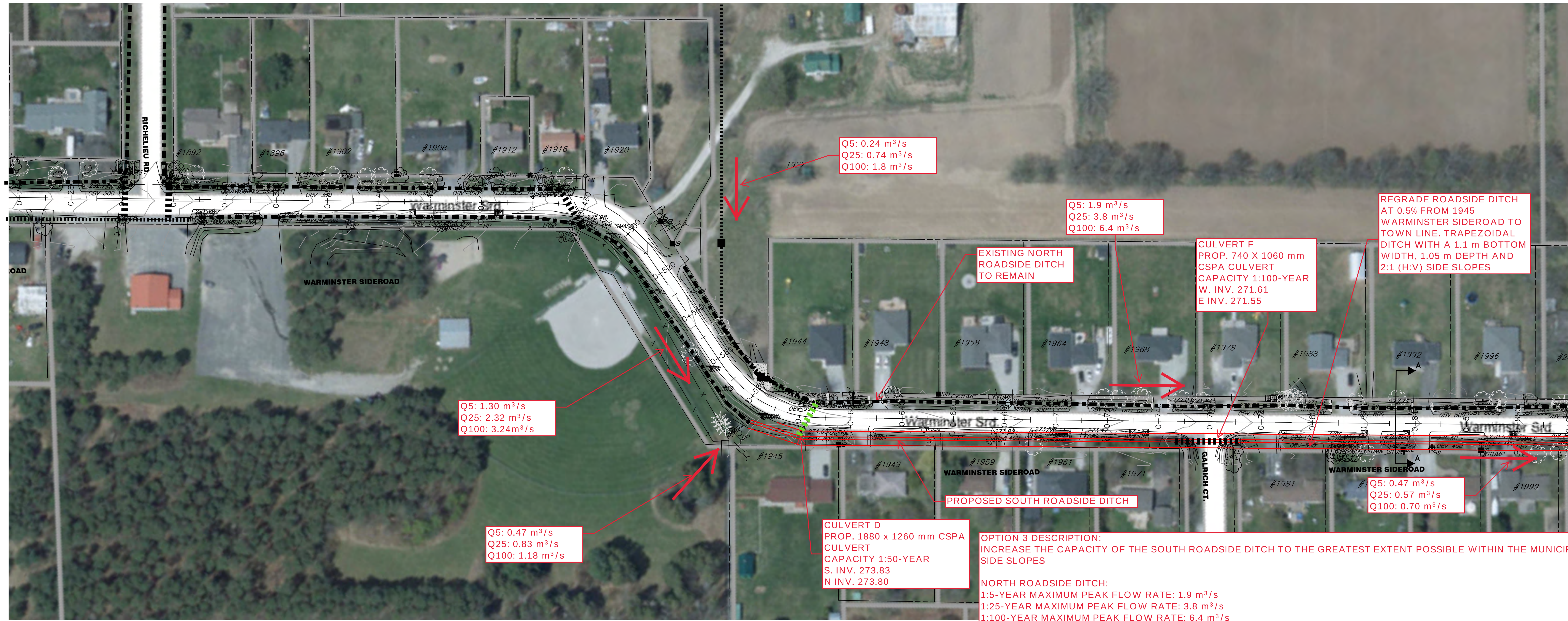
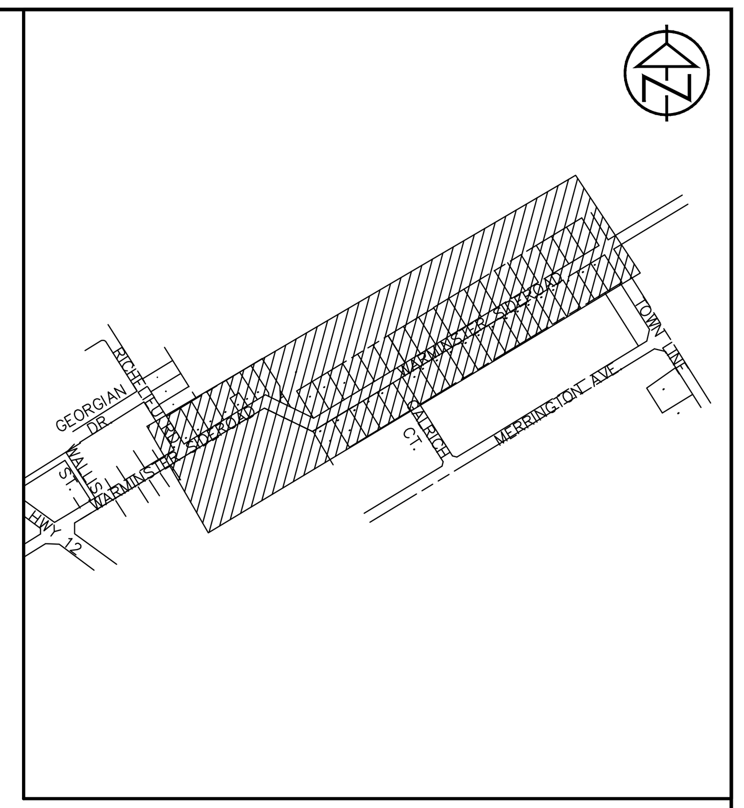




OPTION 3 DESCRIPTION:
INCREASE THE CAPACITY OF THE SOUTH ROADSIDE DITCH TO THE GREATEST EXTENT POSSIBLE WITHIN THE MUNICIPAL R.O.W. WHILE MAINTAINING A GRAVEL SHOULDER AND SAFE DITCH SIDE SLOPES

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 1.9 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 3.8 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.4 m³/s

SOUTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 0.47 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 0.57 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 0.70 m³/s

1) REGRADE DITCH FROM PROPERTY LINE DOWN AT 2:1 (H:V) TO 1.05 m DEPTH, REGRADE DITCH BOTTOM TO 1.1 m WIDTH, REGRADE DITCH UP AT 2:1 (H:V), MAINTAIN 1.5 m GRAVEL SHOULDER;

2) PEAK FLOWS TO NORTH ROADSIDE DITCH REDUCED;

3) CONVEYANCE CAPACITY REMAINS <1:5-YEAR ON NORTH SIDE;

4) CONVEYANCE CAPACITY INCREASED TO 0.7 m³/s ON SOUTH SIDE;

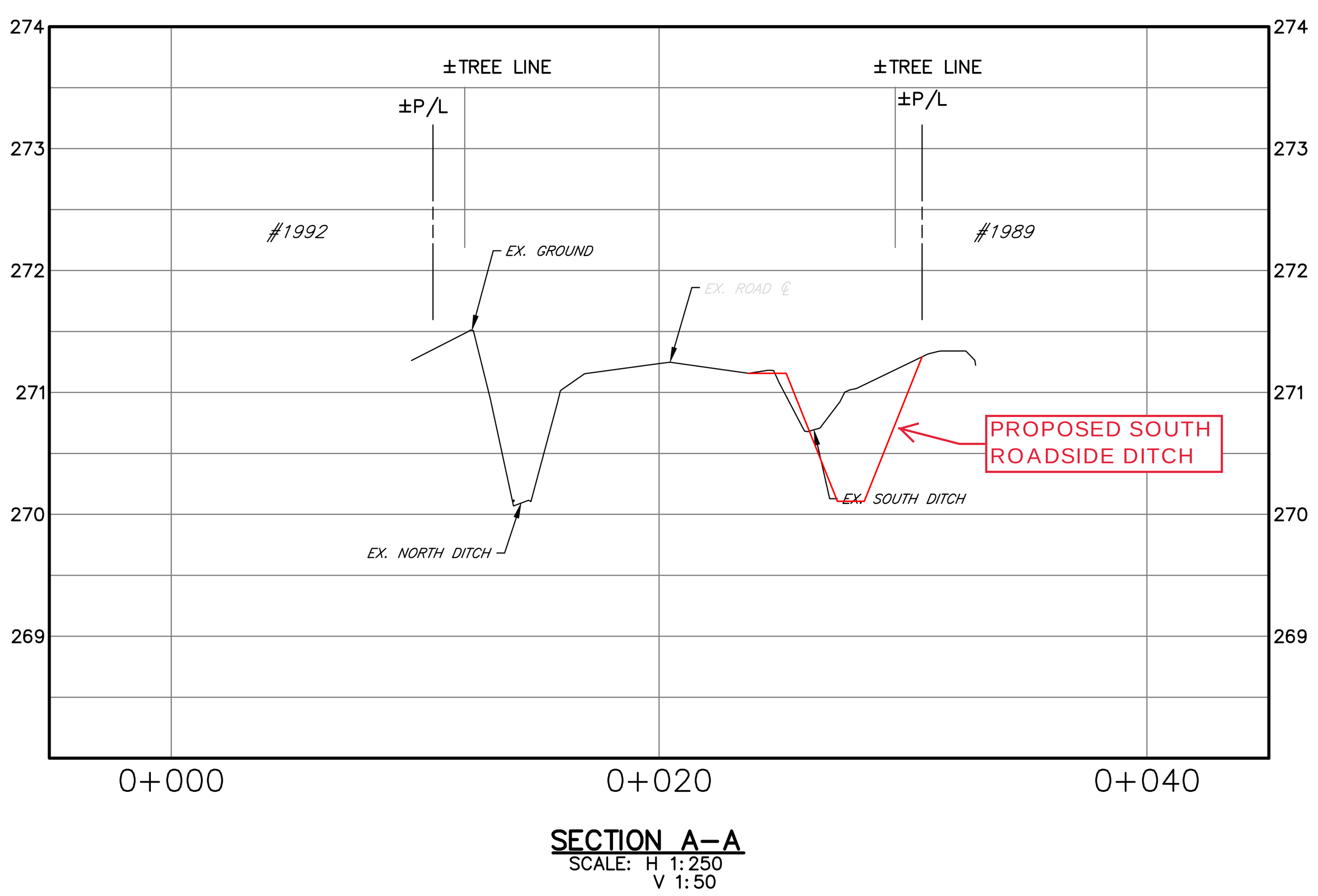
5) SEVERITY OF 1:100-YEAR FLOODING ON NORTH SIDE REDUCED;

6) SHOULDER, SLOPE AND DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE;

7) MAXIMUM CULVERT HEIGHT ACHIEVABLE APPROX. 800 mm WITH 0.30 m COVER (EQUIVALENT 900 mm DIA - 1030 X 740 mm);

8) WILL LOSE MATURE TREES ON SOUTH SIDE OF ROAD; AND

9)EXISTING HYDRANTS, TRANSFORMERS, HYDROPOLES, SIGNS, SERVICES, ETC. MUST BE RELOCATED ON SOUTH SIDE OF ROAD.



SECTION A–A
SCALE: H 1:250
V 1:50

LEGEND

	EXISTING ROADSIDE DITCH
	EXISTING STORM SEWER
	EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
	EXISTING CULVERT
	PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
	PROPOSED STORM SEWER
	PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
	PROPOSED CULVERT

BENCHMARKS

TBM–1: DOUBLE NAIL SPIKE IN HYDRO POLE ON SOUTH SIDE OF WARMINSTER, EAST SIDE OF DRIVEWAY AT #1949 (275.09m)

TBM–2: DOUBLE NAIL SPIKE IN HYDRO POLE ON NORTH SIDE OF WARMINSTER AT EAST PROPERTY CORNER OF #2020 (267.42m)

TBM–3: NAIL AND WASHERS SPIKE IN HYDRO POLE ON EAST SIDE OF TOWNLINE APPROXIMATELY 80m SOUTH OF INTERSECTION AT TOWNLINE AND WARMINSTER (263.31m)

NOTES

ALL PROPERTY LINES SHOWN ARE APPROXIMATE.

TOPOGRAPHIC INFORMATION FROM SURVEY BY TATHAM ENGINEERING LTD. IN OCTOBER 2021 AND JULY 2022.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	SEPT 2022
2.	2ND SUBMISSION	MAR 2023

ENGINEER STAMP

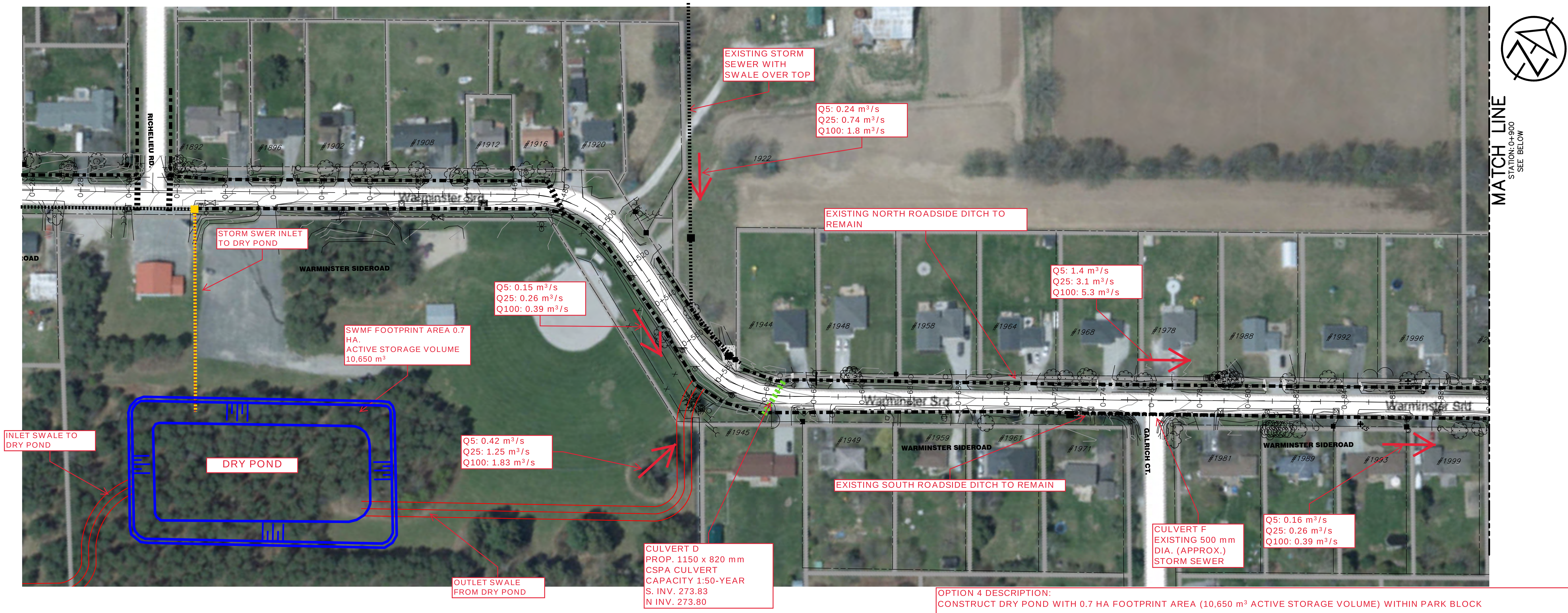
WARMINSTER SIDEROAD
DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE

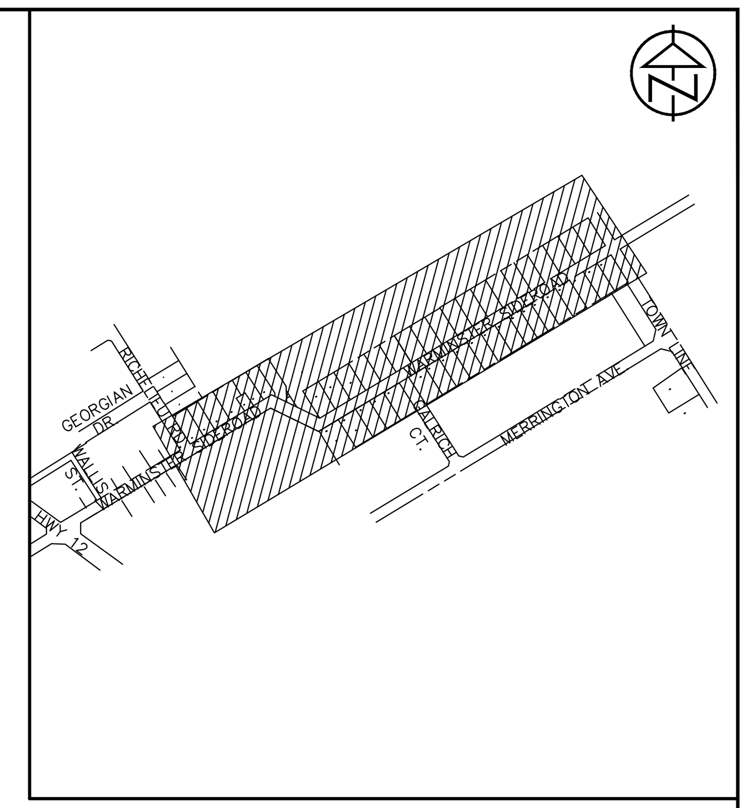
OPTION 3: INCREASE CONVEYANCE CAPACITY OF SOUTH ROADSIDE DITCH

TATHAM ENGINEERING

DESIGN: ARO	FILE: 322863	DWG: OPT-3
DRAWN: WL	DATE: JULY 2022	
CHECK: DRT	SCALE: 1:1000	

Drawing Name: 322863–DI01.dwg, Plotted: Sep 16, 2022





OPTION 4 DESCRIPTION:
CONSTRUCT DRY POND WITH 0.7 HA FOOTPRINT AREA (10,650 m³ ACTIVE STORAGE VOLUME) WITHIN PARK BLOCK

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 1.4 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 3.1 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 5.3 m³/s

1) APPROX. 0.70 HA FOOTPRINT REQUIRED;

2) CONVEYANCE CHANNEL REALIGNMENT FROM HIGHWAY 12 CROSSING ADJACENT TO LEGION TO DRY POND REQUIRED

3) STORM SEWER TO CONVEY WARMINSTER SR. FLOWS TO POND

4) WILL LOSE MATURE TREES IN PARK;

5) NEW CONEYANCE CHANNEL FROM POND TO WARMINSTER SR. REQUIRED;

6) PEAK FLOW RATES TO NORTH ROADSIDE DITCH REDUCED;

7) SHOULDER, SLOPE AND DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE;

8) NORTH ROADSIE DITCH CAPACITY REMAINS <1:5-YEAR STORM (0.9 m³/s);

9) IF CSP CULVERTS REPLACED WITH BOSS 2000 HDPE CONVEYANCE CAPACITY INCREASED TO 1:5-YEAR; AND

10) SEVERITY OF 1:100-YEAR FLOODING REDUCED.

LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT
- PROPOSED SWM FACILITY

DISCLAIMER AND COPYRIGHT

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TBM-1: DOUBLE NAIL SPIKE IN HYDRO POLE ON SOUTH SIDE OF WARMINSTER, EAST SIDE OF DRIVEWAY AT #1949 (275.09m)

TBM-2: DOUBLE NAIL SPIKE IN HYDRO POLE ON NORTH SIDE OF WARMINSTER AT EAST PROPERTY CORNER OF #2020 (267.42m)

TBM-3: NAIL AND WASHERS SPIKE IN HYDRO POLE ON EAST SIDE OF TOWNLINE APPROXIMATELY 80m SOUTH OF INTERSECTION AT TOWNLINE AND WARMINSTER (263.31m)

NOTES

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No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	SEPT 2022
2.	2ND SUBMISSION	MAR 2023

ENGINEER STAMP

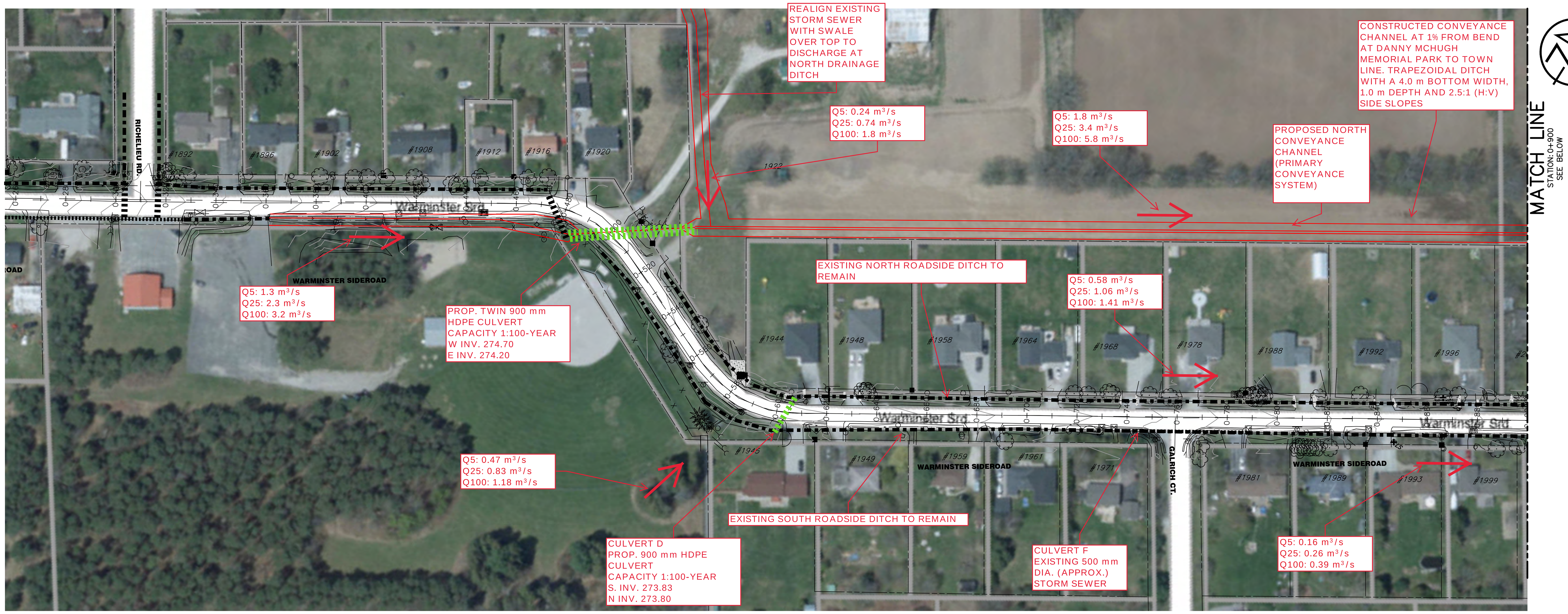
WARMINSTER SIDEROAD
DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE

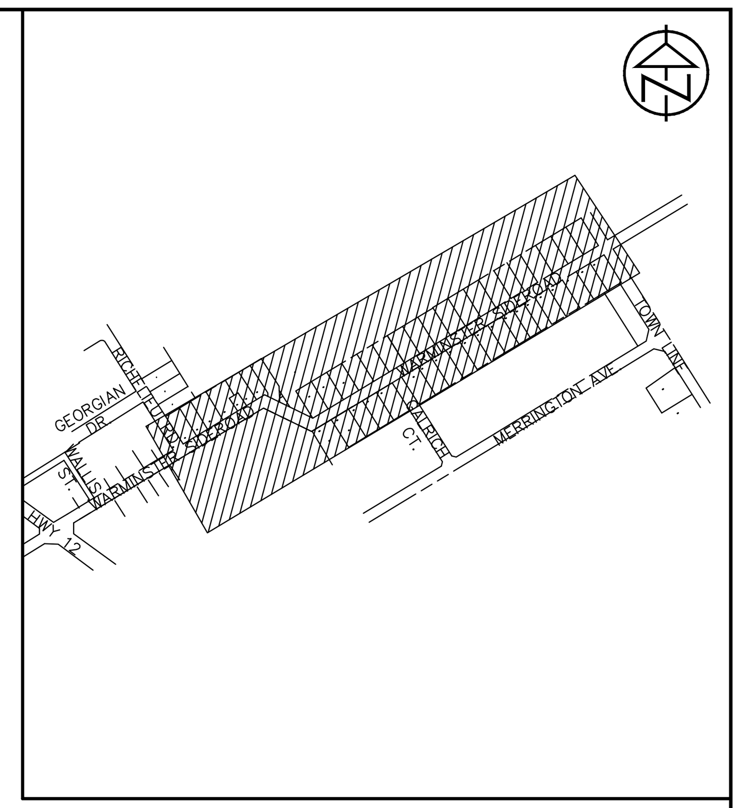
TATHAM ENGINEERING

OPTION 4: DRY POND SWMF ATTENUATION IN PARK BLOCK

DESIGN: ARO	FILE: 322863	DWG: OPT-4
DRAWN: WL	DATE: JULY 2022	
CHECK: DRT	SCALE: 1:1000	

Drawing Name: 322863-DI01.dwg, Plotted: Sep 06, 2022





KEY PLAN
N.T.S.

OPTION 5 DESCRIPTION:
CONSTRUCT NORTH CONVEYANCE CHANNEL ALONG REAR LOTS 1944 - 2058 WARMINSTER SR. TO DISCHARGE TO TOWN LINE ROADSIDE DITCH.
TRAPEZOIDAL CHANNEL TO BE GRADED 1.0 m DEEP WITH 2.5:1 (H:V) SIDE SLOPES AND 4.0 m BOTTOM WIDTH (0.30 m FREEBOARD IN CHANNEL PROVIDED)

WARMINSTER SR NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 0.6 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 1.1 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 1.4 m^3/s

NORTH CONVEYANCE CHANNEL CAPACITY: 6.0 m^3/s

1) REQUIRE LAND ACQUISITION ALONG CONVEYANCE CHANNEL;
2) NEW CROSSING REQUIRED AT WARMINSTER SR;
3) POSSIBLE UTILITIES TO BE RELOCATED;
4) PEAK FLOW RATES TO NORTH ROADSIDE DITCH REDUCED;
5) FARM RUNOFF INTERCEPTED FROM DRAINING TOWARD REAR LOTS #1944 - #2058
6) SHOULDER, SLOPE AND DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE;
7) NORTH ROADSIDE DITCH CAPACITY INCREASED TO 1:25-YEAR STORM; AND
8) IF CSP CULVERTS REPLACED WITH BOSS 2000 HDPE CONVEYANCE CAPACITY INCREASED TO 1:50-YEAR.

LEGEND
- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

DISCLAIMER AND COPYRIGHT

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BENCHMARKS

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TBM-3: NAIL AND WASHERS SPIKE IN HYDRO POLE ON EAST SIDE OF TOWNLINE APPROXIMATELY 80m SOUTH OF INTERSECTION AT TOWNLINE AND WARMINSTER (263.31m)

NOTES

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TOPOGRAPHIC INFORMATION FROM SURVEY BY TATHAM ENGINEERING LTD. IN OCTOBER 2021 AND JULY 2022.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	SEPT 2022
2.	2ND SUBMISSION	MAR 2023

ENGINEER STAMP

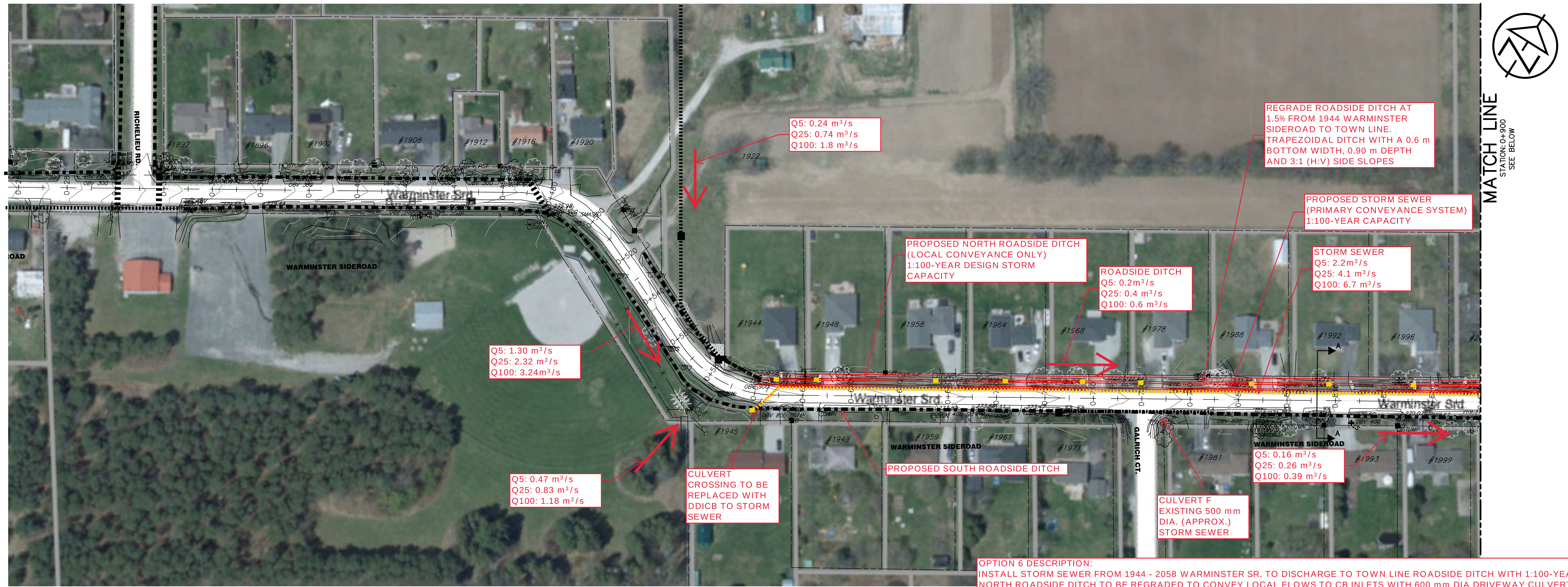
WARMINSTER SIDEROAD
DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE

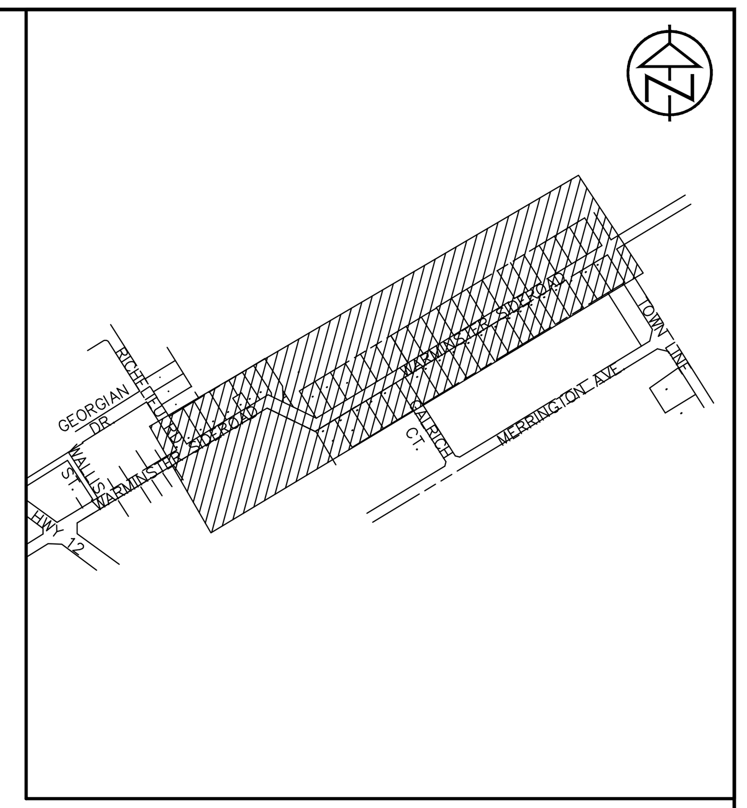
OPTION 5: CONVEYANCE CHANNEL

TATHAM ENGINEERING

DESIGN: ARO	FILE: 322863	DWG:
DRAWN: WL	DATE: JULY 2022	**OPT-5**
CHECK: DRT	SCALE: 1:1000	

Drawing Name: 322863-DI01.dwg, Plotted: Sep 06, 2022





KEY PLAN
N.T.S.

OPTION 6 DESCRIPTION:
INSTALL STORM SEWER FROM 1944 - 2058 WARMINSTER SR. TO DISCHARGE TO TOWN LINE ROADSIDE DITCH WITH 1:100-YEAR CONVEYANCE CAPACITY.
NORTH ROADSIDE DITCH TO BE REGRADED TO CONVEY LOCAL FLOWS TO CB INLETS WITH 600 mm DIA DRIVEWAY CULVERTS.

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 0.2 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 0.4 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 0.6 m^3/s

STORM SEWER:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 2.2 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 4.1 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.7 m^3/s

1) LARGE STORM SEWER (1350 mm - 1500 mm)

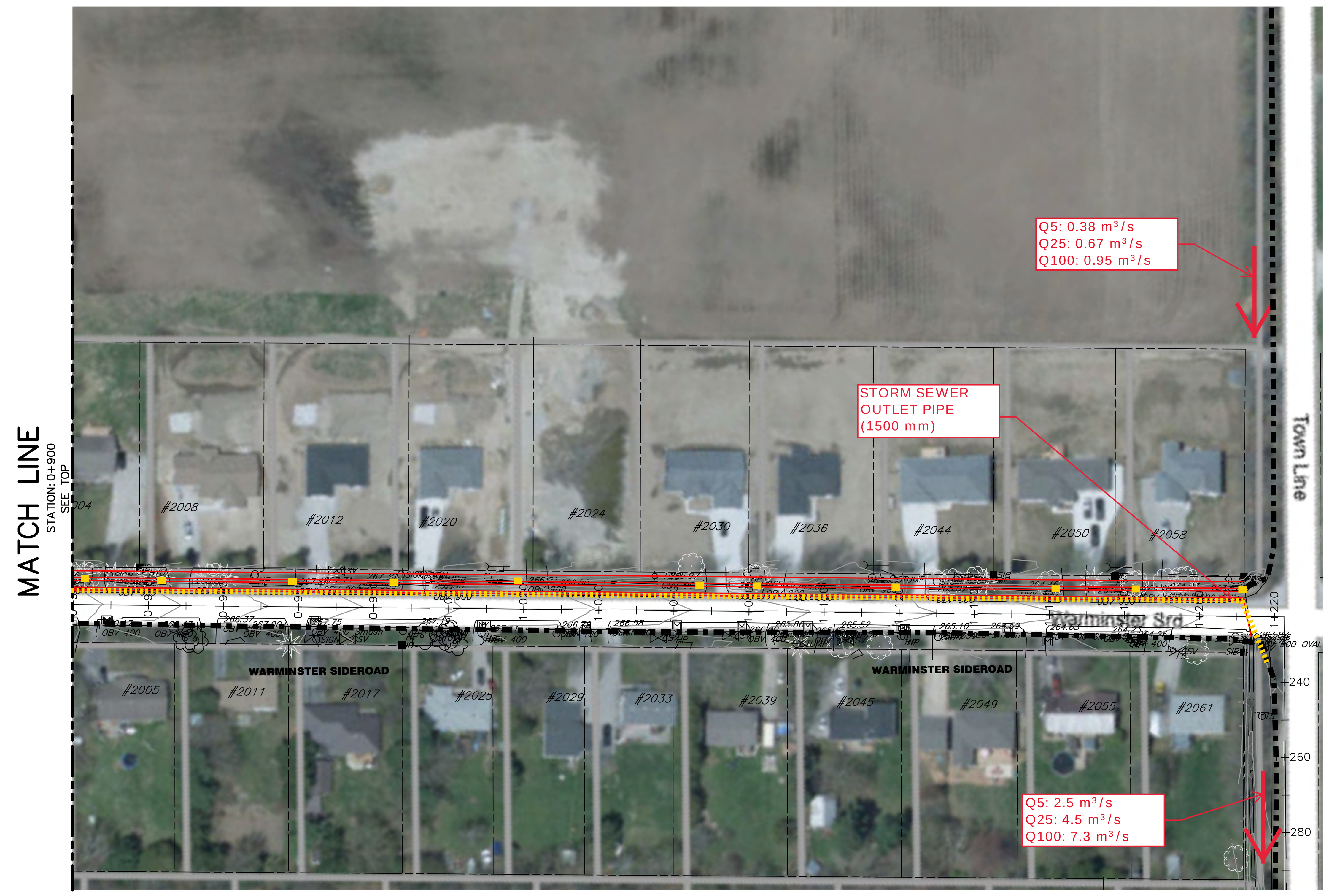
2) ROAD RECONSTRUCTION (MAJOR WORKS);

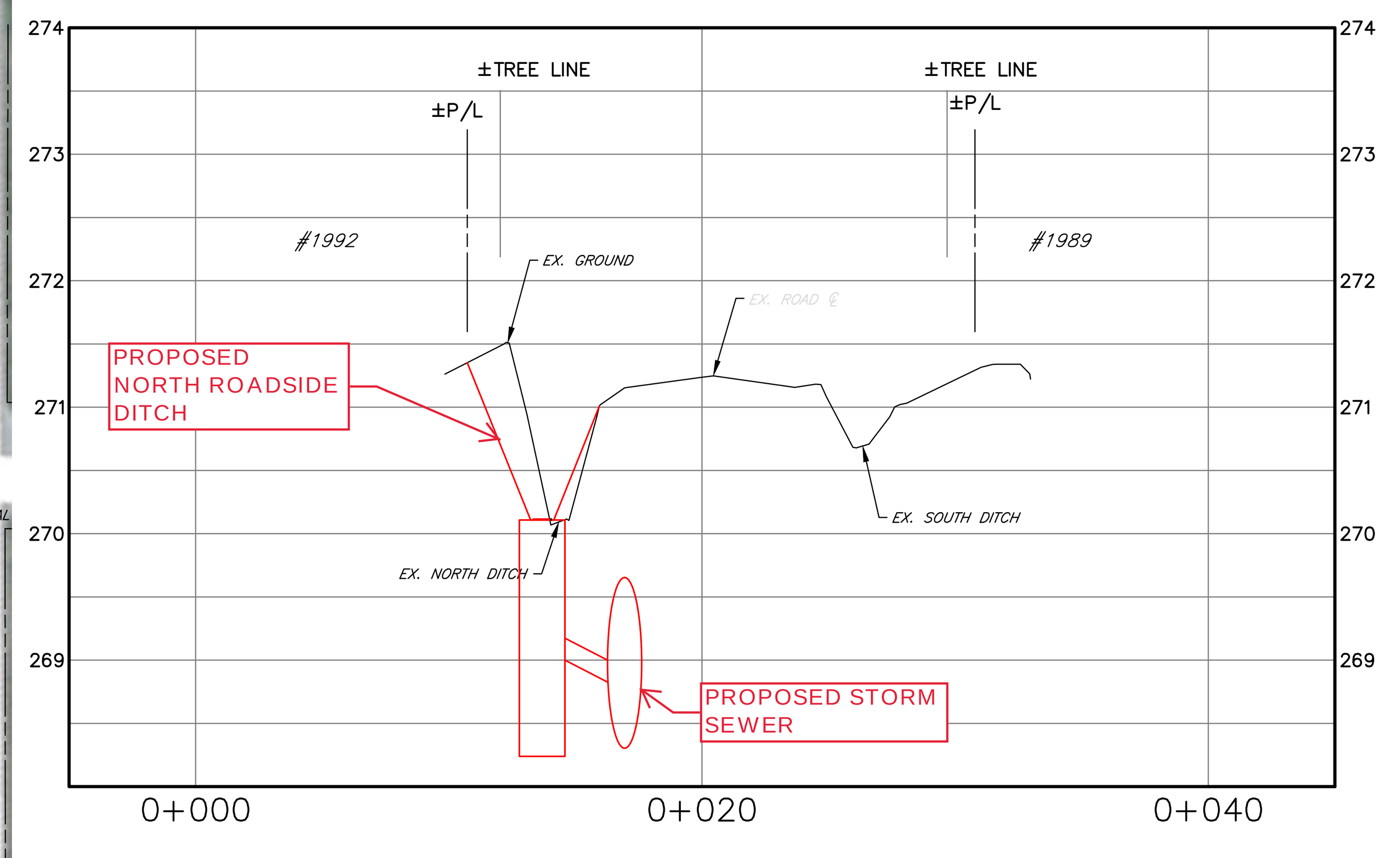
3) POSSIBLE UTILITY CONFLICTS;

4) NORTH ROADSIDE DITCH CAPACITY INCREASED TO 1:100-YEAR STORM FOR LOCAL RUNOFF;

5) WILL LOSE MATURE TREES ON NORTH SIDE; AND

6) EXISTING HYDRANTS, TRANSFORMERS, HYDROPOLES, SIGNS, SERVICES ETC. MUST BE RELOCATED ON NORTH SIDE.





SECTION A–A
SCALE: H 1:250
V 1:50

LEGEND

	EXISTING ROADSIDE DITCH
	EXISTING STORM SEWER
	EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
	EXISTING CULVERT
	PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
	PROPOSED STORM SEWER
	PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
	PROPOSED CULVERT

DISCLAIMER AND COPYRIGHT

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BENCHMARKS

TBM–1: DOUBLE NAIL SPIKE IN HYDRO POLE ON SOUTH SIDE OF WARMINSTER, EAST SIDE OF DRIVEWAY AT #1949 (275.09m)

TBM–2: DOUBLE NAIL SPIKE IN HYDRO POLE ON NORTH SIDE OF WARMINSTER AT EAST PROPERTY CORNER OF #2020 (267.42m)

TBM–3: NAIL AND WASHERS SPIKE IN HYDRO POLE ON EAST SIDE OF TOWNLINE APPROXIMATELY 80m SOUTH OF INTERSECTION AT TOWNLINE AND WARMINSTER (263.31m)

NOTES

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TOPOGRAPHIC INFORMATION FROM SURVEY BY TATHAM ENGINEERING LTD. IN OCTOBER 2021 AND JULY 2022.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	SEPT 2022
2.	2ND SUBMISSION	MAR 2023

ENGINEER STAMP

WARMINSTER SIDEROAD
DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE

OPTION 6: STORM SEWER

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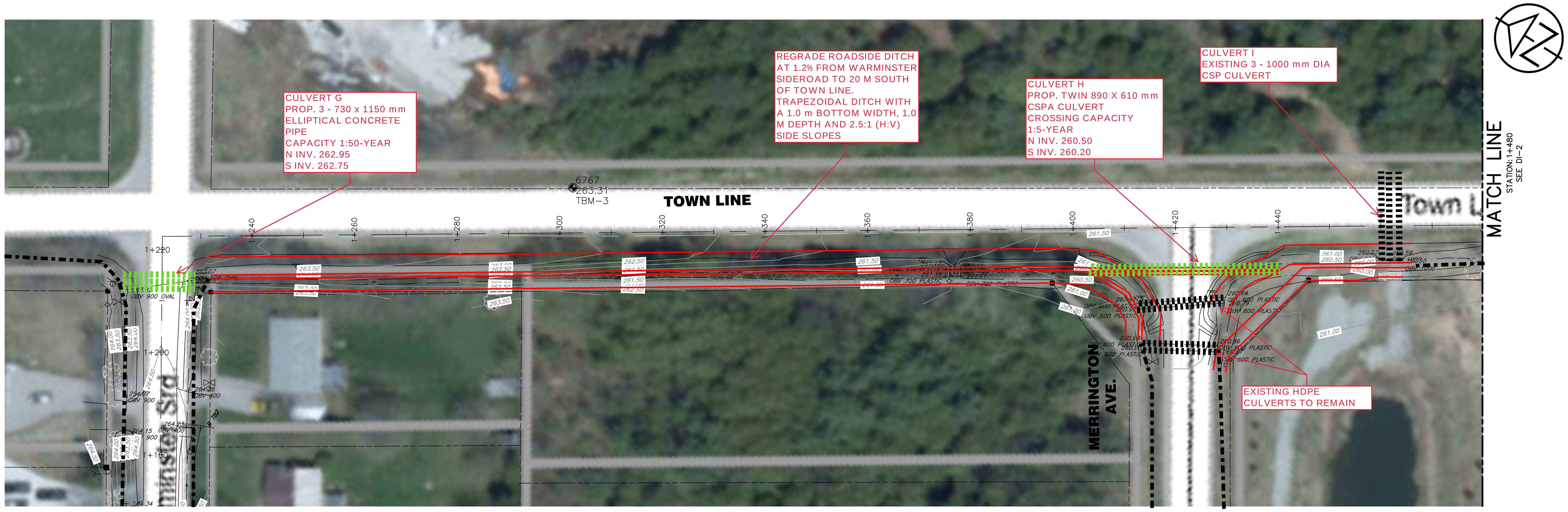
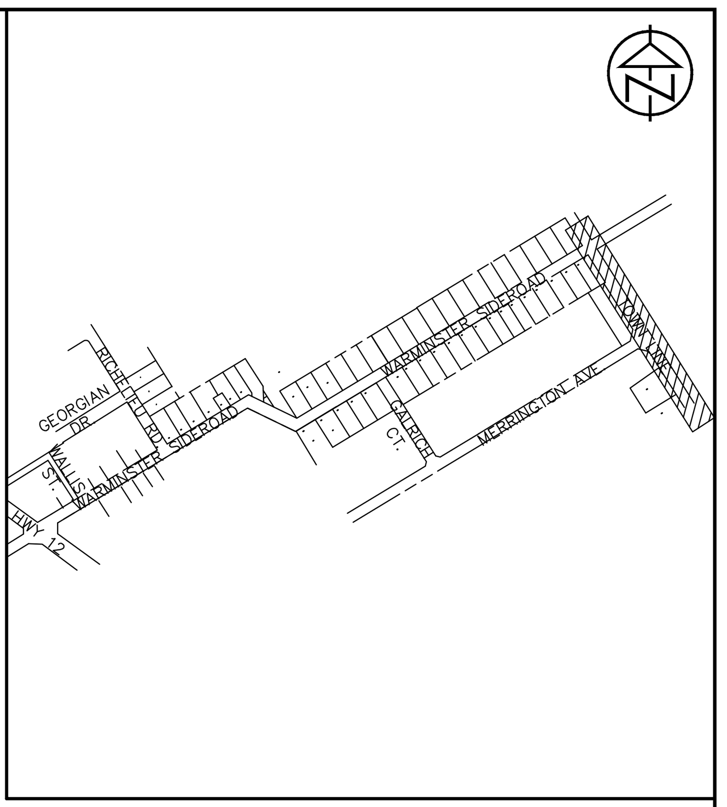
DESIGN: ARO	FILE: 322863	DWG:
DRAWN: WL	DATE: JULY 2022	OPT-6
CHECK: DRT	SCALE: 1:1000	

Drawing Name: 322863–DI01.dwg, Plotted: Sep 16, 2022





KEY PLAN
N.T.S.

LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN / CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK / BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN / CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

DISCLAIMER AND COPYRIGHT

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BENCHMARKS

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NOTES

ALL PROPERTY LINES SHOWN ARE APPROXIMATE.

TOPOGRAPHIC INFORMATION FROM SURVEY BY TATHAM ENGINEERING LTD. IN OCTOBER 2021 AND JULY 2022.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	SEPT 2022
2.	2ND SUBMISSION	MAR 2023

ENGINEER STAMP

WARMINSTER SIDEROAD
DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE

TATHAM ENGINEERING

DRAINAGE IMPROVEMENTS PLAN
TOWN LINE

DESIGN: ARO	FILE: 322863	DWG: **DI-2**
DRAWN: WL	DATE: JULY 2022	
CHECK: DRT	SCALE: 1:500	

Drawing Name: 322863-DI01.dwg, Plotted: Oct 31, 2022

Appendix A: Existing Conditions Hydrologic Analysis

TATHAM ENGINEERING

PROJECT	Warminster SR Drainage Improv.	FILE	322863		
		DATE	March, 2023		
SUBJECT	Impervious Area Calculation	NAME	PK		
		PAGE	1	OF	4

<u>Existing Conditions</u>

Catchment 101	=	13.09	ha
Road Area	=	1.00	ha
Driveway Area	=	0.58	ha
Parking Area		0.25	ha
Building Area	=	0.63	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	0.00	ha
Landscaped	=	10.63	ha

% Impervious	=	18.8%
Directly Connected % Impervious	=	14%

Catchment 102	=	1.06	ha
Road Area	=	0.21	ha
Driveway Area	=	0.05	ha
Parking Area		0.00	ha
Building Area	=	0.02	ha
Waterbody/SWMF	=	0.15	ha
Forest	=	0.00	ha
Landscaped	=	0.62	ha

% Impervious	=	27.2%
Directly Connected % Impervious	=	25%

Catchment 103	=	9.10	ha
Road Area	=	0.56	ha
Driveway Area	=	0.35	ha
Parking Area		0.34	ha
Building Area	=	0.46	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	0.00	ha
Landscaped	=	7.38	ha

% Impervious	=	18.9%
Directly Connected % Impervious	=	14%

PROJECT	Warminster SR Drainage Improv.	FILE	322863
		DATE	March, 2023
SUBJECT	Impervious Area Calculation	NAME	PK
		PAGE	2 OF 4

Existing Conditions

Catchment 104 (Prorated for 1041, 1042)	=	8.35	ha
Road Area	=	0.12	ha
Driveway Area	=	0.25	ha
Parking Area		0.00	ha
Building Area	=	0.26	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	1.61	ha
Landscaped	=	6.11	ha

% Impervious	=	7.5%
Directly Connected % Impervious	=	4%

Catchment 105 (Prorated for 1051, 1052, 1053, 1054)	=	13.91	ha
Road Area	=	1.62	ha
Driveway Area	=	0.77	ha
Parking Area		0.00	ha
Building Area	=	0.80	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	0.00	ha
Landscaped	=	10.72	ha

% Impervious	=	22.9%
Directly Connected % Impervious	=	17%

Catchment 106	=	12.90	ha
Road Area	=	1.03	ha
Driveway Area	=	1.00	ha
Parking Area		0.00	ha
Building Area	=	2.60	ha
Waterbody/SWMF	=	0.65	ha
Forest	=	0.00	ha
Landscaped	=	7.62	ha

% Impervious	=	35.9%
Directly Connected % Impervious	=	16%

Existing Conditions

Catchment 107	=	6.59	ha
Road Area	=	0.00	ha
Driveway Area	=	0.02	ha
Parking Area		0.22	ha
Building Area	=	0.08	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	0.00	ha
Landscaped	=	6.27	ha

% Impervious	=	4.9%
Directly Connected % Impervious	=	4%

Catchment 108 (Prorated for 1081, 1082, 1083, 1084)	=	3.89	ha
Road Area	=	0.32	ha
Driveway Area	=	0.28	ha
Parking Area		0.00	ha
Building Area	=	0.37	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	0.00	ha
Landscaped	=	2.92	ha

% Impervious	=	25.0%
Directly Connected % Impervious	=	16%

Catchment 109 (Prorated for 1091, 1092, 1093, 1094)	=	1.92	ha
Road Area	=	0.32	ha
Driveway Area	=	0.11	ha
Parking Area		0.00	ha
Building Area	=	0.12	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	0.00	ha
Landscaped	=	1.37	ha

% Impervious	=	28.9%
Directly Connected % Impervious	=	23%

Existing Conditions

Catchment 110	=	3.70	ha
Road Area	=	0.46	ha
Driveway Area	=	0.19	ha
Parking Area		0.00	ha
Building Area	=	0.17	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	0.00	ha
Landscaped	=	2.88	ha

% Impervious	=	22.1%
Directly Connected % Impervious	=	18%

Catchment 111 (Prorated for 1111, 1112, 1113, 1114)	=	50.43	ha
Road Area	=	0.31	ha
Driveway Area	=	0.00	ha
Parking Area		0.00	ha
Building Area	=	0.05	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	0.00	ha
Landscaped	=	50.07	ha

% Impervious	=	0.7%
Directly Connected % Impervious	=	1%

Catchment 112	=	4.67	ha
Road Area	=	0.09	ha
Driveway Area	=	0.00	ha
Parking Area		0.00	ha
Building Area	=	0.22	ha
Waterbody/SWMF	=	0.00	ha
Forest	=	1.46	ha
Landscaped	=	2.90	ha

% Impervious	=	6.6%
Directly Connected % Impervious	=	2%

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Pre-Development Condition

Watershed:	NVCA
Catchment ID:	101
Catchment Area (ha):	13.85
Impervious %:	19%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Vasl**												
Soil Series		Vasey												
Hydrologic Soils Group		AB												
Soil Texture		Sand Loam												
Runoff Coefficient Type		1												
Area (ha)		13.85												
Percentage of Catchment		100%												
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	2.61	100	0.95									
Gravel	3		89	0.09									
Woodland	10		46	0.08									
Pasture/Lawns	5	11.24	59	0.10									
Meadows	8		51	0.09									
Cultivated	7		68	0.22									
Waterbody	12		50	0.05									
Average CN		66.73											
Average C		0.26											
Average IA		4.43											

Time to Peak Calculations

Max. Catchment Elev. (m):	292.00
Min. Catchment Elev. (m):	286.00
Catchment Length (m):	603.64
Catchment Slope (%):	0.99%
Method: Airport Method	
Time of Concentration (mins):	67.40

Summary

Catchment CN:	66.7
Catchment C:	0.26
Catchment IA (mm):	4.43
Time of Concentration (hrs):	1.12
Catchment Time to Peak (hrs):	0.75
Catchment Time Step (mins):	8.99

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	103
Catchment Area (ha):	9.10
Impervious %:	19%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		Vasl												
Soil Series		Vasey												
Hydrologic Soils Group		AB												
Soil Texture		Sand Loam												
Runoff Coefficient Type		1												
Area (ha)		9.10												
Percentage of Catchment		100%												
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	1.72	100	0.95									
Gravel	3		89	0.09									
Woodland	10		46	0.08									
Pasture/Lawns	5	7.38	59	0.10									
Meadows	8		51	0.09									
Cultivated	7		68	0.22									
Waterbody	12		50	0.05									
Average CN		66.75											
Average C		0.26											
Average IA		4.43											

Time to Peak Calculations

Max. Catchment Elev. (m):	292.00
Min. Catchment Elev. (m):	287.00
Catchment Length (m):	423.19
Catchment Slope (%):	1.18%
Method:	Airport Method
Time of Concentration (mins):	53.27

Summary

Catchment CN:	66.7
Catchment C:	0.26
Catchment IA (mm):	4.43
Time of Concentration (hrs):	0.89
Catchment Time to Peak (hrs):	0.59
Catchment Time Step (mins):	7.10

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	104
Catchment Area (ha):	8.35
Impervious %:	8%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Vasl**											
Soil Series		Vasey											
Hydrologic Soils Group		AB											
Soil Texture		Sand Loam											
Runoff Coefficient Type		1											
Area (ha)		8.35											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.63	100	0.95									
Gravel	3		89	0.09									
Woodland	10	1.61	46	0.08									
Pasture/Lawns	5	6.11	59	0.10									
Meadows	8		51	0.09									
Cultivated	7		68	0.22									
Waterbody	12		50	0.05									
Average CN		59.59											
Average C		0.16											
Average IA		5.74											

Time to Peak Calculations

Max. Catchment Elev. (m):	288.00
Min. Catchment Elev. (m):	274.80
Catchment Length (m):	453.48
Catchment Slope (%):	2.91%
Method: Airport Method	
Time of Concentration (mins):	45.85

Summary

Catchment CN:	59.6
Catchment C:	0.16
Catchment IA (mm):	5.74
Time of Concentration (hrs):	0.76
Catchment Time to Peak (hrs):	0.51
Catchment Time Step (mins):	6.11

Visual OTTHYMO Model
Parameter Calculations (NasHYD)

TATHAM ENGINEERING

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	107
Catchment Area (ha):	6.59
Impervious %:	5%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Vasl**												
Soil Series		Vasey												
Hydrologic Soils Group		AB												
Soil Texture		Sand Loam												
Runoff Coefficient Type		1												
Area (ha)		6.59												
Percentage of Catchment		100%												
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.32	100	0.95									
Gravel	3		89	0.09									
Woodland	10		46	0.08									
Pasture/Lawns	5	6.27	59	0.10									
Meadows	8		51	0.09									
Cultivated	7		68	0.22									
Waterbody	12		50	0.05									
Average CN		60.99											
Average C		0.14											
Average IA		4.85											

Time to Peak Calculations

Max. Catchment Elev. (m):	286.00
Min. Catchment Elev. (m):	276.00
Catchment Length (m):	380.1
Catchment Slope (%):	2.63%
Method: Airport Method	
Time of Concentration (mins):	44.28

Summary

Catchment CN:	61.0
Catchment C:	0.14
Catchment IA (mm):	4.85
Time of Concentration (hrs):	0.74
Catchment Time to Peak (hrs):	0.49
Catchment Time Step (mins):	5.90

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	111
Catchment Area (ha):	50.43
Impervious %:	7%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Vasl**											
Soil Series		Vasey											
Hydrologic Soils Group		AB											
Soil Texture		Sand Loam											
Runoff Coefficient Type		1											
Area (ha)		50.43											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.36	100	0.95									
Gravel	3		89	0.09									
Woodland	10		46	0.08									
Pasture/Lawns	5	50.07	59	0.10									
Meadows	8		51	0.09									
Cultivated	7		68	0.22									
Waterbody	12		50	0.05									
Average CN		59.29											
Average C		0.11											
Average IA		4.98											

Time to Peak Calculations

Max. Catchment Elev. (m):	297.00
Min. Catchment Elev. (m):	263.00
Catchment Length (m):	1604.39
Catchment Slope (%):	2.12%
Method: Airport Method	
Time of Concentration (mins):	101.30

Summary

Catchment CN:	59.3
Catchment C:	0.11
Catchment IA (mm):	4.98
Time of Concentration (hrs):	1.69
Catchment Time to Peak (hrs):	1.13
Catchment Time Step (mins):	13.51

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	112
Catchment Area (ha):	4.67
Impervious %:	7%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		Vasl												
Soil Series		Vasey												
Hydrologic Soils Group		AB												
Soil Texture		Sand Loam												
Runoff Coefficient Type		1												
Area (ha)		4.67												
Percentage of Catchment		100%												
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.31	100	0.95									
Gravel	3		89	0.09									
Woodland	10	1.46	46	0.08									
Pasture/Lawns	5	2.90	59	0.10									
Meadows	8		51	0.09									
Cultivated	7		68	0.22									
Waterbody	12		50	0.05									
Average CN		57.66											
Average C		0.15											
Average IA		6.36											

Time to Peak Calculations

Max. Catchment Elev. (m):	272.00
Min. Catchment Elev. (m):	260.50
Catchment Length (m):	467.89
Catchment Slope (%):	2.46%
Method: Airport Method	
Time of Concentration (mins):	49.78

Summary

Catchment CN:	57.7
Catchment C:	0.15
Catchment IA (mm):	6.36
Time of Concentration (hrs):	0.83
Catchment Time to Peak (hrs):	0.55
Catchment Time Step (mins):	6.64

Visual OTTHYMO Model Parameter Calculations (StandHYD)

TATHAM ENGINEERING

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	102
Catchment Area (ha):	1.06
Impervious %:	27%
Pervious Area (ha):	0.77

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**Vasl**							
Soil Series		Vasey							
Hydrologic Soils Group		AB							
Soil Texture		Sand Loam							
Runoff Coefficient Type		1							
Area (ha)		0.77							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100						
Gravel	3		89						
Woodland	10		46						
Pasture/Lawns	5	0.62	59						
Meadows	8		51						
Cultivated	7		68						
Waterbody	12	0.15	50						
Average CN		57.25							
Average IA		6.36							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	57.3
Catchment IA (mm):	6.36

Visual OTTHYMO Model Parameter Calculations (StandHYD)

TATHAM ENGINEERING

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	105
Catchment Area (ha):	13.15
Impervious %:	23%
Pervious Area (ha):	10.14

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**Vasl**							
Soil Series		Vasey							
Hydrologic Soils Group		AB							
Soil Texture		Sand Loam							
Runoff Coefficient Type		1							
Area (ha)		10.14							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100						
Gravel	3		89						
Woodland	10		46						
Pasture/Lawns	5	10.14	59						
Meadows	8		51						
Cultivated	7		68						
Waterbody	12		50						
Average CN		59.01							
Average IA		5.00							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	59.0
Catchment IA (mm):	5.00

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	106
Catchment Area (ha):	12.90
Impervious %:	36%
Pervious Area (ha):	8.26

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**Vasl**							
Soil Series		Vasey							
Hydrologic Soils Group		AB							
Soil Texture		Sand Loam							
Runoff Coefficient Type		1							
Area (ha)		8.26							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100						
Gravel	3		89						
Woodland	10		46						
Pasture/Lawns	5	8.26	59						
Meadows	8		51						
Cultivated	7		68						
Waterbody	12		50						
Average CN		59.00							
Average IA		5.00							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	59.0
Catchment IA (mm):	5.00

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	108
Catchment Area (ha):	3.89
Impervious %:	25%
Pervious Area (ha):	2.92

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**Vasl**							
Soil Series		Vasey							
Hydrologic Soils Group		AB							
Soil Texture		Sand Loam							
Runoff Coefficient Type		1							
Area (ha)		2.92							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100						
Gravel	3		89						
Woodland	10		46						
Pasture/Lawns	5	2.92	59						
Meadows	8		51						
Cultivated	7		68						
Waterbody	12		50						
Average CN		59.00							
Average IA		5.00							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	59.0
Catchment IA (mm):	5.00

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	109
Catchment Area (ha):	1.92
Impervious %:	29%
Pervious Area (ha):	1.37

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**Vasl**							
Soil Series		Vasey							
Hydrologic Soils Group		AB							
Soil Texture		Sand Loam							
Runoff Coefficient Type		1							
Area (ha)		1.37							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100						
Gravel	3		89						
Woodland	10		46						
Pasture/Lawns	5	1.37	59						
Meadows	8		51						
Cultivated	7		68						
Waterbody	12		50						
Average CN		59.00							
Average IA		5.00							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	59.0
Catchment IA (mm):	5.00

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

Warminster SR Drainage Improv	322863

Prepared By

PK	March 2023

Data Sources

Detailed Soil Survey Reports for Ontario, NVCA Stormwater Technical Guide (2013), MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	NVCA
Catchment ID:	110
Catchment Area (ha):	3.70
Impervious %:	22%
Pervious Area (ha):	2.88

Average Curve Number (CN) and Initial Abstraction (IA) for Pervious Area

Soil Symbol		**Vasl**							
Soil Series		Vasey							
Hydrologic Soils Group		AB							
Soil Texture		Sand Loam							
Runoff Coefficient Type		1							
Area (ha)		2.88							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100						
Gravel	3		89						
Woodland	10		46						
Pasture/Lawns	5	2.88	59						
Meadows	8		51						
Cultivated	7		68						
Waterbody	12		50						
Average CN		59.00							
Average IA		5.00							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	59.0
Catchment IA (mm):	5.00

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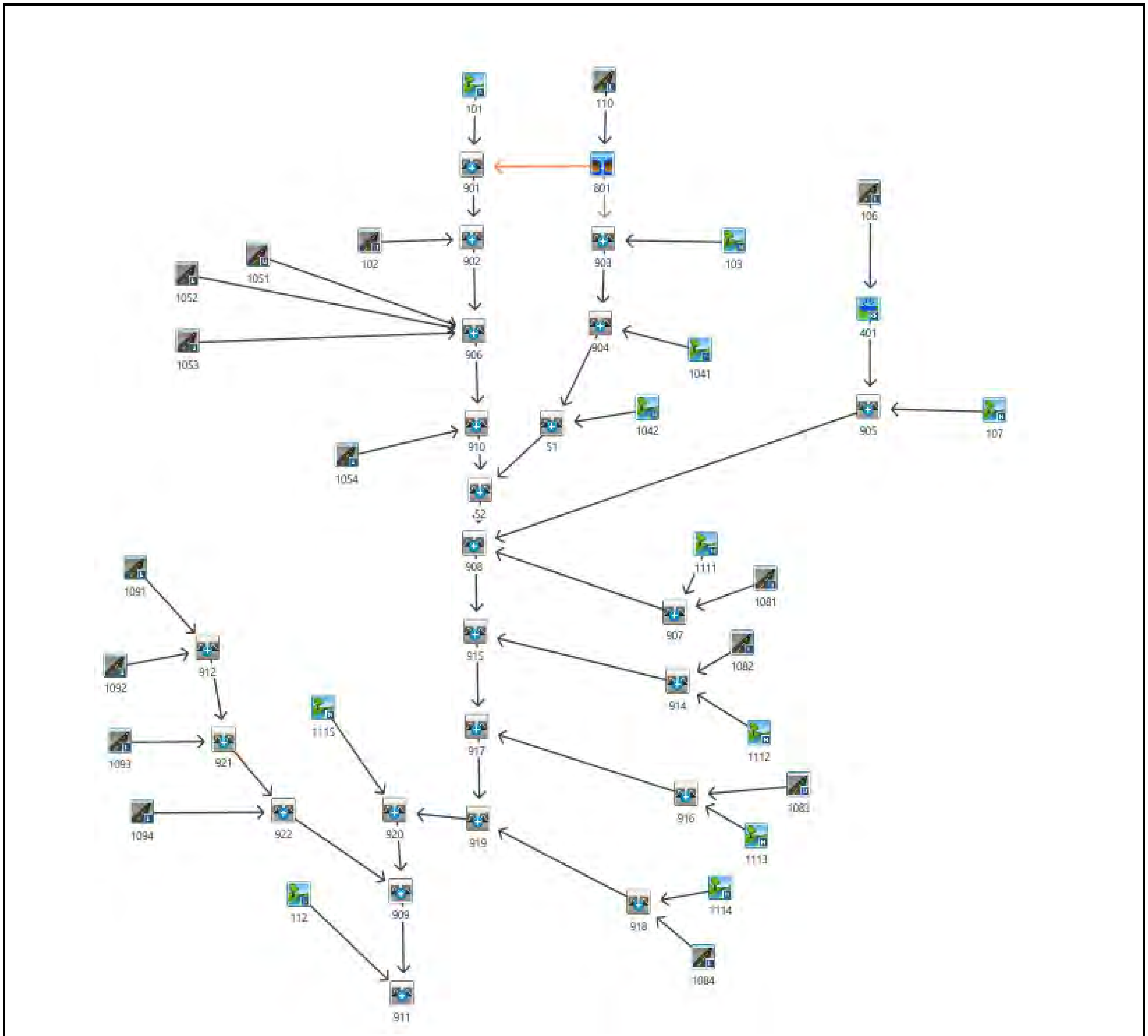
ENGINEERING

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
		DATE	March 2023
SUBJECT	VO Schematic	NAME	PK
	Overall Drainage Plan - Existing	PAGE	1 OF 1



NASHYD	ROUTE PIPE	DUHYD
STANDHYD	ROUTE CHANNEL	DIVERT HYD
ADDHYD	ROUTE RESERVOIR	SHIFTHYD

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================================================================================
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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  D E T A I L E D   O U T P U T *****

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  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
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DATE: 03-13-2023                           TIME: 05:25:35

USER:


COMMENTS: ____________________________________________________________

--------------------------------------------------------------------------------
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  **************************************************
  ** SIMULATION : RUN 001 - OWEN SOUND CHIC25MM **
  **************************************************


 --------------------
|    READ STORM      |    Filename: C:\Users\ALOverholt\AppD
|                    |              ata\Local\Temp\
|                    |              57c4be91-96c2-4fa4-8a23-c6433e3558ea\e3800a90
| Ptotal= 24.97 mm |    Comments: OWEN SOUND CHIC25MM
 --------------------
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.00    1.29 |  1.00    2.81 |  2.00   13.05 |  3.00    2.04
                 0.10    1.36 |  1.10    3.22 |  2.10    8.44 |  3.10    1.89
                 0.20    1.44 |  1.20    3.77 |  2.20    6.21 |  3.20    1.76
                 0.30    1.53 |  1.30    4.55 |  2.30    4.91 |  3.30    1.65
                 0.40    1.63 |  1.40    5.77 |  2.40    4.06 |  3.40    1.55
                 0.50    1.75 |  1.50    7.86 |  2.50    3.47 |  3.50    1.46
                 0.60    1.89 |  1.60   12.27 |  2.60    3.03 |  3.60    1.39
                 0.70    2.06 |  1.70   26.17 |  2.70    2.70 |  3.70    1.32
                 0.80    2.26 |  1.80   72.58 |  2.80    2.43 |  3.80    1.26
                 0.90    2.50 |  1.90   26.96 |  2.90    2.22 |  3.90    1.20

--------------------------------------------------------------------------------
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 --------------------
| CALIB              |
| NASHYD   (  0101)|   Area    (ha)=  13.09   Curve Number   (CN)= 66.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
 --------------------   U.H. Tp(hrs)=   0.75

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
               0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
               0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
               0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
               0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
               0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
               0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
               0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
               0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
               0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
               0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
               1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.667

     PEAK FLOW       (cms)=   0.054 (i)
     TIME TO PEAK    (hrs)=   2.833
     RUNOFF VOLUME    (mm)=   2.863
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.115

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
 --------------------
| CALIB              |
| STANDHYD (  0110)|   Area    (ha)=   3.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  22.00   Dir. Conn.(%)=  18.00
 --------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.81          2.89
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     157.06         40.00
     Mannings n          =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
               0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
               0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
               0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
               0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
               0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
               0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
               0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
               0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
```

```
          0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
          0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
          1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         2.88
                over (min)        5.00        35.00
     Storage Coeff.  (min)=       4.02 (ii)   33.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.24         0.03
                                                           *TOTALS*
     PEAK FLOW       (cms)=       0.10         0.01          0.105 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.50           1.92
     RUNOFF VOLUME    (mm)=      23.97         2.17           6.09
     TOTAL RAINFALL   (mm)=      24.97        24.97          24.97
     RUNOFF COEFFICIENT   =       0.96         0.09           0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  59.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0801)|
| Inlet Cap.= 0.060|
| #of Inlets=    10|
| Total(cms)=   0.6|      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):   3.70      0.10      1.92    6.09
     ==================================================
     MAJOR SYS.(ID= 2):   0.00      0.00      0.00    0.00
     MINOR SYS.(ID= 3):   3.70      0.10      1.92    6.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0901)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):    13.09   0.054     2.83     2.86
      + ID2= 2 (  0801):     3.70   0.105     1.92     6.09
        ==================================================
        ID = 3 (  0901):    16.79   0.108     1.92     3.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0102)|   Area    (ha)=   1.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  25.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.29         0.77
     Dep. Storage     (mm)=       1.00         6.36
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      84.06        40.00
     Mannings n           =      0.013        0.250
```

```
          NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         2.01
                over (min)        5.00        40.00
     Storage Coeff.  (min)=       2.76 (ii)   36.45 (ii)
     Unit Hyd. Tpeak (min)=       5.00        40.00
     Unit Hyd. peak  (cms)=       0.28         0.03
                                                           *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.00          0.044 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.58           1.92
     RUNOFF VOLUME    (mm)=      23.97         1.74           7.27
     TOTAL RAINFALL   (mm)=      24.97        24.97          24.97
     RUNOFF COEFFICIENT   =       0.96         0.07           0.29

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  57.3    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0902)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0102):     1.06   0.044     1.92     7.27
      + ID2= 2 (  0901):    16.79   0.108     1.92     3.57
        ==================================================
        ID = 3 (  0902):    17.85   0.152     1.92     3.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  1051)|   Area    (ha)=  10.37
|ID= 1 DT= 5.0 min |   Total Imp(%)=  23.00   Dir. Conn.(%)=  17.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.39         7.98
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     262.93        40.00
     Mannings n           =      0.013        0.250
```

```
     NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
         0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
         0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
         0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
         0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
         0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
         0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
         0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
         0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
         0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
         0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
         1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

   Max.Eff.Inten.(mm/hr)=      63.46         3.06
             over (min)         5.00        35.00
   Storage Coeff.  (min)=       5.47 (ii)   33.94 (ii)
   Unit Hyd. Tpeak (min)=       5.00        35.00
   Unit Hyd. peak  (cms)=       0.20         0.03
                                                         *TOTALS*
   PEAK FLOW      (cms)=        0.25         0.04          0.256 (iii)
   TIME TO PEAK    (hrs)=       1.92         2.50           1.92
   RUNOFF VOLUME    (mm)=      23.97         2.25           5.94
   TOTAL RAINFALL   (mm)=      24.97        24.97          24.97
   RUNOFF COEFFICIENT   =       0.96         0.09           0.24

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  59.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  1052)|   Area    (ha)=   1.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  23.00   Dir. Conn.(%)=  17.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=        0.38         1.26
   Dep. Storage     (mm)=        1.00         5.00
   Average Slope     (%)=        1.00         2.00
   Length            (m)=      104.56        40.00
   Mannings n          =       0.013        0.250

     NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
         0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
         0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
         0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
         0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
         0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
         0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
         0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
         0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
         0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
         0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
         1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

   Max.Eff.Inten.(mm/hr)=      63.46         3.06
             over (min)         5.00        35.00
   Storage Coeff.  (min)=       3.15 (ii)   31.61 (ii)
   Unit Hyd. Tpeak (min)=       5.00        35.00
   Unit Hyd. peak  (cms)=       0.27         0.03
                                                         *TOTALS*
   PEAK FLOW      (cms)=        0.05         0.01          0.046 (iii)
   TIME TO PEAK    (hrs)=       1.92         2.50           1.92
   RUNOFF VOLUME    (mm)=      23.97         2.25           5.93
   TOTAL RAINFALL   (mm)=      24.97        24.97          24.97
   RUNOFF COEFFICIENT   =       0.96         0.09           0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  59.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| STANDHYD (  1053)|   Area    (ha)=   1.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  23.00   Dir. Conn.(%)=  17.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=        0.23         0.77
   Dep. Storage     (mm)=        1.00         5.00
   Average Slope     (%)=        1.00         2.00
   Length            (m)=       81.65        40.00
   Mannings n          =       0.013        0.250

     NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
         0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
         0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
         0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
         0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
         0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
         0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
         0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
         0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
         0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
         0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
         1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

   Max.Eff.Inten.(mm/hr)=      63.46         3.06
```

```
             over (min)        5.00        35.00
     Storage Coeff.  (min)=       2.71 (ii)   31.18 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.29         0.03
                                                       *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.00         0.029 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.50          1.92
     RUNOFF VOLUME    (mm)=      23.97         2.25          5.92
     TOTAL RAINFALL   (mm)=      24.97        24.97         24.97
     RUNOFF COEFFICIENT   =       0.96         0.09          0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  59.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0906)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1051):     10.37   0.256     1.92     5.94
      + ID2= 2 (  1052):      1.64   0.046     1.92     5.93
        ====================================================
        ID = 3 (  0906):     12.01   0.302     1.92     5.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0906)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0906):     12.01   0.302     1.92     5.94
      + ID2= 2 (  1053):      1.00   0.029     1.92     5.92
        ====================================================
        ID = 1 (  0906):     13.01   0.330     1.92     5.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0906)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0906):     13.01   0.330     1.92     5.93
      + ID2= 2 (  0902):     17.85   0.152     1.92     3.79
        ====================================================
        ID = 3 (  0906):     30.86   0.482     1.92     4.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  1054)|   Area    (ha)=   0.92
|ID= 1 DT= 5.0 min |   Total Imp(%)=  23.00   Dir. Conn.(%)=  17.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
```

```
     Surface Area     (ha)=       0.21         0.71
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      78.32        40.00
     Mannings n          =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                 0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                 0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                 0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                 0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                 0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                 0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                 0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                 0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                 0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                 0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                 1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         3.06
                over (min)        5.00        35.00
     Storage Coeff.  (min)=       2.65 (ii)   31.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.29         0.03
                                                       *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.00         0.026 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.50          1.92
     RUNOFF VOLUME    (mm)=      23.97         2.25          5.92
     TOTAL RAINFALL   (mm)=      24.97        24.97         24.97
     RUNOFF COEFFICIENT   =       0.96         0.09          0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  59.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0910)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1054):      0.92   0.026     1.92     5.92
      + ID2= 2 (  0906):     30.86   0.482     1.92     4.70
        ====================================================
        ID = 3 (  0910):     31.78   0.509     1.92     4.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=   9.10   Curve Number   (CN)= 66.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
```

```
--------------------   U.H. Tp(hrs)=   0.59

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
               0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
               0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
               0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
               0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
               0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
               0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
               0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
               0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
               0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
               0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
               1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.589

     PEAK FLOW       (cms)=   0.045 (i)
     TIME TO PEAK    (hrs)=   2.583
     RUNOFF VOLUME    (mm)=   2.863
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.115

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0903)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0801 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
        ID1= 1 (  0103):     9.10   0.045     2.58     2.86
      + ID2= 2 (  0801):     0.00   0.000     0.00     0.00
        ====================================================
        ID = 3 (  0903):     9.10   0.045     2.58     2.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  1041)|   Area    (ha)=   5.61   Curve Number   (CN)= 59.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.74   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.37

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
               0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
               0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
               0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
               0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
               0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
               0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
               0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
               0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
               0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
               0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
               1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.579

     PEAK FLOW       (cms)=   0.025 (i)
     TIME TO PEAK    (hrs)=   2.333
     RUNOFF VOLUME    (mm)=   1.932
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.077

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0904)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1041):     5.61   0.025     2.33     1.93
      + ID2= 2 (  0903):     9.10   0.045     2.58     2.86
        ====================================================
        ID = 3 (  0904):    14.71   0.067     2.50     2.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  1042)|   Area    (ha)=   2.74   Curve Number   (CN)= 59.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.74   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.36

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
               0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
               0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
               0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
               0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
               0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
               0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
               0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
               0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
               0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
               0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
               1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.291

     PEAK FLOW       (cms)=   0.013 (i)
     TIME TO PEAK    (hrs)=   2.333
     RUNOFF VOLUME    (mm)=   1.932
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.077

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

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--------------------
| ADD HYD  (  0051)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1042):      2.74   0.013     2.33     1.93
      + ID2= 2 (  0904):     14.71   0.067     2.50     2.51
        ===================================================
        ID = 3 (  0051):     17.45   0.079     2.50     2.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0051):     17.45   0.079     2.50     2.42
      + ID2= 2 (  0910):     31.78   0.509     1.92     4.73
        ===================================================
        ID = 3 (  0052):     49.23   0.520     1.92     3.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0106)|   Area    (ha)=  12.90
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  16.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.64          8.26
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     293.26         40.00
     Mannings n          =       0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                               ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                 0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                 0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                 0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                 0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                 0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                 0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                 0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                 0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                 0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                 0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                 1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         25.66
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       5.84 (ii)    18.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=       0.20          0.06
                                                            *TOTALS*
     PEAK FLOW       (cms)=       0.29          0.33          0.414 (iii)
```

```
     TIME TO PEAK    (hrs)=       1.92          2.17          2.17
     RUNOFF VOLUME    (mm)=      23.97          9.79         12.06
     TOTAL RAINFALL   (mm)=      24.97         24.97         24.97
     RUNOFF COEFFICIENT   =       0.96          0.39          0.48

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0401)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.1240      0.4640
                          0.0210     0.2677   |   0.1340      0.4889
                          0.0210     0.2847   |   0.1430      0.5143
                          0.0220     0.3019   |   0.1520      0.5401
                          0.0220     0.3237   |   0.3340      0.5664
                          0.0230     0.3460   |   0.6770      0.5931
                          0.0680     0.3687   |   1.1390      0.6203
                          0.0860     0.3918   |   1.7230      0.6479
                          0.1010     0.4154   |   6.3030      0.7927
                          0.1130     0.4395   |   0.0000      0.0000

                               AREA     QPEAK     TPEAK        R.V.
                               (ha)     (cms)     (hrs)        (mm)
   INFLOW : ID= 2 (  0106)    12.900     0.414      2.17       12.06
   OUTFLOW: ID= 1 (  0401)    12.900     0.011      4.42       11.81

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.76
                  TIME SHIFT OF PEAK FLOW        (min)=135.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1458

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=   6.59   Curve Number   (CN)= 61.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.85   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.49

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                               ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                 0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                 0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                 0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                 0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                 0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                 0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                 0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                 0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                 0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                 0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
```

```
              1.000     2.50 | 2.000   26.96 | 3.000     2.22 |  4.00     1.20

     Unit Hyd Qpeak  (cms)=   0.514

     PEAK FLOW       (cms)=   0.028 (i)
     TIME TO PEAK    (hrs)=   2.500
     RUNOFF VOLUME    (mm)=   2.218
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.089

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0905)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0107):     6.59   0.028     2.50     2.22
      + ID2= 2 (  0401):    12.90   0.011     4.42    11.81
        ===================================================
        ID = 3 (  0905):    19.49   0.036     2.58     8.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  1111)|   Area    (ha)=   6.26   Curve Number   (CN)= 61.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.79   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.54

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                             ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
              0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
              0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
              0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
              0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
              0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
              0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
              0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
              0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
              0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
              0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
              1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.443

     PEAK FLOW       (cms)=   0.026 (i)
     TIME TO PEAK    (hrs)=   2.583
     RUNOFF VOLUME    (mm)=   2.307
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.092

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  1081)|   Area    (ha)=   1.03
```

```
|ID= 1 DT= 5.0 min |   Total Imp(%)=  25.00   Dir. Conn.(%)=  16.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.26         0.77
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      82.87        40.00
     Mannings n          =       0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                             ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
              0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
              0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
              0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
              0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
              0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
              0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
              0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
              0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
              0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
              0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
              1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         3.35
               over (min)        5.00        35.00
     Storage Coeff.  (min)=       2.74 (ii)    30.19 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.29         0.04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.00         0.028 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.50          1.92
     RUNOFF VOLUME    (mm)=      23.97         2.36          5.80
     TOTAL RAINFALL   (mm)=      24.97        24.97         24.97
     RUNOFF COEFFICIENT   =       0.96         0.09          0.23

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  59.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0907)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1081):     1.03   0.028     1.92     5.80
      + ID2= 2 (  1111):     6.26   0.026     2.58     2.31
        ===================================================
        ID = 3 (  0907):     7.29   0.032     2.50     2.80

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
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--------------------
| ADD HYD  (  0908)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0052):     49.23   0.520     1.92     3.91
      + ID2= 2 (  0905):     19.49   0.036     2.58     8.57
        ==================================================
        ID = 3 (  0908):     68.72   0.526     1.92     5.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0908)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0908):     68.72   0.526     1.92     5.23
      + ID2= 2 (  0907):      7.29   0.032     2.50     2.80
        ==================================================
        ID = 1 (  0908):     76.01   0.557     1.92     5.00

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  1112)|   Area    (ha)=   7.73   Curve Number   (CN)= 61.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.79   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.642

     PEAK FLOW       (cms)=   0.036 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=   2.307
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.092

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  1082)|   Area    (ha)=   0.92
|ID= 1 DT= 5.0 min |   Total Imp(%)=  25.00   Dir. Conn.(%)=  16.00
--------------------
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```
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        0.23         0.69
     Dep. Storage     (mm)=        1.00         5.00
     Average Slope     (%)=        1.00         2.00
     Length            (m)=       78.32        40.00
     Mannings n           =       0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                             ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         3.35
               over (min)        5.00        35.00
     Storage Coeff.  (min)=       2.65 (ii)    30.10 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.29         0.04
                                                             *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00            0.025 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.50             1.92
     RUNOFF VOLUME    (mm)=      23.97         2.36             5.80
     TOTAL RAINFALL   (mm)=      24.97        24.97            24.97
     RUNOFF COEFFICIENT   =       0.96         0.09             0.23

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  59.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0914)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1082):      0.92   0.025     1.92     5.80
      + ID2= 2 (  1112):      7.73   0.036     2.42     2.31
        ==================================================
        ID = 3 (  0914):      8.65   0.042     2.42     2.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0915)|
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|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0908):    76.01   0.557     1.92     5.00
      + ID2= 2 (  0914):     8.65   0.042     2.42     2.68
        ==================================================
        ID = 3 (  0915):    84.66   0.587     1.92     4.76

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  1113)|   Area    (ha)=   5.08   Curve Number   (CN)= 61.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.79   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.44

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.441

     PEAK FLOW      (cms)=   0.025 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=   2.307
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.092

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  1083)|   Area    (ha)=   0.89
|ID= 1 DT= 5.0 min |   Total Imp(%)=  25.00   Dir. Conn.(%)=  16.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.22          0.67
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      77.03         40.00
     Mannings n          =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         3.35
               over (min)         5.00        35.00
     Storage Coeff.  (min)=       2.62 (ii)   30.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.29         0.04
                                                           *TOTALS*
     PEAK FLOW      (cms)=        0.02         0.00          0.024 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.50           1.92
     RUNOFF VOLUME    (mm)=      23.97         2.36           5.80
     TOTAL RAINFALL   (mm)=      24.97        24.97          24.97
     RUNOFF COEFFICIENT   =       0.96         0.09           0.23

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  59.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0916)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1083):     0.89   0.024     1.92     5.80
      + ID2= 2 (  1113):     5.08   0.025     2.42     2.31
        ==================================================
        ID = 3 (  0916):     5.97   0.030     2.42     2.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0917)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0915):    84.66   0.587     1.92     4.76
      + ID2= 2 (  0916):     5.97   0.030     2.42     2.83
        ==================================================
        ID = 3 (  0917):    90.63   0.615     1.92     4.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  1114)|   Area    (ha)=   4.81   Curve Number   (CN)= 61.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.79   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50
```

```
     NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                   ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
         0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
         0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
         0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
         0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
         0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
         0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
         0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
         0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
         0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
         0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
         1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

   Unit Hyd Qpeak  (cms)=   0.367

   PEAK FLOW       (cms)=   0.021 (i)
   TIME TO PEAK    (hrs)=   2.500
   RUNOFF VOLUME    (mm)=   2.307
   TOTAL RAINFALL   (mm)=  24.971
   RUNOFF COEFFICIENT   =   0.092

   (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  1084)|   Area    (ha)=   1.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  25.00   Dir. Conn.(%)=  16.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
   Surface Area     (ha)=       0.26         0.79
   Dep. Storage     (mm)=       1.00         5.00
   Average Slope     (%)=       1.00         2.00
   Length            (m)=      83.67        40.00
   Mannings n          =       0.013        0.250

     NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                   ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
         0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
         0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
         0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
         0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
         0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
         0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
         0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
         0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
         0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
         0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
         1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

   Max.Eff.Inten.(mm/hr)=      63.46         3.35
              over (min)       5.00        35.00
```

```
     Storage Coeff.  (min)=       2.75 (ii)   30.21 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.28         0.04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.00         0.028 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.50         1.92
     RUNOFF VOLUME    (mm)=      23.97         2.36         5.80
     TOTAL RAINFALL   (mm)=      24.97        24.97        24.97
     RUNOFF COEFFICIENT   =       0.96         0.09         0.23

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
               YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  59.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0918)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1084):     1.05   0.028     1.92     5.80
      + ID2= 2 (  1114):     4.81   0.021     2.50     2.31
        ==================================================
        ID = 3 (  0918):     5.86   0.031     1.92     2.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0919)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0917):    90.63   0.615     1.92     4.63
      + ID2= 2 (  0918):     5.86   0.031     1.92     2.93
        ==================================================
        ID = 3 (  0919):    96.49   0.646     1.92     4.53

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  1115)|   Area    (ha)=  26.55   Curve Number   (CN)= 61.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.79   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.13

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                   ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
         0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
         0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
         0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
         0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
         0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
         0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
```

```
                0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.897

     PEAK FLOW       (cms)=   0.065 (i)
     TIME TO PEAK    (hrs)=   3.333
     RUNOFF VOLUME    (mm)=   2.307
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.092

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0920)|
|   1 +  2 =  3    |         AREA    QPEAK     TPEAK     R.V.
--------------------         (ha)    (cms)     (hrs)     (mm)
        ID1= 1 (  1115):    26.55   0.065      3.33      2.31
      + ID2= 2 (  0919):    96.49   0.646      1.92      4.53
        ==================================================
        ID = 3 (  0920):   123.04   0.648      1.92      4.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  1091)|   Area    (ha)=   0.87
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  23.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        0.25         0.62
     Dep. Storage     (mm)=        1.00         5.00
     Average Slope     (%)=        1.00         2.00
     Length            (m)=       76.16        40.00
     Mannings n          =       0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                  ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         3.11
                over (min)        5.00        35.00
     Storage Coeff.  (min)=       2.60 (ii)   30.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
```

```
     Unit Hyd. peak  (cms)=       0.29         0.04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.00         0.034 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.50          1.92
     RUNOFF VOLUME    (mm)=      23.97         2.26          7.24
     TOTAL RAINFALL   (mm)=      24.97        24.97         24.97
     RUNOFF COEFFICIENT   =       0.96         0.09          0.29

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  59.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  1092)|   Area    (ha)=   0.42
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  23.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        0.12         0.30
     Dep. Storage     (mm)=        1.00         5.00
     Average Slope     (%)=        1.00         2.00
     Length            (m)=       52.92        40.00
     Mannings n          =       0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                  ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         3.11
                over (min)        5.00        35.00
     Storage Coeff.  (min)=       2.09 (ii)   30.39 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.31         0.04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00         0.017 (iii)
     TIME TO PEAK    (hrs)=       1.92         2.50          1.92
     RUNOFF VOLUME    (mm)=      23.97         2.26          7.21
     TOTAL RAINFALL   (mm)=      24.97        24.97         24.97
     RUNOFF COEFFICIENT   =       0.96         0.09          0.29

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  59.0    Ia = Dep. Storage  (Above)
```

```
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0912)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1091):     0.87   0.034     1.92     7.24
      + ID2= 2 (  1092):     0.42   0.017     1.92     7.21
        ===================================================
        ID = 3 (  0912):     1.29   0.050     1.92     7.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  1093)|   Area    (ha)=   0.41
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  23.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.29
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      52.28        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
               0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
               0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
               0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
               0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
               0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
               0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
               0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
               0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
               0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
               0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
               1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         3.11
                over (min)        5.00        35.00
     Storage Coeff.  (min)=       2.08 (ii)   30.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.31         0.04
                                                           *TOTALS*
     PEAK FLOW      (cms)=        0.02         0.00          0.016 (iii)
     TIME TO PEAK   (hrs)=        1.92         2.50           1.92
     RUNOFF VOLUME   (mm)=       23.97         2.26           7.21
     TOTAL RAINFALL  (mm)=       24.97        24.97          24.97
     RUNOFF COEFFICIENT   =       0.96         0.09           0.29

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  59.0    Ia = Dep. Storage  (Above)
```

```
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0921)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1093):     0.41   0.016     1.92     7.21
      + ID2= 2 (  0912):     1.29   0.050     1.92     7.23
        ===================================================
        ID = 3 (  0921):     1.70   0.067     1.92     7.22

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  1094)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  23.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.16
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      38.30        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
               0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
               0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
               0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
               0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
               0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
               0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
               0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
               0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
               0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
               0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
               1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46         3.11
                over (min)        5.00        35.00
     Storage Coeff.  (min)=       1.72 (ii)   30.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=       0.32         0.04
                                                           *TOTALS*
     PEAK FLOW      (cms)=        0.01         0.00          0.009 (iii)
     TIME TO PEAK   (hrs)=        1.92         2.50           1.92
     RUNOFF VOLUME   (mm)=       23.97         2.26           7.17
     TOTAL RAINFALL  (mm)=       24.97        24.97          24.97
     RUNOFF COEFFICIENT   =       0.96         0.09           0.29

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  59.0    Ia = Dep. Storage  (Above)
```

```
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0922)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  1094):     0.22   0.009     1.92     7.17
      + ID2= 2 (  0921):     1.70   0.067     1.92     7.22
        ===================================================
        ID = 3 (  0922):     1.92   0.076     1.92     7.22

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0909)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0920):   123.04   0.648     1.92     4.05
      + ID2= 2 (  0922):     1.92   0.076     1.92     7.22
        ===================================================
        ID = 3 (  0909):   124.96   0.723     1.92     4.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0112)|   Area    (ha)=   4.67   Curve Number   (CN)= 57.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.36   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                  ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
                0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
                0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
                0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
                0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
                0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
                0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
                0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.324

     PEAK FLOW       (cms)=   0.014 (i)
     TIME TO PEAK    (hrs)=   2.583
     RUNOFF VOLUME    (mm)=   1.691
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.068

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0911)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0112):     4.67   0.014     2.58     1.69
      + ID2= 2 (  0909):   124.96   0.723     1.92     4.10
        ===================================================
        ID = 3 (  0911):   129.63   0.724     1.92     4.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

```
==================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L            (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\ba206ad4-517a-4f24-83f3-7ad02435eab3\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\ba206ad4-517a-4f24-83f3-7ad02435eab3\s


DATE: 03-13-2023                           TIME: 05:25:35

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 001 - OWEN SOUND CHIC25MM **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                 min     ha  '  cms   hrs     mm          cms

      START @  0.00 hrs
      -------------------
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.05  2.83   2.86 0.11   0.000
    [CN=66.7        ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.10  1.92   6.09 0.24   0.000
    [I%=18.0:S%= 2.00]
```

```
*
    DUHYD                 0801  1  5.0    3.70    0.10  1.92   6.09  n/a   0.000
       MAJOR SYSTEM:      0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:      0801  3  5.0    3.70    0.10  1.92   6.09  n/a   0.000
*
    ADD [  0101+  0801]   0901  3  5.0   16.79    0.11  1.92   3.57  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        0102  1  5.0    1.06    0.04  1.92   7.27 0.29   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]   0902  3  5.0   17.85    0.15  1.92   3.79  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        1051  1  5.0   10.37    0.26  1.92   5.94 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        1052  1  5.0    1.64    0.05  1.92   5.93 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        1053  1  5.0    1.00    0.03  1.92   5.92 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3  5.0   12.01    0.30  1.92   5.94  n/a   0.000
*
    ADD [  0906+  1053]   0906  1  5.0   13.01    0.33  1.92   5.93  n/a   0.000
*
    ADD [  0906+  0902]   0906  3  5.0   30.86    0.48  1.92   4.70  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        1054  1  5.0    0.92    0.03  1.92   5.92 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]   0910  3  5.0   31.78    0.51  1.92   4.73  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
```

```
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.04  2.58   2.86 0.11   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.04  2.58   2.86  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.03  2.33   1.93 0.08   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.07  2.50   2.51  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.01  2.33   1.93 0.08   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    0.08  2.50   2.42  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    0.52  1.92   3.91  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    0.41  2.17  12.06 0.48   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.01  4.42  11.81  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.03  2.50   2.22 0.09   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.04  2.58   8.57  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.03  2.58   2.31 0.09   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.03  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.03  2.50   2.80  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    0.53  1.92   5.23  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    0.56  1.92   5.00  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.04  2.42   2.31 0.09   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.02  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.04  2.42   2.68  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    0.59  1.92   4.76  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.02  2.42   2.31 0.09   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.02  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.03  2.42   2.83  n/a   0.000
```

```
*
    ADD [  0915+  0916]  0917  3  5.0    90.63    0.61  1.92   4.63  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD          1114  1  5.0     4.81    0.02  2.50   2.31 0.09   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        1084  1  5.0     1.05    0.03  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0     5.86    0.03  1.92   2.93  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0    96.49    0.65  1.92   4.53  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD          1115  1  5.0    26.55    0.06  3.33   2.31 0.09   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0   123.04    0.65  1.92   4.05  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        1091  1  5.0     0.87    0.03  1.92   7.24 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        1092  1  5.0     0.42    0.02  1.92   7.21 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0     1.29    0.05  1.92   7.23  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        1093  1  5.0     0.41    0.02  1.92   7.21 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0     1.70    0.07  1.92   7.22  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD        1094  1  5.0     0.22    0.01  1.92   7.17 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0     1.92    0.08  1.92   7.22  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0   124.96    0.72  1.92   4.10  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD          0112  1  5.0     4.67    0.01  2.58   1.69 0.07   0.000
    [CN=57.7        ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0   129.63    0.72  1.92   4.01  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L               (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\9db6aa29-0b9d-4573-a212-a733f694fe01\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\9db6aa29-0b9d-4573-a212-a733f694fe01\s


DATE: 03-13-2023                           TIME: 05:25:30

USER:
```

COMMENTS: ____

```
  ************************************************
  ** SIMULATION : RUN 002 - Chicago-2yr 4hr 10m **
  ************************************************

  W/E COMMAND            HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                 min      ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.08  2.33    5.18 0.16    0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.15  1.33    9.01 0.27    0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.15  1.33    9.01  n/a    0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00    0.00  n/a    0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.15  1.33    9.01  n/a    0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.15  1.33    6.03  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.06  1.33   10.45 0.32    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.21  1.33    6.29  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.37  1.33    8.83 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.06  1.33    8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.04  1.33    8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.43  1.33    8.83  n/a    0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.47  1.33    8.83  n/a    0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    0.69  1.33    7.36  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.04  1.33    8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    0.72  1.33    7.40  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.06  2.08    5.18 0.16    0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.06  2.08    5.18  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.04  1.75    3.67 0.11    0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.10  1.92    4.61  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.02  1.75    3.67 0.11    0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    0.11  1.92    4.46  n/a    0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    0.74  1.33    6.36  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    0.68  1.33   17.87 0.55    0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.02  4.42   17.62  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.04  1.92    4.10 0.13    0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.05  2.00   13.05  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.04  2.00    4.25 0.13    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
```

```
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.04  1.33   8.70 0.27   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.05  1.92   4.88  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    0.75  1.33   8.26  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    0.80  1.33   7.93  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.05  1.92   4.25 0.13   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.03  1.33   8.70 0.27   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.06  1.83   4.73  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    0.84  1.33   7.61  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.03  1.83   4.25 0.13   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.03  1.33   8.70 0.27   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.04  1.83   4.92  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    0.88  1.33   7.43  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.03  1.92   4.25 0.13   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.04  1.33   8.70 0.27   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.04  1.33   5.05  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    0.92  1.33   7.28  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.10  2.92   4.25 0.13   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    0.93  1.33   6.63  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.05  1.33  10.50 0.32   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.02  1.33  10.48 0.32   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.07  1.33  10.49  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.02  1.33  10.48 0.32   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.09  1.33  10.49  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01  1.33  10.45 0.32   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.10  1.33  10.49  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.03  1.33   6.69  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.02  2.08   3.29 0.10   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    1.03  1.33   6.57  n/a   0.000
*
================================================================================
==========================


      V    V   I    SSSSS  U   U    A    L               (v 6.2.2011)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

```
                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\3a1c8a39-77a9-4c7a-a5b3-30156b75d908\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\3a1c8a39-77a9-4c7a-a5b3-30156b75d908\s


DATE: 03-13-2023                          TIME: 05:25:29

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 003 - Chicago-5yr 4hr 10m **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                 min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.14  2.25   9.31 0.21   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.21  1.33  13.72 0.31   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.21  1.33  13.72  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.21  1.33  13.72  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.22  1.33  10.28  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.08  1.33  15.45 0.35   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.30  1.33  10.59  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.52  1.33  13.53 0.31   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.09  1.33  13.52 0.31   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.06  1.33  13.52 0.31   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.61  1.33  13.53  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.67  1.33  13.53  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    0.96  1.33  11.83  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.05  1.33  13.52 0.31   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    1.02  1.33  11.88  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.12  2.00   9.31 0.21   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.12  2.00   9.31  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.07  1.75   6.88 0.16   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.18  1.92   8.38  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.03  1.75   6.88 0.16   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    0.21  1.83   8.15  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    1.06  1.33  10.55  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.05  1.50  26.71 0.61   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.02  3.50  26.45  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
```

```
 *  CALIB NASHYD         0107  1  5.0    6.59    0.08  1.92   7.52 0.17   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.09  1.92  20.05  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.07  2.00   7.78 0.18   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.05  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.08  1.92   8.57  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    1.08  1.33  13.25  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    1.14  1.33  12.80  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.10  1.83   7.78 0.18   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.05  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.11  1.83   8.38  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    1.21  1.33  12.35  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.07  1.83   7.78 0.18   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.05  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.08  1.75   8.62  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    1.27  1.33  12.10  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.06  1.92   7.78 0.18   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.06  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.07  1.83   8.79  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    1.33  1.33  11.90  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.19  2.83   7.78 0.18   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    1.34  1.33  11.01  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.06  1.33  15.67 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.03  1.33  15.65 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.09  1.33  15.66  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03  1.33  15.65 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.13  1.33  15.66  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  15.64 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.14  1.33  15.66  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.48  1.33  11.08  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.04  2.00   6.26 0.14   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    1.49  1.33  10.91  n/a   0.000
*
================================================================================
==========================
```

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

Developed and Distributed by Smart City Water Inc

***** S U M M A R Y   O U T P U T *****

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b90c857c-c082-41d0-9514-4ce08f02e0e0\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b90c857c-c082-41d0-9514-4ce08f02e0e0\s


DATE: 03-13-2023                             TIME: 05:25:31

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 004 - Chicago-10yr 4hr 10 **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 ** CALIB NASHYD          0101  1  5.0    13.09    0.20  2.25  12.51 0.25   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        0110  1  5.0     3.70    0.25  1.33  17.19 0.34   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                 0801  1  5.0     3.70    0.25  1.33  17.19  n/a   0.000
       MAJOR SYSTEM:      0801  2  5.0     0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:      0801  3  5.0     3.70    0.25  1.33  17.19  n/a   0.000
*
    ADD [  0101+  0801]   0901  3  5.0    16.79    0.27  1.33  13.54  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        0102  1  5.0     1.06    0.10  1.33  19.07 0.37   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]   0902  3  5.0    17.85    0.37  1.33  13.87  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1051  1  5.0    10.37    0.64  1.33  16.99 0.33   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1052  1  5.0     1.64    0.11  1.33  16.99 0.33   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1053  1  5.0     1.00    0.07  1.33  16.98 0.33   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3  5.0    12.01    0.75  1.33  16.99  n/a   0.000
*
    ADD [  0906+  1053]   0906  1  5.0    13.01    0.82  1.33  16.99  n/a   0.000
*
    ADD [  0906+  0902]   0906  3  5.0    30.86    1.18  1.33  15.18  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1054  1  5.0     0.92    0.06  1.33  16.98 0.33   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]   0910  3  5.0    31.78    1.24  1.33  15.24  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD          0103  1  5.0     9.10    0.16  2.00  12.51 0.25   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]   0903  3  5.0     9.10    0.16  2.00  12.51  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD          1041  1  5.0     5.61    0.10  1.75   9.42 0.18   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]   0904  3  5.0    14.71    0.25  1.92  11.33  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD          1042  1  5.0     2.74    0.05  1.75   9.42 0.18   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
```

```
    ADD [  1042+  0904]  0051  3  5.0    17.45    0.29  1.83  11.03  n/a    0.000
*
    ADD [  0051+  0910]  0052  3  5.0    49.23    1.31  1.33  13.75  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0    12.90    1.34  1.50  32.86 0.64    0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0    12.90    0.08  4.17  32.56  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         0107  1  5.0     6.59    0.11  1.92  10.21 0.20    0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0    19.49    0.13  1.92  25.00  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1111  1  5.0     6.26    0.10  2.00  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0     1.03    0.07  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0     7.29    0.12  1.83  11.44  n/a    0.000
*
    ADD [  0052+  0905]  0908  3  5.0    68.72    1.33  1.33  16.94  n/a    0.000
*
    ADD [  0908+  0907]  0908  1  5.0    76.01    1.41  1.33  16.41  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1112  1  5.0     7.73    0.13  1.83  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0     0.92    0.06  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0     8.65    0.15  1.83  11.22  n/a    0.000
*
    ADD [  0908+  0914]  0915  3  5.0    84.66    1.50  1.33  15.88  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1113  1  5.0     5.08    0.09  1.83  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
```

```
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0     0.89    0.06  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0     5.97    0.11  1.75  11.49  n/a    0.000
*
    ADD [  0915+  0916]  0917  3  5.0    90.63    1.57  1.33  15.59  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1114  1  5.0     4.81    0.08  1.92  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0     1.05    0.07  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0     5.86    0.10  1.83  11.68  n/a    0.000
*
    ADD [  0917+  0918]  0919  3  5.0    96.49    1.65  1.33  15.35  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1115  1  5.0    26.55    0.25  2.83  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0   123.04    1.66  1.33  14.32  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0     0.87    0.08  1.33  19.41 0.38    0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0     0.42    0.04  1.33  19.41 0.38    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0     1.29    0.11  1.33  19.41  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0     0.41    0.04  1.33  19.40 0.38    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0     1.70    0.15  1.33  19.41  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0     0.22    0.02  1.33  19.38 0.38    0.000
    [I%=23.0:S%= 2.00]
```

```
*
   ADD [  1094+  0921]  0922  3  5.0    1.92    0.17  1.33  19.40  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    1.83  1.33  14.39  n/a   0.000
*
   CHIC STORM                   10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD         0112  1  5.0    4.67    0.06  2.00   8.63 0.17   0.000
   [CN=57.7         ]
   [ N = 3.0:Tp 0.55]
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    1.84  1.33  14.19  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\6e00b64d-10a3-4101-9612-7185121be678\s
  Summary     filename:     C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\6e00b64d-10a3-4101-9612-7185121be678\s


DATE: 03-13-2023                           TIME: 05:25:29

USER:


COMMENTS: ____________________________________________________________


  *************************************************
  ** SIMULATION : RUN 005 - Chicago-25yr 4hr 10 **
  *************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                  min      ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
   CHIC STORM                   10.0
   [ Ptot= 60.03 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.27  2.25  16.95 0.28   0.000
```

```
   [CN=66.7         ]
   [ N = 3.0:Tp 0.75]
*
   CHIC STORM                   10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       0110  1  5.0    3.70    0.30  1.33  21.85 0.36   0.000
   [I%=18.0:S%= 2.00]
*
   DUHYD                0801  1  5.0    3.70    0.30  1.33  21.85  n/a   0.000
      MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     0801  3  5.0    3.70    0.30  1.33  21.85  n/a   0.000
*
   ADD [  0101+  0801]  0901  3  5.0   16.79    0.33  2.08  18.03  n/a   0.000
*
   CHIC STORM                   10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       0102  1  5.0    1.06    0.12  1.33  23.88 0.40   0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  0102+  0901]  0902  3  5.0   17.85    0.45  1.33  18.37  n/a   0.000
*
   CHIC STORM                   10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1051  1  5.0   10.37    0.78  1.33  21.65 0.36   0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                   10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1052  1  5.0    1.64    0.14  1.33  21.65 0.36   0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                   10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1053  1  5.0    1.00    0.09  1.33  21.65 0.36   0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1051+  1052]  0906  3  5.0   12.01    0.92  1.33  21.65  n/a   0.000
*
   ADD [  0906+  1053]  0906  1  5.0   13.01    1.01  1.33  21.65  n/a   0.000
*
   ADD [  0906+  0902]  0906  3  5.0   30.86    1.46  1.33  19.76  n/a   0.000
*
   CHIC STORM                   10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1054  1  5.0    0.92    0.08  1.33  21.64 0.36   0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1054+  0906]  0910  3  5.0   31.78    1.53  1.33  19.81  n/a   0.000
*
   CHIC STORM                   10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         0103  1  5.0    9.10    0.22  2.00  16.94 0.28   0.000
   [CN=66.7         ]
   [ N = 3.0:Tp 0.59]
*
   ADD [  0103+  0801]  0903  3  5.0    9.10    0.22  2.00  16.94  n/a   0.000
*
```

```
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.14  1.75  13.01 0.22   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.34  1.92  15.44  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.07  1.67  13.01 0.22   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    0.41  1.83  15.06  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    1.63  1.33  18.13  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.72  1.50  40.75 0.68   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.11  4.08  40.44  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.15  1.92  13.99 0.23   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.20  2.17  31.50  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.13  1.92  14.42 0.24   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.08  1.33  21.60 0.36   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.16  1.83  15.43  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    1.66  1.33  21.92  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    1.77  1.33  21.30  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.19  1.83  14.42 0.24   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.08  1.33  21.60 0.36   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.21  1.83  15.18  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    1.89  1.33  20.67  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.13  1.83  14.42 0.24   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.07  1.33  21.60 0.36   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.15  1.75  15.49  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    1.99  1.33  20.33  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.11  1.92  14.42 0.24   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.09  1.33  21.60 0.36   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.14  1.83  15.71  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    2.09  1.33  20.05  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.35  2.83  14.42 0.24   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    2.12  1.83  18.84  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.09  1.33  24.40 0.41   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.05  1.33  24.40 0.41   0.000
    [I%=23.0:S%= 2.00]
```

```
*
   ADD [  1091+  1092]  0912  3  5.0    1.29    0.14  1.33  24.40  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1093  1  5.0    0.41    0.04  1.33  24.40 0.41   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1093+  0912]  0921  3  5.0    1.70    0.19  1.33  24.40  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  24.38 0.41   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0    1.92    0.21  1.33  24.40  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    2.32  1.33  18.92  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         0112  1  5.0    4.67    0.08  2.00  12.01 0.20   0.000
   [CN=57.7          ]
   [ N = 3.0:Tp 0.55]
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    2.33  1.33  18.67  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\a37ea194-715c-43ab-9642-a314c3905862\s
  Summary     filename:     C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\a37ea194-715c-43ab-9642-a314c3905862\s


DATE: 03-13-2023                           TIME: 05:25:30

USER:
```

```
COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 006 - Chicago-50yr 4hr 10 **
  ************************************************

  W/E COMMAND               HYD ID   DT      AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                     min      ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.33  2.25  20.60 0.31   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.37  1.33  25.61 0.38   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.37  1.33  25.61  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.37  1.33  25.61  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.40  1.33  21.70  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.14  1.33  27.74 0.41   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.54  1.33  22.06  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.90  1.33  25.42 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.16  1.33  25.42 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.10  1.33  25.41 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.06  1.33  25.42  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.15  1.33  25.42  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    1.69  1.33  23.48  n/a   0.000
*
    CHIC STORM                 10.0
```

```
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1054  1  5.0    0.92    0.09  1.33  25.41 0.38    0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1054+  0906]  0910  3  5.0   31.78    1.78  1.33  23.53  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         0103  1  5.0    9.10    0.27  2.00  20.60 0.31    0.000
   [CN=66.7          ]
   [ N = 3.0:Tp 0.59]
*
   ADD [  0103+  0801]  0903  3  5.0    9.10    0.27  2.00  20.60  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         1041  1  5.0    5.61    0.17  1.75  16.01 0.24    0.000
   [CN=59.6          ]
   [ N = 3.0:Tp 0.37]
*
   ADD [  1041+  0903]  0904  3  5.0   14.71    0.42  1.83  18.85  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         1042  1  5.0    2.74    0.09  1.67  16.01 0.24    0.000
   [CN=59.6          ]
   [ N = 3.0:Tp 0.36]
*
   ADD [  1042+  0904]  0051  3  5.0   17.45    0.50  1.83  18.41  n/a    0.000
*
   ADD [  0051+  0910]  0052  3  5.0   49.23    1.90  1.33  21.72  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       0106  1  5.0   12.90    2.03  1.42  46.87 0.70    0.000
   [I%=16.0:S%= 2.00]
*
 ** Reservoir
   OUTFLOW:             0401  1  5.0   12.90    0.14  4.08  46.55  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         0107  1  5.0    6.59    0.18  1.92  17.14 0.26    0.000
   [CN=61.0          ]
   [ N = 3.0:Tp 0.49]
*
   ADD [  0107+  0401]  0905  3  5.0   19.49    0.27  2.08  36.61  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         1111  1  5.0    6.26    0.17  1.92  17.64 0.26    0.000
   [CN=61.9          ]
   [ N = 3.0:Tp 0.54]
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
```

```
 * CALIB STANDHYD       1081  1  5.0    1.03    0.10  1.33  25.40 0.38    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1081+  1111]  0907  3  5.0    7.29    0.19  1.83  18.74  n/a    0.000
*
   ADD [  0052+  0905]  0908  3  5.0   68.72    1.95  1.33  25.94  n/a    0.000
*
   ADD [  0908+  0907]  0908  1  5.0   76.01    2.07  1.33  25.25  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         1112  1  5.0    7.73    0.23  1.83  17.64 0.26    0.000
   [CN=61.9          ]
   [ N = 3.0:Tp 0.46]
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1082  1  5.0    0.92    0.09  1.33  25.40 0.38    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1082+  1112]  0914  3  5.0    8.65    0.26  1.83  18.47  n/a    0.000
*
   ADD [  0908+  0914]  0915  3  5.0   84.66    2.21  1.33  24.56  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         1113  1  5.0    5.08    0.16  1.83  17.64 0.26    0.000
   [CN=61.9          ]
   [ N = 3.0:Tp 0.44]
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1083  1  5.0    0.89    0.08  1.33  25.40 0.38    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1083+  1113]  0916  3  5.0    5.97    0.18  1.75  18.80  n/a    0.000
*
   ADD [  0915+  0916]  0917  3  5.0   90.63    2.33  1.33  24.18  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         1114  1  5.0    4.81    0.13  1.92  17.64 0.26    0.000
   [CN=61.9          ]
   [ N = 3.0:Tp 0.50]
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1084  1  5.0    1.05    0.10  1.33  25.40 0.38    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1084+  1114]  0918  3  5.0    5.86    0.17  1.83  19.03  n/a    0.000
*
   ADD [  0917+  0918]  0919  3  5.0   96.49    2.46  1.33  23.86  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         1115  1  5.0   26.55    0.43  2.83  17.64 0.26    0.000
```

```
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    2.63  1.83  22.52  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.11  1.33  28.41 0.42   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.05  1.33  28.40 0.42   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.16  1.33  28.40  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.05  1.33  28.39 0.42   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.21  1.33  28.40  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.03  1.33  28.38 0.42   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.24  1.33  28.40  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    2.71  1.33  22.61  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.10  2.00  14.84 0.22   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    2.78  1.83  22.33  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\e702ffac-6f95-4d02-975d-67484fc8de46\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\e702ffac-6f95-4d02-975d-67484fc8de46\s


DATE: 03-13-2023                            TIME: 05:25:31

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 007 - Chicago-100yr 4hr 1 **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                   min      ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.39  2.25  24.35 0.33   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.42  1.33  29.41 0.40   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.42  1.33  29.41  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.42  1.33  29.41  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.47  2.08  25.46  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.15  1.33  31.61 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.61  1.33  25.83  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.10  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
```

```
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.18  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.11  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.28  1.33  29.23  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.39  1.33  29.23  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.01  1.33  27.26  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.10  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    2.11  1.33  27.32  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.32  2.00  24.34 0.33   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.32  2.00  24.34  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.21  1.75  19.12 0.26   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.51  1.83  22.35  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.10  1.67  19.12 0.26   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    0.60  1.83  21.85  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    2.26  1.33  25.38  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.91  1.33  52.88 0.72   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.18  3.83  52.55  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
```

```
 *  CALIB NASHYD         0107  1  5.0    6.59    0.22  1.83  20.39 0.28   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.33  2.00  41.67  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.20  1.92  20.97 0.29   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.11  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.23  1.83  22.14  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    2.31  1.33  30.00  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    2.46  1.33  29.25  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.28  1.83  20.97 0.29   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.10  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.31  1.75  21.85  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    2.63  1.33  28.49  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.19  1.83  20.97 0.29   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.10  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.22  1.75  22.20  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    2.77  1.33  28.08  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.16  1.92  20.97 0.29   0.000
    [CN=61.9          ]
```

```
   [ N = 3.0:Tp 0.50]
*
   CHIC STORM              10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1084  1  5.0    1.05    0.11  1.33  29.25 0.40   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1084+  1114]  0918  3  5.0    5.86    0.20  1.83  22.45  n/a   0.000
*
   ADD [  0917+  0918]  0919  3  5.0   96.49    2.92  1.33  27.74  n/a   0.000
*
   CHIC STORM              10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB NASHYD         1115  1  5.0   26.55    0.51  2.75  20.97 0.29   0.000
   [CN=61.9        ]
   [ N = 3.0:Tp 1.13]
*
   ADD [  1115+  0919]  0920  3  5.0  123.04    3.12  1.83  26.28  n/a   0.000
*
   CHIC STORM              10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1091  1  5.0    0.87    0.12  1.33  32.43 0.44   0.000
   [I%=23.0:S%= 2.00]
*
   CHIC STORM              10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1092  1  5.0    0.42    0.06  1.33  32.43 0.44   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1091+  1092]  0912  3  5.0    1.29    0.18  1.33  32.43  n/a   0.000
*
   CHIC STORM              10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1093  1  5.0    0.41    0.06  1.33  32.43 0.44   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1093+  0912]  0921  3  5.0    1.70    0.24  1.33  32.43  n/a   0.000
*
   CHIC STORM              10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1094  1  5.0    0.22    0.03  1.33  32.41 0.44   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0    1.92    0.27  1.33  32.43  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    3.21  1.33  26.37  n/a   0.000
*
   CHIC STORM              10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB NASHYD         0112  1  5.0    4.67    0.12  2.00  17.78 0.24   0.000
   [CN=57.7        ]
   [ N = 3.0:Tp 0.55]
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    3.31  1.83  26.06  n/a   0.000
*
===================================================================================
==========================
```

```
      V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O     T      T    H   H   Y Y   MM MM  O   O
      O   O     T      T    H   H    Y    M   M  O   O
       OOO      T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\a463d149-90d9-4529-ab57-8986eef369ee\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\a463d149-90d9-4529-ab57-8986eef369ee\s


DATE: 03-13-2023                           TIME: 05:25:34

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 008 - SCS-2yr 24hr 15min  **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min      ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM               15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.17 12.92  13.65 0.26   0.000
    [CN=66.7        ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM               15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.15 12.25  18.39 0.34   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.15 12.25  18.39  n/a   0.000
```

```
      MAJOR SYSTEM:     0801  2  5.0     0.00    0.00  0.00   0.00  n/a    0.000
      MINOR SYSTEM:     0801  3  5.0     3.70    0.15 12.25  18.39  n/a    0.000
*
   ADD [  0101+  0801]  0901  3  5.0    16.79    0.22 12.75  14.69  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0     1.06    0.05 12.25  20.32 0.38   0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  0102+  0901]  0902  3  5.0    17.85    0.26 12.25  15.03  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0    10.37    0.39 12.25  18.20 0.34   0.000
   [I%=17.0:S%= 2.00]
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0     1.64    0.07 12.25  18.19 0.34   0.000
   [I%=17.0:S%= 2.00]
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0     1.00    0.04 12.25  18.19 0.34   0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1051+  1052]  0906  3  5.0    12.01    0.46 12.25  18.20  n/a    0.000
*
   ADD [  0906+  1053]  0906  1  5.0    13.01    0.50 12.25  18.20  n/a    0.000
*
   ADD [  0906+  0902]  0906  3  5.0    30.86    0.76 12.25  16.36  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0     0.92    0.04 12.25  18.19 0.34   0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1054+  0906]  0910  3  5.0    31.78    0.79 12.25  16.42  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0     9.10    0.14 12.75  13.65 0.26   0.000
   [CN=66.7         ]
   [ N = 3.0:Tp 0.59]
*
   ADD [  0103+  0801]  0903  3  5.0     9.10    0.14 12.75  13.65  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0     5.61    0.09 12.50  10.33 0.19   0.000
   [CN=59.6         ]
   [ N = 3.0:Tp 0.37]
*
   ADD [  1041+  0903]  0904  3  5.0    14.71    0.22 12.67  12.38  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0     2.74    0.05 12.50  10.33 0.19   0.000
   [CN=59.6         ]
   [ N = 3.0:Tp 0.36]
*
   ADD [  1042+  0904]  0051  3  5.0    17.45    0.26 12.58  12.06  n/a    0.000
*
   ADD [  0051+  0910]  0052  3  5.0    49.23    0.93 12.25  14.87  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0    12.90    1.04 12.25  34.94 0.65   0.000
   [I%=16.0:S%= 2.00]
*
 ** Reservoir
   OUTFLOW:             0401  1  5.0    12.90    0.03 20.33  34.45  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0     6.59    0.09 12.67  11.18 0.21   0.000
   [CN=61.0         ]
   [ N = 3.0:Tp 0.49]
*
   ADD [  0107+  0401]  0905  3  5.0    19.49    0.11 12.67  26.58  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot= 53.41 mm ]
   fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
```

```
 *  CALIB NASHYD        1111  1  5.0    6.26    0.09 12.75  11.53 0.22   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1081  1  5.0    1.03    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.10 12.67  12.46  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    0.99 12.25  18.19  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    1.07 12.25  17.64  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1112  1  5.0    7.73    0.12 12.58  11.53 0.22   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1082  1  5.0    0.92    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.14 12.58  12.23  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    1.16 12.25  17.09  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1113  1  5.0    5.08    0.08 12.58  11.53 0.22   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1083  1  5.0    0.89    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.10 12.50  12.51  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    1.24 12.25  16.79  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1114  1  5.0    4.81    0.07 12.67  11.53 0.22   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1084  1  5.0    1.05    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.09 12.58  12.71  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    1.32 12.25  16.54  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1115  1  5.0   26.55    0.21 13.42  11.53 0.22   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    1.41 12.58  15.46  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1091  1  5.0    0.87    0.05 12.25  20.71 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1092  1  5.0    0.42    0.02 12.25  20.70 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.07 12.25  20.71  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1093  1  5.0    0.41    0.02 12.25  20.70 0.39   0.000
    [I%=23.0:S%= 2.00]
```

```
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.09 12.25  20.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01 12.25  20.68 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.10 12.25  20.70  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.46 12.25  15.54  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.05 12.75   9.49 0.18   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    1.49 12.58  15.32  n/a   0.000
*
===================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\931a31e8-1da2-4ad9-a124-4adcb3deb123\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\931a31e8-1da2-4ad9-a124-4adcb3deb123\s


DATE: 03-13-2023                           TIME: 05:25:34

USER:


COMMENTS: ____________________________________________________________
```

```
    ************************************************
    ** SIMULATION : RUN 009 - SCS-5yr 24hr 15min  **
    ************************************************

    W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                     min     ha   '  cms   hrs     mm          cms

        START @  0.00 hrs
        --------------------
      READ STORM                 15.0
      [ Ptot= 71.65 mm ]
      fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
      remark: 5yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.29 12.92  23.29 0.33   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.24 12.25  28.34 0.40   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.24 12.25  28.34  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.24 12.25  28.34  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.36 12.75  24.40  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.08 12.25  30.53 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.42 12.25  24.77  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.63 12.25  28.16 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.12 12.25  28.16 0.39   0.000
    [I%=17.0:S%= 2.00]
*
```

```
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.07 12.25  28.15 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.74 12.25  28.16  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.82 12.25  28.16  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    1.23 12.25  26.20  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.07 12.25  28.15 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    1.30 12.25  26.25  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.24 12.75  23.29 0.33   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.24 12.75  23.29  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.16 12.50  18.24 0.25   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.39 12.67  21.36  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.08 12.50  18.24 0.25   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    0.47 12.58  20.87  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    1.55 12.25  24.35  n/a   0.000
*
```

```
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.60 12.25  51.20 0.71   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.11 14.00  50.70  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.17 12.67  19.47 0.27   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.24 12.83  40.14  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.15 12.67  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.07 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.18 12.67  21.18  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    1.65 12.25  28.83  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    1.79 12.25  28.09  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.21 12.58  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
```

```
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.06 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.24 12.58  20.89  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    1.96 12.25  27.36  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.14 12.58  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.06 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.17 12.50  21.24  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    2.10 12.25  26.95  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.12 12.67  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.07 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.15 12.58  21.48  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    2.25 12.50  26.62  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.37 13.42  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    2.43 12.50  25.20  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.07 12.25  31.30 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.04 12.25  31.29 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.11 12.25  31.30  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03 12.25  31.29 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.14 12.25  31.29  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02 12.25  31.28 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.16 12.25  31.29  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    2.49 12.50  25.29  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.09 12.75  16.95 0.24   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    2.57 12.50  24.99  n/a   0.000
*
================================================================================
=========================


       V     V   I    SSSSS  U    U    A    L              (v 6.2.2011)
       V     V   I    SS     U    U   A A   L
```

```
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
        OOO      T      T    H   H    Y    M   M   OOO
```

Developed and Distributed by Smart City Water Inc

***** S U M M A R Y   O U T P U T *****

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output     filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\38fed38a-3743-4df4-83ac-da44a0d53ea7\s
  Summary    filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\38fed38a-3743-4df4-83ac-da44a0d53ea7\s


DATE: 03-13-2023                         TIME: 05:25:32

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 010 - SCS-10yr 24hr 15min **
  ************************************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                    min    ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD          0101  1  5.0   13.09    0.39 12.92  30.47 0.36   0.000
    [CN=66.7        ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        0110  1  5.0    3.70    0.33 12.25  35.56 0.43   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                 0801  1  5.0    3.70    0.33 12.25  35.56  n/a   0.000
       MAJOR SYSTEM:      0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:      0801  3  5.0    3.70    0.33 12.25  35.56  n/a   0.000
*
    ADD [  0101+  0801]   0901  3  5.0   16.79    0.47 12.75  31.59  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        0102  1  5.0    1.06    0.11 12.25  37.86 0.45   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]   0902  3  5.0   17.85    0.57 12.25  31.96  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1051  1  5.0   10.37    0.89 12.25  35.40 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1052  1  5.0    1.64    0.15 12.25  35.40 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1053  1  5.0    1.00    0.09 12.25  35.39 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3  5.0   12.01    1.04 12.25  35.40  n/a   0.000
*
    ADD [  0906+  1053]   0906  1  5.0   13.01    1.13 12.25  35.40  n/a   0.000
*
    ADD [  0906+  0902]   0906  3  5.0   30.86    1.70 12.25  33.41  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1054  1  5.0    0.92    0.08 12.25  35.39 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]   0910  3  5.0   31.78    1.78 12.25  33.47  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          0103  1  5.0    9.10    0.32 12.75  30.47 0.36   0.000
    [CN=66.7        ]
```

```
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.32 12.75  30.47  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.22 12.50  24.27 0.29   0.000
    [CN=59.6        ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.52 12.58  28.10  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.11 12.50  24.27 0.29   0.000
    [CN=59.6        ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    0.62 12.58  27.50  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    2.12 12.25  31.35  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.00 12.25  62.25 0.74   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.14 13.83  61.74  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.22 12.67  25.75 0.31   0.000
    [CN=61.0        ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.34 12.75  49.57  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.20 12.67  26.45 0.32   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.09 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.23 12.58  27.72  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    2.25 12.25  36.52  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    2.44 12.25  35.68  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.28 12.58  26.44 0.32   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.08 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.31 12.58  27.40  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    2.67 12.25  34.83  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.19 12.58  26.44 0.32   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.08 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.23 12.50  27.79  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    2.85 12.25  34.37  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
```

```
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0     4.81    0.16 12.67  26.45 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0     1.05    0.10 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0     5.86    0.20 12.50  28.06  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0    96.49    3.03 12.25  33.98  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0    26.55    0.50 13.42  26.45 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0   123.04    3.20 12.42  32.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0     0.87    0.09 12.25  38.90 0.47   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0     0.42    0.04 12.25  38.90 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0     1.29    0.14 12.25  38.90  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0     0.41    0.04 12.25  38.90 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0     1.70    0.18 12.25  38.90  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0     0.22    0.02 12.25  38.88 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0     1.92    0.20 12.25  38.90  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0   124.96    3.34 12.25  32.46  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0     4.67    0.13 12.75  22.67 0.27   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0   129.63    3.41 12.42  32.11  n/a   0.000
*
==================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b6504abf-f29b-459d-a9ae-99ae5ec0b0f2\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b6504abf-f29b-459d-a9ae-99ae5ec0b0f2\s


DATE: 03-13-2023                           TIME: 05:25:35

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 011 - SCS-25yr 24hr 15min **
  ************************************************
```

```
  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.52 12.92  40.16 0.41   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.43 12.25  45.18 0.46   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.43 12.25  45.18  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.43 12.25  45.18  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.61 12.75  41.26  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.14 12.25  47.57 0.48   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.75 12.25  41.64  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.16 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.19 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.12 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.35 12.25  45.05  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.47 12.25  45.05  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.21 12.25  43.08  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.11 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    2.32 12.25  43.13  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.43 12.75  40.16 0.41   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.43 12.75  40.16  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.30 12.50  32.55 0.33   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.69 12.58  37.26  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.15 12.50  32.55 0.33   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    0.83 12.58  36.52  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    2.79 12.25  40.79  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
```

```
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.51 12.25  76.27 0.77   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.48 12.92  75.76  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.30 12.67  34.34 0.35   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.74 12.83  61.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.27 12.67  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.12 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.31 12.58  36.62  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    2.96 12.25  46.73  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    3.21 12.25  45.76  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.38 12.58  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.11 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.42 12.50  36.27  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    3.54 12.42  44.79  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.26 12.58  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.11 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.30 12.50  36.69  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    3.84 12.42  44.26  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.22 12.67  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.12 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.27 12.50  37.00  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    4.11 12.42  43.82  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.67 13.42  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    4.37 12.42  41.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
```

```
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.12 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.06 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.17 12.25  48.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.06 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.23 12.25  48.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.03 12.25  48.94 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.26 12.25  48.96  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    4.51 12.42  42.07  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.17 12.75  30.58 0.31   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    4.65 12.42  41.65  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U    U    A    L              (v 6.2.2011)
       V    V   I    SS     U    U   A A   L
        V  V    I     SS    U    U  AAAAA  L
        V  V    I      SS   U    U  A   A  L
         VV     I    SSSSS  UUUUU   A   A  LLLLL
```

```
       OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
      O   O     T      T    H   H   Y Y   MM MM  O   O
      O   O     T      T    H   H    Y    M   M  O   O
       OOO      T      T    H   H    Y    M   M   OOO
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```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\2ea6ce74-c9f1-4814-97fb-2a50703ff68b\s
  Summary     filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\2ea6ce74-c9f1-4814-97fb-2a50703ff68b\s


DATE: 03-13-2023                           TIME: 05:25:32

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 012 - SCS-50yr 24hr 15min **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.62 12.92  48.02 0.44   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.51 12.25  52.93 0.48   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.51 12.25  52.93  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.51 12.25  52.93  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.73 12.75  49.10  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
```

```
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.16 12.25  55.36 0.50   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.89 12.25  49.47  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.37 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.23 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.14 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.60 12.25  52.82  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.74 12.25  52.82  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.63 12.25  50.88  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.13 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    2.76 12.25  50.94  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.51 12.75  48.02 0.44   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.51 12.75  48.02  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.36 12.50  39.37 0.36   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.84 12.58  44.72  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.18 12.50  39.36 0.36   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    1.01 12.58  43.88  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    3.33 12.25  48.44  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.91 12.25  87.12 0.79   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.90 12.67  86.60  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.36 12.67  41.37 0.38   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.26 12.67  71.31  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.33 12.67  42.37 0.38   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
```

```
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.14 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.37 12.58  43.88  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    3.66 12.58  54.92  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    4.03 12.58  53.86  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.46 12.58  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.13 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.51 12.50  43.51  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    4.54 12.58  52.81  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.31 12.58  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.13 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.37 12.42  43.96  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    4.89 12.58  52.22  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.27 12.67  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.15 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.32 12.42  44.28  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    5.21 12.58  51.74  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.81 13.42  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    5.69 12.58  49.72  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.14 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.07 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.21 12.25  57.01  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.07 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.28 12.25  57.01  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
```

```
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.04 12.25  57.00 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.32 12.25  57.01  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    5.78 12.58  49.83  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.21 12.75  37.10 0.34   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    5.98 12.58  49.37  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\44703b3e-2b24-40a0-a161-d8939372b57e\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\44703b3e-2b24-40a0-a161-d8939372b57e\s


DATE: 03-13-2023                           TIME: 05:25:33

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 013 - SCS-100yr 24hr 15mi **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA   ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min     ha    '  cms   hrs      mm           cms
```

```
         START @  0.00 hrs
         --------------------
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.72 12.92  55.81 0.46   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.59 12.25  60.57 0.50   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.59 12.25  60.57  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.59 12.25  60.57  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.85 12.75  56.86  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.19 12.25  63.03 0.52   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    1.03 12.25  57.23  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.59 12.25  60.50 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.26 12.25  60.50 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.18 12.25  60.49 0.50   0.000
    [I%=17.0:S%= 2.00]
```

```
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.86 12.25  60.50  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    2.04 12.25  60.50  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    3.07 12.25  58.61  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.17 12.25  60.49 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    3.24 12.25  58.66  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.60 12.75  55.81 0.46   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.60 12.75  55.81  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.42 12.50  46.19 0.38   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.98 12.58  52.14  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.21 12.50  46.19 0.38   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    1.18 12.58  51.21  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    3.92 12.25  56.02  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    3.73 12.25  97.53 0.81   0.000
    [I%=16.0:S%= 2.00]
```

```
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    1.42 12.50  97.00  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.42 12.67  48.41 0.40   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.83 12.50  80.57  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.39 12.67  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.19 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.43 12.67  51.12  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    4.97 12.42  62.98  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    5.37 12.42  61.84  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.54 12.58  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                   15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.17 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.58 12.58  50.72  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    5.94 12.50  60.71  n/a   0.000
*
```

```
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1113  1  5.0    5.08    0.36 12.58  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1083  1  5.0    0.89    0.16 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.42 12.50  51.20  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    6.35 12.50  60.08  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1114  1  5.0    4.81    0.31 12.67  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1084  1  5.0    1.05    0.19 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.36 12.58  51.54  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    6.72 12.50  59.56  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1115  1  5.0   26.55    0.95 13.33  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    7.19 12.50  57.40  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
```

```
 *  CALIB STANDHYD      1091  1  5.0    0.87    0.17 12.25  64.94 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1092  1  5.0    0.42    0.08 12.25  64.93 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.26 12.25  64.94  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1093  1  5.0    0.41    0.08 12.25  64.93 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.34 12.25  64.94  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1094  1  5.0    0.22    0.04 12.25  64.92 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.39 12.25  64.93  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    7.31 12.50  57.51  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        0112  1  5.0    4.67    0.25 12.67  43.66 0.36   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    7.53 12.50  57.02  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

```
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                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\c2c0bf08-3d15-4806-b36e-9ce09e44a243\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\c2c0bf08-3d15-4806-b36e-9ce09e44a243\s

DATE: 03-13-2023                           TIME: 05:25:36

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 014 - Regional-TIMMINS    **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.79  7.42 112.75 0.58   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.29  7.00 116.15 0.60   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.29  7.00 116.15  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.29  7.00 116.15  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    1.00  7.25 113.50  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.08  7.00 118.53 0.61   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    1.06  7.25 113.80  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.80  7.00 116.27 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.13  7.00 116.27 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.08  7.00 116.26 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.93  7.00 116.27  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.01  7.00 116.27  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.06  7.00 114.84  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.07  7.00 116.26 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    2.14  7.00 114.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.60  7.25 112.75 0.58   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.60  7.25 112.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
```

```
    remark: TIMMINS
*
 *  CALIB NASHYD          1041  1  5.0    5.61    0.37  7.08  97.54 0.51   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.96  7.17 106.95  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD          1042  1  5.0    2.74    0.18  7.08  97.54 0.51   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0051  3  5.0   17.45    1.14  7.17 105.47  n/a   0.000
*
    ADD [  0051+  0910]  0052  3  5.0   49.23    3.24  7.00 111.55  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD        0106  1  5.0   12.90    1.43  7.00 167.53 0.87   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:              0401  1  5.0   12.90    1.39  7.00 167.11  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD          0107  1  5.0    6.59    0.41  7.17 100.98 0.52   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.79  7.08 144.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD          1111  1  5.0    6.26    0.39  7.25 102.81 0.53   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD        1081  1  5.0    1.03    0.08  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.45  7.17 104.81  n/a   0.000
*
    ADD [  0052+  0905]  0908  3  5.0   68.72    5.02  7.00 120.96  n/a   0.000
*
    ADD [  0908+  0907]  0908  1  5.0   76.01    5.47  7.00 119.41  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD          1112  1  5.0    7.73    0.50  7.17 102.80 0.53   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD        1082  1  5.0    0.92    0.07  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.57  7.08 104.31  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    6.03  7.00 117.87  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD          1113  1  5.0    5.08    0.34  7.08 102.80 0.53   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD        1083  1  5.0    0.89    0.07  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.40  7.00 104.91  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    6.43  7.00 117.02  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD          1114  1  5.0    4.81    0.31  7.17 102.80 0.53   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
```

```
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1084  1  5.0     1.05    0.08  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0     5.86    0.38  7.00 105.34  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0    96.49    6.81  7.00 116.31  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1115  1  5.0    26.55    1.23  8.08 102.81 0.53   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0   123.04    7.67  7.08 113.39  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1091  1  5.0     0.87    0.07  7.00 121.98 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1092  1  5.0     0.42    0.03  7.00 121.97 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0     1.29    0.11  7.00 121.97  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1093  1  5.0     0.41    0.03  7.00 121.97 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0     1.70    0.14  7.00 121.97  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1094  1  5.0     0.22    0.02  7.00 121.95 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0     1.92    0.16  7.00 121.97  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0   124.96    7.81  7.00 113.53  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\57c4be91-96c2-4fa4-8a23-
c6433e3558ea\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0112  1  5.0     4.67    0.26  7.25  93.42 0.48   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0   129.63    8.06  7.00 112.80  n/a   0.000
*
 FINISH

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```

Appendix B:
Existing Conditions Hydraulic Analysis

Driveway Culvert Conveyance Analysis
Existing Condition, 1:5-Year Storm

TATHAM ENGINEERING

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	403	**219.3%**
Section B	NASHYD 1052					5							0.116	0.024	115.6	2.8%	**300**	1.24	0.088	1.24	1.55	333	**132.3%**
Section C	NASHYD 1053					5							0.071	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	285	87.5%
Section E	ADDHYD 908					5							1.787	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	1048	**205.8%**
Section F	ADDHYD 915					5							1.961	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	1085	**225.8%**
Section G	ADDHYD 917					5							2.101	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	1114	**176.7%**
Section H	ADDHYD 919					5							2.247	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	1142	**189.0%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.024	75.0	1.4%	900	1.82	1.160	1.51	0.83	582	31.3%
Section B	ADDHYD 902					5							0.416	0.024	180.0	2.7%	900	2.53	1.611	2.00	1.50	541	25.8%

Driveway Culvert Conveyance Analysis
Existing Condition, 1:5-Year Storm

TATHAM ENGINEERING

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					5							1.232	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	832	81.1%
Section E	STANDHYD 1091					5							0.073	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	387	91.5%
Section F	ADDHYD 912					5							0.109	0.024	9.4	0.5%	**400**	0.63	0.080	0.63	0.25	450	**136.6%**
Sectoin G	ADDHYD 921					5							0.143	0.024	14.2	1.0%	**400**	0.90	0.113	0.90	0.26	437	**126.8%**
Section H	ADDHYD 922					5							0.162	0.024	7.8	2.0%	**400**	1.27	0.160	1.27	0.10	402	**101.5%**
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.024	3.0	1.0%	**985**	1.64	1.247	1.64	0.03	1291	**206.0%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Existing Condition, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.024	37.2	1.0%	300	0.75	0.053	0.75	0.83	486	362.9%
Section B	NASHYD 1052					25							0.192	0.024	115.6	2.8%	300	1.24	0.088	1.24	1.55	402	219.1%
Section C	NASHYD 1053					25							0.118	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	345	145.4%
Section E	ADDHYD 908					25							3.206	0.024	7.8	1.5%	800	1.73	0.868	1.73	0.08	1305	369.2%
Section F	ADDHYD 915					25							3.538	0.024	9.6	1.5%	800	1.73	0.868	1.73	0.09	1354	407.4%
Section G	ADDHYD 917					25							3.84	0.024	9.0	1.5%	900	1.87	1.189	1.87	0.08	1396	323.0%
Section H	ADDHYD 919					25							4.107	0.024	7.5	1.5%	900	1.87	1.189	1.87	0.07	1432	345.4%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.024	75.0	1.4%	900	1.82	1.160	1.74	0.72	708	52.8%
Section B	ADDHYD 902					25							0.747	0.024	180.0	2.7%	900	2.53	1.611	2.34	1.28	674	46.4%

![TATHAM ENGINEERING]

Driveway Culvert Conveyance Analysis
Existing Condition, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					25							2.214	0.024	8.7	2.4%	**900**	2.39	1.519	2.39	0.06	1036	**145.7%**
Section E	STANDHYD 1091					25							0.117	0.024	15.9	0.5%	**400**	0.63	0.080	0.63	0.42	462	**146.7%**
Section F	ADDHYD 912					25							0.174	0.024	9.4	0.5%	**400**	0.63	0.080	0.63	0.25	536	**218.1%**
Sectoin G	ADDHYD 921					25							0.229	0.024	14.2	1.0%	**400**	0.90	0.113	0.90	0.26	521	**203.0%**
Section H	ADDHYD 922					25							0.259	0.024	7.8	2.0%	**400**	1.27	0.160	1.27	0.10	480	**162.4%**
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.024	3.0	1.0%	**985**	1.64	1.247	1.64	0.03	1613	**372.7%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Existing Condition, 1:100Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	548	**499.0%**
Section B	NASHYD 1052					100							0.264	0.024	115.6	2.8%	**300**	1.24	0.088	1.24	1.55	453	**301.2%**
Section C	NASHYD 1053					100							0.183	0.024	12.1	2.4%	**300**	1.15	0.081	1.15	0.18	407	**225.5%**
Section E	ADDHYD 908					100							5.371	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	1584	**618.5%**
Section F	ADDHYD 915					100							5.938	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	1644	**683.8%**
Section G	ADDHYD 917					100							6.353	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	1687	**534.4%**
Section H	ADDHYD 919					100							6.717	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	1722	**565.0%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.024	75.0	1.4%	900	1.82	1.160	1.82	0.69	801	73.3%
Section B	ADDHYD 902					100							1.033	0.024	180.0	2.7%	900	2.53	1.611	2.53	1.18	762	64.1%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Existing Condition, 1:100Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					100							3.074	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	1172	202.4%
Section E	STANDHYD 1091					100							0.174	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	536	218.1%
Section F	ADDHYD 912					100							0.259	0.024	9.4	0.5%	400	0.63	0.080	0.63	0.25	622	324.7%
Sectoin G	ADDHYD 921					100							0.342	0.024	14.2	1.0%	400	0.90	0.113	0.90	0.26	606	303.2%
Section H	ADDHYD 922					100							0.386	0.024	7.8	2.0%	400	1.27	0.160	1.27	0.10	557	242.0%
West Side of Town Line																							
Section J	ADDHYD 911					100							7.533	0.024	3.0	1.0%	985	1.64	1.247	1.64	0.03	1933	603.9%

HY-8 Culvert Analysis Report

Existing Conditions: Culvert A

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 280.78 m

Outlet Station: 13.50 m

Outlet Elevation: 280.64 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 900.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Table 1 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	1.35 cms	1.27 cms	282.06	1.28	1.246	7-M2c	0.90	0.67	0.67	0.48	2.51	1.45
1:50	1.60 cms	1.31 cms	282.10	1.32	1.285	7-M2c	0.90	0.68	0.68	0.52	2.55	1.51
1:100	1.86 cms	1.34 cms	282.14	1.36	1.319	7-M2c	0.90	0.69	0.69	0.55	2.58	1.57

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 280.78 m,

Outlet Elevation (invert): 280.64 m

Culvert Length: 13.50 m,

Culvert Slope: 0.0104

Tailwater Data for Crossing: Crossing 1 Ex

Table 2 - Downstream Channel Rating Curve (Crossing: Crossing 1 Ex)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
1.35	281.05	0.48	1.45	65.70	0.85
1.60	281.09	0.52	1.51	71.08	0.86
1.86	281.12	0.55	1.57	76.02	0.87

Tailwater Channel Data - Crossing 1 Ex

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.75 m

Side Slope (H:V): 2.50 (_:1)

Channel Slope: 0.0140

Channel Manning's n: 0.0350

Channel Invert Elevation: 280.57 m

Roadway Data for Crossing: Crossing 1 Ex

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 7.40 m

Crest Elevation: 282.02 m

Roadway Surface: Paved

Roadway Top Width: 12.50 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 3 - Summary of Culvert Flows at Crossing: Crossing 1 Ex

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
282.06	1:25	1.35	1.27	0.08	12
282.10	1:50	1.60	1.31	0.29	5
282.14	1:100	1.86	1.34	0.51	4
282.02	Overtopping	1.23	1.23	0.00	Overtopping

Existing Conditions: Culvert B

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 280.86 m

Outlet Station: 13.20 m

Outlet Elevation: 280.60 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 4 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	0.12 cms	0.12 cms	281.18	0.32	0.0*	1-S2n	0.21	0.22	0.21	0.14	1.38	0.75
1:50	0.14 cms	0.14 cms	281.22	0.36	0.027	1-S2n	0.22	0.24	0.22	0.16	1.45	0.79
1:100	0.18 cms	0.18 cms	281.28	0.42	0.096	1-S2n	0.26	0.28	0.26	0.18	1.55	0.85

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 280.86 m,

Outlet Elevation (invert): 280.60 m

Culvert Length: 13.20 m,

Culvert Slope: 0.0197

Tailwater Data for Crossing: Crossing 2 Ex

Table 5 - Downstream Channel Rating Curve (Crossing: Crossing 2 Ex)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
0.12	280.71	0.14	0.75	19.58	0.73
0.14	280.73	0.16	0.79	21.44	0.73
0.18	280.75	0.18	0.85	24.69	0.75

Tailwater Channel Data - Crossing 2 Ex

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.75 m

Side Slope (H:V): 2.50 (_:1)

Channel Slope: 0.0140

Channel Manning's n: 0.0350

Channel Invert Elevation: 280.57 m

Roadway Data for Crossing: Crossing 2 Ex

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 7.40 m

Crest Elevation: 281.69 m

Roadway Surface: Paved

Roadway Top Width: 12.50 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 6 - Summary of Culvert Flows at Crossing: Crossing 2 Ex

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
281.18	1:25	0.12	0.12	0.00	1
281.22	1:50	0.14	0.14	0.00	1
281.28	1:100	0.18	0.18	0.00	1
281.69	Overtopping	0.45	0.45	0.00	Overtopping

Existing Conditions: Culvert C

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 276.17 m

Outlet Station: 13.70 m

Outlet Elevation: 275.80 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 500.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 7 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	0.11 cms	0.11 cms	276.50	0.33	0.0*	1-S2n	0.20	0.22	0.20	0.12	1.53	0.70
1:50	0.13 cms	0.13 cms	276.54	0.37	0.0*	1-S2n	0.21	0.24	0.21	0.13	1.60	0.74
1:100	0.17 cms	0.17 cms	276.61	0.44	0.072	1-S2n	0.25	0.28	0.25	0.15	1.71	0.80

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 276.17 m,

Outlet Elevation (invert): 275.80 m

Culvert Length: 13.70 m,

Culvert Slope: 0.0270

Tailwater Data for Crossing: Crossing 3 Ex

Table 8 - Downstream Channel Rating Curve (Crossing: Crossing 3 Ex)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
0.11	275.92	0.12	0.70	16.96	0.74
0.13	275.93	0.13	0.74	18.61	0.75
0.17	275.95	0.15	0.80	21.48	0.76

Tailwater Channel Data - Crossing 3 Ex

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 1.00 m

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0150

Channel Manning's n: 0.0350

Channel Invert Elevation: 275.80 m

Roadway Data for Crossing: Crossing 3 Ex

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 8.45 m

Crest Elevation: 276.69 m

Roadway Surface: Paved

Roadway Top Width: 12.50 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 9 - Summary of Culvert Flows at Crossing: Crossing 3 Ex

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
276.50	1:25	0.11	0.11	0.00	1
276.54	1:50	0.13	0.13	0.00	1
276.61	1:100	0.17	0.17	0.00	1
276.69	Overtopping	0.21	0.21	0.00	Overtopping

Existing Conditions: Culvert D

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 273.83 m

Outlet Station: 12.60 m

Outlet Elevation: 273.80 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 900.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 10 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	2.79 cms	1.65 cms	275.66	1.76	1.834	7-M2t	0.90	0.75	0.83	0.83	2.69	2.14
1:50	3.33 cms	1.68 cms	275.74	1.80	1.908	7-M2t	0.90	0.76	0.90	0.89	2.65	2.24
1:100	3.91 cms	1.69 cms	275.81	1.82	1.983	4-FFf	0.90	0.76	0.90	0.95	2.66	2.33

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 273.83 m,

Outlet Elevation (invert): 273.80 m

Culvert Length: 12.60 m,

Culvert Slope: 0.0024

Tailwater Data for Crossing: Crossing 4 Ex

Table 11 - Downstream Channel Rating Curve (Crossing: Crossing 4 Ex)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
2.79	274.63	0.83	2.14	122.39	1.03
3.33	274.69	0.89	2.24	131.26	1.04
3.91	274.75	0.95	2.33	139.87	1.05

Tailwater Channel Data - Crossing 4 Ex

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.15 m

Side Slope (H:V): 1.70 (_:1)

Channel Slope: 0.0150

Channel Manning's n: 0.0300

Channel Invert Elevation: 273.80 m

Roadway Data for Crossing: Crossing 4 Ex

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 275.40 m

Roadway Surface: Paved

Roadway Top Width: 9.00 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 12 - Summary of Culvert Flows at Crossing: Crossing 4 Ex

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
275.66	1:25	2.79	1.65	1.13	7
275.74	1:50	3.33	1.68	1.65	4
275.81	1:100	3.91	1.69	2.22	4
275.40	Overtopping	1.46	1.46	0.00	Overtopping

Existing Conditions: Culvert G

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 263.03 m

Outlet Station: 12.30 m

Outlet Elevation: 262.86 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Pipe Arch

Barrel Span: 889.00 mm

Barrel Rise: 609.60 mm

Barrel Material: Steel or Aluminum

Embedment: 0.00 mm

Barrel Manning's n: 0.0250

Culvert Type: Straight

Inlet Configuration: Projecting

Inlet Depression: None

Table 13 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	4.37 cms	0.94 cms	264.53	1.18	1.497	4-FFf	0.61	0.49	0.61	0.85	2.18	1.74
1:50	5.69 cms	0.93 cms	264.62	1.17	1.591	4-FFf	0.61	0.49	0.61	0.95	2.16	1.86
1:100	7.19 cms	0.93 cms	264.72	1.16	1.688	4-FFf	0.61	0.49	0.61	1.06	2.15	1.98

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 263.03 m,

Outlet Elevation (invert): 262.86 m

Culvert Length: 12.30 m,

Culvert Slope: 0.0138

Tailwater Data for Crossing: Crossing 6 Ex

Table 14 - Downstream Channel Rating Curve (Crossing: Crossing 6 Ex)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
4.37	263.71	0.85	1.74	83.21	0.78
5.69	263.81	0.95	1.86	93.60	0.79
7.19	263.92	1.06	1.98	103.74	0.80

Tailwater Channel Data - Crossing 6 Ex

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 1.00 m

Side Slope (H:V): 2.30 (_:1)

Channel Slope: 0.0100

Channel Manning's n: 0.0350

Channel Invert Elevation: 262.86 m

Roadway Data for Crossing: Crossing 6 Ex

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 8.50 m

Crest Elevation: 264.14 m

Roadway Surface: Paved

Roadway Top Width: 9.25 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 15 - Summary of Culvert Flows at Crossing: Crossing 6 Ex

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
264.53	1:25	4.37	0.94	3.43	6
264.62	1:50	5.69	0.93	4.76	4
264.72	1:100	7.19	0.93	6.26	3
264.14	Overtopping	0.90	0.90	0.00	Overtopping

Existing Conditions: Culvert H

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 260.32 m

Outlet Station: 16.40 m

Outlet Elevation: 260.24 m

Number of Barrels: 4

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Table 16 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	4.65 cms	1.86 cms	261.34	0.75	1.021	4-FFf	0.49	0.45	0.60	0.81	1.64	1.28
1:50	5.98 cms	1.75 cms	261.41	0.72	1.092	4-FFf	0.46	0.43	0.60	0.92	1.55	1.37
1:100	7.53 cms	1.64 cms	261.48	0.68	1.164	4-FFf	0.44	0.42	0.60	1.02	1.45	1.46

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 260.32 m,

Outlet Elevation (invert): 260.24 m

Culvert Length: 16.40 m,

Culvert Slope: 0.0049

Tailwater Data for Crossing: Crossing 7 Ex

Table 17 - Downstream Channel Rating Curve (Crossing: Crossing 7 Ex)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
4.65	261.05	0.81	1.28	39.94	0.57
5.98	261.16	0.92	1.37	44.98	0.57
7.53	261.26	1.02	1.46	50.07	0.58

Tailwater Channel Data - Crossing 7 Ex

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 m

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0350

Channel Invert Elevation: 260.24 m

Roadway Data for Crossing: Crossing 7 Ex

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 16.00 m

Crest Elevation: 261.12 m

Roadway Surface: Paved

Roadway Top Width: 8.50 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 18 - Summary of Culvert Flows at Crossing: Crossing 7 Ex

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
261.34	1:25	4.65	1.86	2.79	4
261.41	1:50	5.98	1.75	4.23	4
261.48	1:100	7.53	1.64	5.89	3
261.12	Overtopping	1.98	1.98	0.00	Overtopping

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
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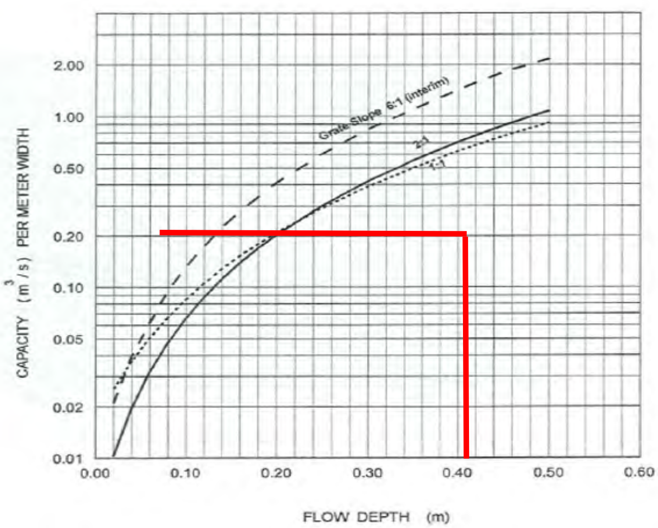
SUBJECT	Conveyance Capacity	NAME	ARO
		PAGE	1 OF 1

Ditch Inlet Capacity DICB West of Galrich Court

MTO Drainage Management Manual

Design Chart 4.20: Ditch Inlet Capacity



Maximum depth of ponding at sag:	0.13 m
Appoximate Grate Slope:	6 :1
Maximum inlet capacity at sag:	0.2 $m^3/s/m$
Width of DICB	0.6 m
Maximum inlet capacity at sag:	0.12 m^3/s

TATHAM ENGINEERING

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
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SUBJECT	Conveyance Capacity	NAME	ARO
		PAGE	1 OF 1

Manning's Equation Existing Conditions: Section 2 - North Side of Warminster Sideroad

Channel
Manning's n 0.035
Slope 0.02 m/m
Bottom Width 0.15 m
Side Slopes 2 :1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.10	0.01	0.37	0.03	0.00
0.10	0.20	0.04	0.60	0.06	0.02
0.15	0.30	0.07	0.82	0.08	0.04
0.20	0.40	0.11	1.04	0.11	0.09
0.25	0.50	0.16	1.27	0.13	0.14
0.30	0.60	0.23	1.49	0.15	0.22
0.35	0.70	0.30	1.72	0.17	0.32
0.40	0.80	0.38	1.94	0.20	0.45
0.45	0.90	0.47	2.16	0.22	0.60
0.50	1.00	0.58	2.39	0.24	0.78
0.55	1.10	0.69	2.61	0.26	0.99
0.60	1.20	0.81	2.83	0.29	1.23
0.65	1.30	0.94	3.06	0.31	1.51
0.70	1.40	1.09	3.28	0.33	1.82
0.75	1.50	1.24	3.50	0.35	2.16
0.80	1.60	1.40	3.73	0.38	2.55
0.85	1.70	1.57	3.95	0.40	2.98
0.90	1.80	1.76	4.17	0.42	3.45
0.95	1.90	1.95	4.40	0.44	3.96

Q_5 = 2.2 m^3/s
Q_{25} = 4.1 m^3/s
Q_{100} = 6.7 m^3/s

Maximum Flow Conveyance: 3.96 m^3/s
Maximum Flow Depth: 0.95 m
Maximum Flow Velocity: 2.0 m/s

TATHAM ENGINEERING

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
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SUBJECT	Conveyance Capacity	NAME	ARO
		PAGE	1 OF 1

Manning's Equation Existing Conditions: Section 2 - South Side of Warminster Sideroad

Channel

Manning's n	0.035
Slope	0.01 m/m
Bottom Width	0.15 m
Side Slopes	2 :1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.10	0.01	0.37	0.03	0.00
0.10	0.20	0.04	0.60	0.06	0.01
0.15	0.30	0.07	0.82	0.08	0.03
0.20	0.40	0.11	1.04	0.11	0.05
0.25	0.50	0.16	1.27	0.13	0.08
0.30	0.60	0.23	1.49	0.15	0.13
0.35	0.70	0.30	1.72	0.17	0.19
0.40	0.80	0.38	1.94	0.20	0.26
0.45	0.90	0.47	2.16	0.22	0.35
0.50	1.00	0.58	2.39	0.24	0.45
0.55	1.10	0.69	2.61	0.26	0.57
0.60	1.20	0.81	2.83	0.29	0.71

Q_5 =	0.16 m^3/s	Maximum Flow Conveyance:	0.71 m^3/s
Q_{25} =	0.26 m^3/s	Maximum Flow Depth:	0.60 m
Q_{100} =	0.39 m^3/s	Maximum Flow Velocity:	0.9 m/s

Appendix C:
Cost Estimates

WARMINSTER SIDEROAD DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE
OPINION OF PROBABLE CONSTRUCTION COSTS
MARCH 13, 2023

TATHAM ENGINEERING

PROJECT #322863

SECTION 1: WARMINSTER SIDEROAD FROM HIGHWAY 12 TO THE BEND AT 1920 WARMINSTER SIDEROAD

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	5	$1,500.00	$7,500.00
	SUBTOTAL: GENERAL WORKS				**$27,500.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	810	$125.00	$101,250.00
2.02	Remove & Dispose of Gravel Driveways	ea	7	$500.00	$3,500.00
2.03	Remove & Dispose of Existing Storm Sewer and Drains	m	380	$105.00	$39,900.00
2.04	Remove & Dispose of Existing Culvert	m	100	$105.00	$10,500.00
2.05	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	335	$32.00	$10,720.00
2.06	600 mm x 600 mm Single Catchbasin & Lead	ea	6	$4,410.00	$26,460.00
2.07	300 mm Dia Storm Sewer	m	77	$460.00	$35,420.00
2.08	375 mm Dia. Culvert	m	72	$470.00	$33,840.00
2.09	450 mm Dia. Culvert	m	16	$525.00	$8,400.00
2.10	525 mm Dia. Culvert	m	13	$640.00	$8,448.00
2.11	900 mm Dia. Culvert	m	14	$1,125.00	$15,187.50
2.12	Reinstate Asphalt Roadway/Driveways	sq.m	335	$66.00	$22,110.00
2.13	Heavy Duty Silt Fence	m	810	$26.00	$21,060.00
2.14	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	435	$125.00	$54,375.00
2.15	Remove & Dispose of Gravel Driveways	ea	4	$500.00	$2,000.00
2.16	Remove & Dispose of Existing Storm Sewer and Drains	m	230	$15.00	$3,450.00
2.17	Remove & Dispose of Existing Catchbasin Inlet Sturctures	ea	2	$675.00	$1,350.00
2.18	Remove & Dispose of Existing Culvert	m	41	$105.00	$4,278.75
2.19	Remove & Dispose of Existing Fence	m	180	$25.00	$4,500.00
2.20	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	110	$32.00	$3,520.00
2.21	600 mm x 600 mm Single Catchbasin & Lead	ea	10	$4,410.00	$44,100.00
2.22	900 mm Dia Storm Sewer	m	255	$1,240.00	$316,200.00
2.23	1050 mm Dia Storm Sewer	m	85	$1,440.00	$122,400.00
2.24	Concrete Headwall - 1050 mm Dia.	ea	1	$44,300.00	$44,300.00
2.25	Reinstate Asphalt Roadway/Driveways	sq.m	110	$66.00	$7,260.00
2.26	Concrete Sidewalk	sq.m	1,035	$110.00	$113,850.00
2.27	Asphalt Gutter	m	50	$18.00	$900.00
2.28	1.5 m Chain Link Fence	m	180	$80.00	$14,400.00
2.29	R10 Rip Rap	sq.m	90	$50.00	$4,500.00
2.30	Heavy Duty Silt Fence	m	435	$26.00	$11,310.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$1,089,500.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	460	$40.00	$18,400.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	6	$300.00	$1,800.00
	SUBTOTAL: PROVISIONAL ITEMS				**$20,200.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$341,200.00
4.02	Utlities/Services Relocation Cost			30%	$341,200.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$682,400.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$1,819,600.00**

TATHAM ENGINEERING

SECTION 2: WARMINSTER SIDEROAD FROM 1920 WARMINSTER SIDEROAD TO TOWN LINE - OPTION 2

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	5	$1,500.00	$7,500.00
	SUBTOTAL: GENERAL WORKS				**$27,500.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	610	$125.00	$76,250.00
2.02	Clearing and Grubbing (Tree Removal)	sq.m	1,220	$35.00	$42,700.00
2.03	Remove & Dispose of Gravel Driveways	ea	4	$500.00	$2,000.00
2.04	Remove & Dispose of Existing Culvert	m	190	$105.00	$19,950.00
2.05	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	313	$32.00	$10,003.20
2.06	1150 x 820 mm CSPA Culvert	m	190	$1,560.00	$296,400.00
2.07	1880 x 1260 mm CSPA Culvert	m	13	$2,775.00	$34,965.00
2.08	Reinstate Asphalt Roadway/Driveways	sq.m	313	$66.00	$20,631.60
2.09	R10 Rip Rap	sq.m	320	$50.00	$16,000.00
2.10	Heavy Duty Silt Fence	m	610	$26.00	$15,860.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$534,800.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	700	$40.00	$28,000.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	5	$300.00	$1,500.00
	SUBTOTAL: PROVISIONAL ITEMS				**$29,500.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$177,600.00
4.02	Utlities/Services Relocation Cost			30%	$177,600.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$355,200.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$947,000.00**

SECTION 2: WARMINSTER SIDEROAD FROMT 1920 WARMINSTER SIDEROAD TO TOWN LINE - OPTION 3

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	5	$1,500.00	$7,500.00
	SUBTOTAL: GENERAL WORKS				**$27,500.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	610	$125.00	$76,250.00
2.02	Clearing and Grubbing (Tree Removal)	sq.m	1,220	$35.00	$42,700.00
2.03	Remove & Dispose of Gravel Driveways	ea	2	$500.00	$1,000.00
2.04	Remove & Dispose of Existing Culvert	m	160	$105.00	$16,800.00
2.05	Remove & Dispose of Existing Storm Sewer and Drains	m	60	$105.00	$6,300.00
2.06	Remove & Dispose of Existing Catchbasin Inlet Sturctures	ea	1	$675.00	$675.00
2.07	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	350	$32.00	$11,187.20
2.08	1030 x 740 mm CSPA Culvert	m	200	$1,350.00	$270,000.00
2.09	1880 x 1260 mm CSPA Culvert	m	13	$2,775.00	$34,965.00
2.10	Reinstate Asphalt Roadway/Driveways	sq.m	350	$66.00	$23,073.60
2.11	R10 Rip Rap	sq.m	352	$50.00	$17,600.00
2.12	Heavy Duty Silt Fence	m	610	$26.00	$15,860.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$516,500.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	1,500	$40.00	$60,000.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	5	$300.00	$1,500.00
	SUBTOTAL: PROVISIONAL ITEMS				**$61,500.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$181,700.00
4.02	Utlities/Services Relocation Cost			30%	$181,700.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$363,400.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$968,900.00**

SECTION 2: WARMINSTER SIDEROAD FROMT 1920 WARMINSTER SIDEROAD TO TOWN LINE - OPTION 4

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	2	$1,500.00	$3,000.00
	SUBTOTAL: GENERAL WORKS				**$23,000.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	SWMF Excavation, Grading & Plantings	ha	0.7	$250,000.00	$175,000.00
2.02	Excavate, Grade, Topsoil, & Seed Conveyance Swale	m	395	$125.00	$49,375.00
2.03	Clearing and Grubbing (Tree Removal)	sq.m	7,700	$35.00	$269,500.00
2.04	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	28	$32.00	$883.20
2.05	1050 mm Dia Storm Sewer	m	85	$1,440.00	$122,400.00
2.06	1150 x 820 mm CSPA Culvert	m	12	$1,560.00	$18,720.00
2.07	Reinstate Asphalt Roadway/Driveways	sq.m	28	$66.00	$1,821.60
2.08	R10 Rip Rap	sq.m	70	$50.00	$3,500.00
2.09	Heavy Duty Silt Fence	m	1,090	$26.00	$28,340.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$669,600.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	11,300	$40.00	$452,000.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	1	$300.00	$300.00
	SUBTOTAL: PROVISIONAL ITEMS				**$452,300.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$343,500.00
4.02	Utlities/Services Relocation Cost			15%	$171,800.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$515,300.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$1,660,200.00**

TATHAM ENGINEERING

SECTION 2: WARMINSTER SIDEROAD FROMT 1920 WARMINSTER SIDEROAD TO TOWN LINE - OPTION 5

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	2	$1,500.00	$3,000.00
	SUBTOTAL: GENERAL WORKS				**$23,000.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Conveyance Ditch	m	700	$125.00	$87,500.00
2.02	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	68	$32.00	$2,163.20
2.03	900 mm Dia. Culvert	m	113	$1,125.00	$127,125.00
2.04	Concrete Headwall - 900 mm Dia.	ea	2	$44,100.00	$88,200.00
2.05	Reinstate Asphalt Roadway/Driveways	sq.m	68	$66.00	$4,461.60
2.06	R10 Rip Rap	sq.m	70	$50.00	$3,500.00
2.07	Heavy Duty Silt Fence	m	1,200	$26.00	$31,200.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$344,200.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	1,700	$40.00	$68,000.00
3.02	Protect Underground Services	m	65	$500.00	$32,500.00
3.03	Remove, Salvage, & Reinstate Existing Signs	ea	2	$300.00	$600.00
	SUBTOTAL: PROVISIONAL ITEMS				**$101,100.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$140,500.00
4.02	Utlities/Services Relocation Cost			15%	$70,300.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$210,800.00**
5.0	**PROPERTYACQUISITION**				
5.01	12 m Wide Parcel Through 1922 Warminster Sideroad	LS	1	$50,000.00	$50,000.00
5.02	12 m Wide Parcel Through 3320 Town Line	LS	1	$40,000.00	$40,000.00
	SUBTOTAL: PROPERTY ACQUISITION				**$90,000.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$769,100.00**

TATHAM ENGINEERING

SECTION 2: WARMINSTER SIDEROAD FROMT 1920 WARMINSTER SIDEROAD TO TOWN LINE - OPTION 6

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	5	$1,500.00	$7,500.00
	SUBTOTAL: GENERAL WORKS				**$27,500.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	610	$125.00	$76,250.00
2.02	Clearing and Grubbing (Tree Removal)	sq.m	1,220	$35.00	$42,700.00
2.03	Remove & Dispose of Gravel Driveways	ea	4	$500.00	$2,000.00
2.04	Remove & Dispose of Existing Storm Sewer and Drains	m	55	$105.00	$5,775.00
2.05	Remove & Dispose of Existing Culvert	m	190	$105.00	$19,950.00
2.06	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	1,228	$32.00	$39,283.20
2.07	1350 mm Dia. Storm Sewer	m	490	$2,020.00	$989,800.00
2.08	1500 mm Dia. Storm Sewer	m	125	$2,330.00	$291,250.00
2.09	600 mm x 600 mm Single Catchbasin & Lead	ea	19	$4,410.00	$83,790.00
2.10	2400 mm Dia. Maintenance Hole	ea	3	$27,210.00	$81,630.00
2.11	2400 mm Dia. Ditch Inlet Maintenance Hole	ea	2	$32,710.00	$65,420.00
2.12	Reinstate Asphalt Roadway/Driveways	sq.m	1,228	$66.00	$81,021.60
2.13	R10 Rip Rap	sq.m	48	$50.00	$2,400.00
2.14	Heavy Duty Silt Fence	m	610	$26.00	$15,860.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$1,797,200.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	1,200	$40.00	$48,000.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	5	$300.00	$1,500.00
	SUBTOTAL: PROVISIONAL ITEMS				**$49,500.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$562,300.00
4.02	Utlities/Services Relocation Cost			30%	$562,300.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$1,124,600.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$2,998,800.00**

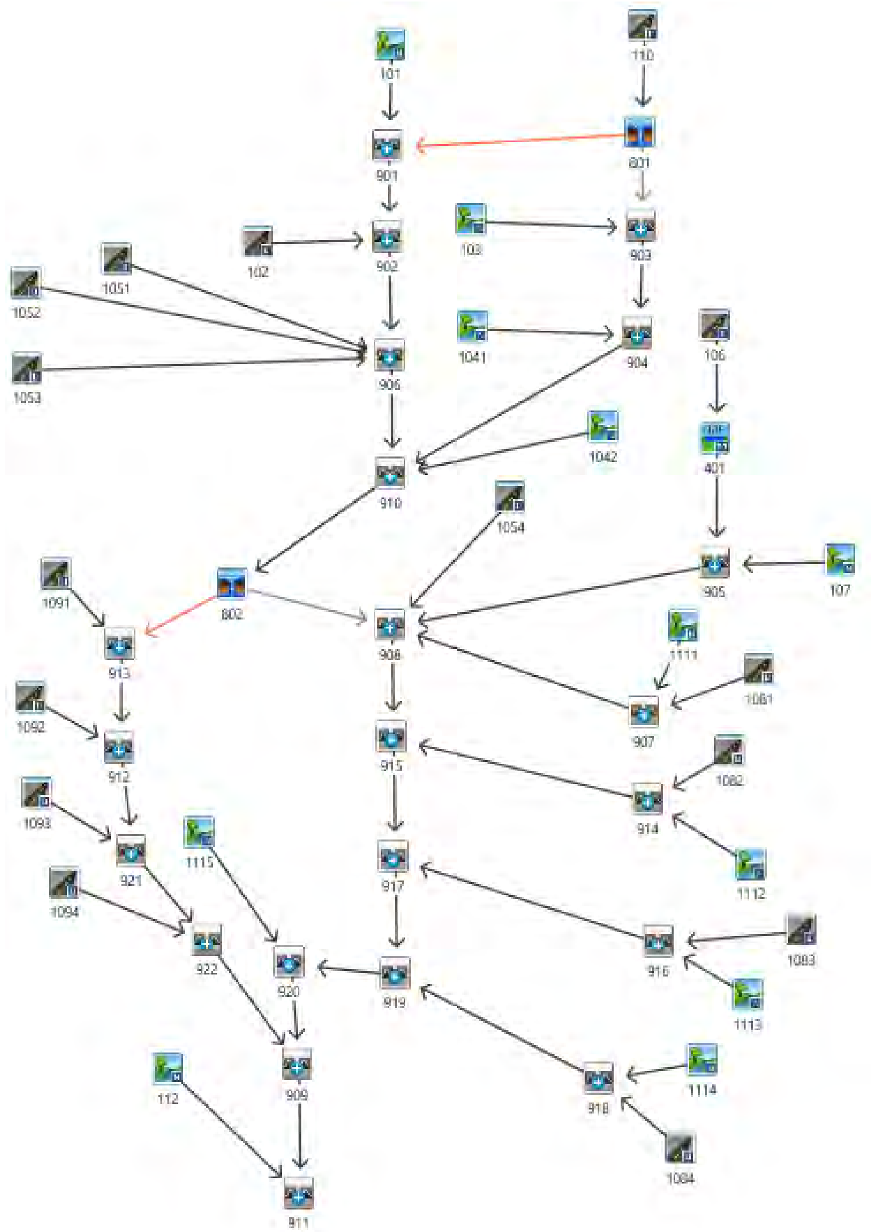
SECTION 3: TOWN LINE FROM WARMINSTER SIDEROAD TO 30 m SOUTH OF MERRINGTON AVENUE

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	5	$1,500.00	$7,500.00
	SUBTOTAL: GENERAL WORKS				**$27,500.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	240	$125.00	$30,000.00
2.02	Remove & Dispose of Existing Culvert	m	6	$105.00	$577.50
2.03	Remove & Dispose of Existing Curb & Gutter	m	6	$25.00	$150.00
2.07	Remove & Dispose of Existing Asphalt Roadway (Full Depth, Including Granulars)	sq.m	100	$32.00	$3,200.00
2.04	730 x 1150 mm Elliptical Concrete Pipe	m	36	$1,120.00	$40,320.00
2.05	750 mm Dia. Culvert	m	6	$870.00	$4,785.00
2.06	890 x 610 mm CSPA Culvert	m	74	$1,045.00	$77,330.00
2.07	Reinstate Roadway	sq.m	100	$66.00	$6,600.00
2.08	Concrete Curb & Gutter	m	6	$120.00	$720.00
2.09	R10 Rip Rap	sq.m	48	$50.00	$2,400.00
2.10	Heavy Duty Silt Fence	m	240	$26.00	$6,240.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$172,400.00**
4.0	**PROVISIONAL ITEMS**				
4.01	Remove & Dispose of Excess Material	cu.m	390	$40.00	$15,600.00
4.02	Remove, Salvage, & Reinstate Existing Signs	ea	3	$300.00	$900.00
	SUBTOTAL: PROVISIONAL ITEMS				**$16,500.00**
5.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
5.01	Construction Contingency			30%	$65,000.00
5.02	Utlities/Services Relocation Cost			30%	$65,000.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$130,000.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$346,400.00**

Appendix D: Proposed Conditions Hydrologic Analysis

TATHAM ENGINEERING

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
		DATE	March 2023
SUBJECT	VO Schematic	NAME	PK
	Overall Drainage Plan - Option 3	PAGE	1 OF 1



NASHYD	ROUTE PIPE	DUHYD
STANDHYD	ROUTE CHANNEL	DIVERT HYD
ADDHYD	ROUTE RESERVOIR	SHIFTHYD

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================================================================================
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        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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DATE: 03-13-2023                           TIME: 05:28:38

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 001 - OWEN SOUND CHIC25MM **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
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    remark: OWEN SOUND CHIC25MM
*
 ** CALIB NASHYD         0101  1  5.0    13.09    0.05  2.83   2.86 0.11   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
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    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0110  1  5.0     3.70    0.10  1.92   6.09 0.24   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0     3.70    0.10  1.92   6.09  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0     0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0     3.70    0.10  1.92   6.09  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0    16.79    0.11  1.92   3.57  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0102  1  5.0     1.06    0.04  1.92   7.27 0.29   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0    17.85    0.15  1.92   3.79  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1051  1  5.0    10.37    0.26  1.92   5.94 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1052  1  5.0     1.64    0.05  1.92   5.93 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1053  1  5.0     1.00    0.03  1.92   5.92 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0    12.01    0.30  1.92   5.94  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0    13.01    0.33  1.92   5.93  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0    30.86    0.48  1.92   4.70  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0103  1  5.0     9.10    0.04  2.58   2.86 0.11   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0     9.10    0.04  2.58   2.86  n/a   0.000
*
    READ STORM                  6.0
```

```
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.03  2.33   1.93 0.08    0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.07  2.50   2.51  n/a    0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.01  2.33   1.93 0.08    0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0910  3  5.0   17.45    0.08  2.50   2.42  n/a    0.000
*
    ADD [  0910+  0906]  0910  1  5.0   48.31    0.49  1.92   3.87  n/a    0.000
*
    DUHYD                0802  1  5.0   48.31    0.49  1.92   3.87  n/a    0.000
       MAJOR SYSTEM:     0802  2  5.0   30.55    0.44  1.92   3.87  n/a    0.000
       MINOR SYSTEM:     0802  3  5.0   17.76    0.05  1.58   3.87  n/a    0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    0.41  2.17  12.06 0.48    0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.01  4.42  11.81  n/a    0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.03  2.50   2.22 0.09    0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.04  2.58   8.57  n/a    0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.03  2.58   2.31 0.09    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.03  1.92   5.80 0.23    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.03  2.50   2.80  n/a    0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.03  1.92   5.92 0.24    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]  0908  3  5.0   31.47    0.47  1.92   3.93  n/a    0.000
*
    ADD [  0908+  0905]  0908  1  5.0   50.96    0.48  1.92   5.71  n/a    0.000
*
    ADD [  0908+  0907]  0908  3  5.0   58.25    0.51  1.92   5.34  n/a    0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.04  2.42   2.31 0.09    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.02  1.92   5.80 0.23    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.04  2.42   2.68  n/a    0.000
*
    ADD [  0908+  0914]  0915  3  5.0   66.90    0.54  1.92   5.00  n/a    0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.02  2.42   2.31 0.09    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
```

```
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.02  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.03  2.42   2.83  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   72.87    0.56  1.92   4.82  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.02  2.50   2.31 0.09   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.03  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.03  1.92   2.93  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   78.73    0.60  1.92   4.68  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.06  3.33   2.31 0.09   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  105.28    0.60  1.92   4.08  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.03  1.92   7.24 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0   18.63    0.08  1.92   4.03  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.02  1.92   7.21 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0   19.05    0.10  1.92   4.10  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.02  1.92   7.21 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0   19.46    0.12  1.92   4.17  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01  1.92   7.17 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0   19.68    0.13  1.92   4.20  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    0.72  1.92   4.10  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.01  2.58   1.69 0.07   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    0.72  1.92   4.01  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\db1aea06-ee1d-4634-880b-63704f40dc71\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\db1aea06-ee1d-4634-880b-63704f40dc71\s
```

```
DATE: 03-13-2023                           TIME: 05:28:40

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 002 - Chicago-2yr 4hr 10m **
  ************************************************

  W/E COMMAND            HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                 min      ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.08  2.33   5.18 0.16   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.15  1.33   9.01 0.27   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.15  1.33   9.01  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.15  1.33   9.01  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.15  1.33   6.03  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.06  1.33  10.45 0.32   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.21  1.33   6.29  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.37  1.33   8.83 0.27   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.06  1.33   8.82 0.27   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.04  1.33   8.82 0.27   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.43  1.33   8.83  n/a   0.000
```

```
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.47  1.33   8.83  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    0.69  1.33   7.36  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.06  2.08   5.18 0.16   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.06  2.08   5.18  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.04  1.75   3.67 0.11   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.10  1.92   4.61  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.02  1.75   3.67 0.11   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0910  3  5.0   17.45    0.11  1.92   4.46  n/a   0.000
*
    ADD [  0910+  0906]  0910  1  5.0   48.31    0.71  1.33   6.31  n/a   0.000
*
    DUHYD                0802  1  5.0   48.31    0.71  1.33   6.31  n/a   0.000
       MAJOR SYSTEM:     0802  2  5.0   35.10    0.66  1.33   6.31  n/a   0.000
       MINOR SYSTEM:     0802  3  5.0   13.21    0.05  0.92   6.31  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    0.68  1.33  17.87 0.55   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.02  4.42  17.62  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.04  1.92   4.10 0.13   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.05  2.00  13.05  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.04  2.00   4.25 0.13   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                  10.0
```

```
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.04  1.33   8.70 0.27    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.05  1.92   4.88  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.04  1.33   8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]  0908  3  5.0   36.02    0.69  1.33   6.38  n/a    0.000
*
    ADD [  0908+  0905]  0908  1  5.0   55.51    0.70  1.33   8.72  n/a    0.000
*
    ADD [  0908+  0907]  0908  3  5.0   62.80    0.75  1.33   8.28  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.05  1.92   4.25 0.13    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.03  1.33   8.70 0.27    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.06  1.83   4.73  n/a    0.000
*
    ADD [  0908+  0914]  0915  3  5.0   71.45    0.79  1.33   7.85  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.03  1.83   4.25 0.13    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.03  1.33   8.70 0.27    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.04  1.83   4.92  n/a    0.000
*
    ADD [  0915+  0916]  0917  3  5.0   77.42    0.83  1.33   7.62  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.03  1.92   4.25 0.13    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.04  1.33   8.70 0.27    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.04  1.33   5.05  n/a    0.000
*
    ADD [  0917+  0918]  0919  3  5.0   83.28    0.87  1.33   7.44  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.10  2.92   4.25 0.13    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  109.83    0.88  1.33   6.67  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.05  1.33  10.50 0.32    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0   14.08    0.10  1.33   6.57  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.02  1.33  10.48 0.32    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0   14.50    0.12  1.33   6.69  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.02  1.33  10.48 0.32    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0   14.91    0.14  1.33   6.79  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01  1.33  10.45 0.32    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0   15.13    0.15  1.33   6.84  n/a    0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.03  1.33   6.69  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.02  2.08   3.29 0.10    0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    1.03  1.33   6.57  n/a    0.000
*
=================================================================================
==========================


       V     V    I     SSSSS  U     U     A     L              (v 6.2.2011)
       V     V    I     SS     U     U    A A    L
```

```
      V   V     I       SS     U    U   AAAAA   L
      V   V     I        SS    U    U   A    A  L
       VV       I     SSSSS   UUUUU   A    A  LLLLL

      OOO    TTTTT   TTTTT   H    H   Y    Y   M    M    OOO      TM
     O    O     T        T     H    H    Y Y    MM MM   O    O
     O    O     T        T     H    H     Y     M    M   O    O
      OOO      T        T     H    H     Y     M    M    OOO
```



```
                    *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\c789c467-48c0-4edf-8073-4ef525374475\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\c789c467-48c0-4edf-8073-4ef525374475\s


DATE: 03-13-2023                           TIME: 05:28:39

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 003 - Chicago-5yr 4hr 10m **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA   ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min      ha    '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 ** CALIB NASHYD          0101  1   5.0    13.09     0.14  2.25    9.31 0.21    0.000
    [CN=66.7           ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        0110  1   5.0     3.70     0.21  1.33   13.72 0.31    0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                 0801  1   5.0     3.70     0.21  1.33   13.72  n/a    0.000
       MAJOR SYSTEM:      0801  2   5.0     0.00     0.00  0.00    0.00  n/a    0.000
       MINOR SYSTEM:      0801  3   5.0     3.70     0.21  1.33   13.72  n/a    0.000
*
    ADD [  0101+  0801]   0901  3   5.0    16.79     0.22  1.33   10.28  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        0102  1   5.0     1.06     0.08  1.33   15.45 0.35    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]   0902  3   5.0    17.85     0.30  1.33   10.59  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        1051  1   5.0    10.37     0.52  1.33   13.53 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        1052  1   5.0     1.64     0.09  1.33   13.52 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        1053  1   5.0     1.00     0.06  1.33   13.52 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3   5.0    12.01     0.61  1.33   13.53  n/a    0.000
*
    ADD [  0906+  1053]   0906  1   5.0    13.01     0.67  1.33   13.53  n/a    0.000
*
    ADD [  0906+  0902]   0906  3   5.0    30.86     0.96  1.33   11.83  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD          0103  1   5.0     9.10     0.12  2.00    9.31 0.21    0.000
    [CN=66.7           ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]   0903  3   5.0     9.10     0.12  2.00    9.31  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD          1041  1   5.0     5.61     0.07  1.75    6.88 0.16    0.000
    [CN=59.6           ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]   0904  3   5.0    14.71     0.18  1.92    8.38  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD          1042  1   5.0     2.74     0.03  1.75    6.88 0.16    0.000
    [CN=59.6           ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]   0910  3   5.0    17.45     0.21  1.83    8.15  n/a    0.000
*
    ADD [  0910+  0906]   0910  1   5.0    48.31     1.01  1.33   10.50  n/a    0.000
*
    DUHYD                 0802  1   5.0    48.31     1.01  1.33   10.50  n/a    0.000
       MAJOR SYSTEM:      0802  2   5.0    39.71     0.96  1.33   10.50  n/a    0.000
       MINOR SYSTEM:      0802  3   5.0     8.60     0.05  0.75   10.50  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        0106  1   5.0    12.90     1.05  1.50   26.71 0.61    0.000
```

```
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:          0401  1  5.0   12.90    0.02  3.50  26.45  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD      0107  1  5.0    6.59    0.08  1.92   7.52 0.17   0.000
    [CN=61.0        ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.09  1.92  20.05  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD      1111  1  5.0    6.26    0.07  2.00   7.78 0.18   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD    1081  1  5.0    1.03    0.05  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.08  1.92   8.57  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD    1054  1  5.0    0.92    0.05  1.33  13.52 0.31   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]  0908  3  5.0   40.63    1.01  1.33  10.57  n/a   0.000
*
    ADD [  0908+  0905]  0908  1  5.0   60.12    1.03  1.33  13.64  n/a   0.000
*
    ADD [  0908+  0907]  0908  3  5.0   67.41    1.09  1.33  13.09  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD      1112  1  5.0    7.73    0.10  1.83   7.78 0.18   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD    1082  1  5.0    0.92    0.05  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.11  1.83   8.38  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   76.06    1.16  1.33  12.56  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD      1113  1  5.0    5.08    0.07  1.83   7.78 0.18   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 0.44]
```

```
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD    1083  1  5.0    0.89    0.05  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.08  1.75   8.62  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   82.03    1.22  1.33  12.27  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD      1114  1  5.0    4.81    0.06  1.92   7.78 0.18   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD    1084  1  5.0    1.05    0.06  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.07  1.83   8.79  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   87.89    1.28  1.33  12.04  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD      1115  1  5.0   26.55    0.19  2.83   7.78 0.18   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  114.44    1.29  1.33  11.05  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD    1091  1  5.0    0.87    0.06  1.33  15.67 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0    9.47    0.11  1.33  10.97  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD    1092  1  5.0    0.42    0.03  1.33  15.65 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0    9.89    0.14  1.33  11.17  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD    1093  1  5.0    0.41    0.03  1.33  15.65 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0   10.30    0.18  1.33  11.35  n/a   0.000
*
    CHIC STORM              10.0
    [ Ptot= 43.76 mm ]
*
```

```
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  15.64 0.36    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0   10.52    0.19  1.33  11.44  n/a    0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.48  1.33  11.08  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.04  2.00   6.26 0.14    0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    1.49  1.33  10.91  n/a    0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\d6ff4c14-0a44-40c1-90c4-95bcdb0d55ce\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\d6ff4c14-0a44-40c1-90c4-95bcdb0d55ce\s


DATE: 03-13-2023                           TIME: 05:28:40

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 004 - Chicago-10yr 4hr 10 **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
```

```
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.20  2.25  12.51 0.25    0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.25  1.33  17.19 0.34    0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.25  1.33  17.19  n/a    0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.25  1.33  17.19  n/a    0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.27  1.33  13.54  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.10  1.33  19.07 0.37    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.37  1.33  13.87  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.64  1.33  16.99 0.33    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.11  1.33  16.99 0.33    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.07  1.33  16.98 0.33    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.75  1.33  16.99  n/a    0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.82  1.33  16.99  n/a    0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    1.18  1.33  15.18  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.16  2.00  12.51 0.25    0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.16  2.00  12.51  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.10  1.75   9.42 0.18    0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
```

```
*
   ADD [  1041+  0903]  0904  3  5.0   14.71    0.25  1.92  11.33  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD         1042  1  5.0    2.74    0.05  1.75   9.42 0.18    0.000
   [CN=59.6        ]
   [ N = 3.0:Tp 0.36]
*
   ADD [  1042+  0904]  0910  3  5.0   17.45    0.29  1.83  11.03  n/a    0.000
*
   ADD [  0910+  0906]  0910  1  5.0   48.31    1.24  1.33  13.68  n/a    0.000
*
   DUHYD                0802  1  5.0   48.31    1.24  1.33  13.68  n/a    0.000
      MAJOR SYSTEM:     0802  2  5.0   41.46    1.19  1.33  13.68  n/a    0.000
      MINOR SYSTEM:     0802  3  5.0    6.85    0.05  0.58  13.68  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD       0106  1  5.0   12.90    1.34  1.50  32.86 0.64    0.000
   [I%=16.0:S%= 2.00]
*
** Reservoir
   OUTFLOW:             0401  1  5.0   12.90    0.08  4.17  32.56  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD         0107  1  5.0    6.59    0.11  1.92  10.21 0.20    0.000
   [CN=61.0        ]
   [ N = 3.0:Tp 0.49]
*
   ADD [  0107+  0401]  0905  3  5.0   19.49    0.13  1.92  25.00  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD         1111  1  5.0    6.26    0.10  2.00  10.54 0.21    0.000
   [CN=61.9        ]
   [ N = 3.0:Tp 0.54]
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD       1081  1  5.0    1.03    0.07  1.33  16.90 0.33    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1081+  1111]  0907  3  5.0    7.29    0.12  1.83  11.44  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD       1054  1  5.0    0.92    0.06  1.33  16.98 0.33    0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1054+  0802]  0908  3  5.0   42.38    1.26  1.33  13.76  n/a    0.000
*
   ADD [  0908+  0905]  0908  1  5.0   61.87    1.28  1.33  17.30  n/a    0.000
*
   ADD [  0908+  0907]  0908  3  5.0   69.16    1.36  1.33  16.68  n/a    0.000
*
   CHIC STORM                 10.0
```

```
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD         1112  1  5.0    7.73    0.13  1.83  10.54 0.21    0.000
   [CN=61.9        ]
   [ N = 3.0:Tp 0.46]
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD       1082  1  5.0    0.92    0.06  1.33  16.90 0.33    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1082+  1112]  0914  3  5.0    8.65    0.15  1.83  11.22  n/a    0.000
*
   ADD [  0908+  0914]  0915  3  5.0   77.81    1.45  1.33  16.07  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD         1113  1  5.0    5.08    0.09  1.83  10.54 0.21    0.000
   [CN=61.9        ]
   [ N = 3.0:Tp 0.44]
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD       1083  1  5.0    0.89    0.06  1.33  16.90 0.33    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1083+  1113]  0916  3  5.0    5.97    0.11  1.75  11.49  n/a    0.000
*
   ADD [  0915+  0916]  0917  3  5.0   83.78    1.52  1.33  15.75  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD         1114  1  5.0    4.81    0.08  1.92  10.54 0.21    0.000
   [CN=61.9        ]
   [ N = 3.0:Tp 0.50]
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD       1084  1  5.0    1.05    0.07  1.33  16.90 0.33    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1084+  1114]  0918  3  5.0    5.86    0.10  1.83  11.68  n/a    0.000
*
   ADD [  0917+  0918]  0919  3  5.0   89.64    1.60  1.33  15.48  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD         1115  1  5.0   26.55    0.25  2.83  10.54 0.21    0.000
   [CN=61.9        ]
   [ N = 3.0:Tp 1.13]
*
   ADD [  1115+  0919]  0920  3  5.0  116.19    1.61  1.33  14.35  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD       1091  1  5.0    0.87    0.08  1.33  19.41 0.38    0.000
   [I%=23.0:S%= 2.00]
```

```
*
    ADD [  1091+  0802]  0913  3  5.0    7.72    0.13  1.33  14.33  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.04  1.33  19.41 0.38   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0    8.14    0.16  1.33  14.59  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.04  1.33  19.40 0.38   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    8.55    0.20  1.33  14.82  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  19.38 0.38   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    8.77    0.22  1.33  14.94  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.83  1.33  14.39  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.06  2.00   8.63 0.17   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    1.84  1.33  14.19  n/a   0.000
*
=================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\5c49b876-c245-473f-8fc5-888543e7dedb\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\5c49b876-c245-473f-8fc5-888543e7dedb\s

DATE: 03-13-2023                          TIME: 05:28:37

USER:

COMMENTS: ____________________________________________________________

  **************************************************
  ** SIMULATION : RUN 005 - Chicago-25yr 4hr 10 **
  **************************************************

  W/E COMMAND               HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                     min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.27  2.25  16.95 0.28   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.30  1.33  21.85 0.36   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.30  1.33  21.85  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.30  1.33  21.85  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.33  2.08  18.03  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.12  1.33  23.88 0.40   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.45  1.33  18.37  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.78  1.33  21.65 0.36   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.14  1.33  21.65 0.36   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.09  1.33  21.65 0.36   0.000
    [I%=17.0:S%= 2.00]
```

```
*
   ADD [  1051+  1052]  0906  3  5.0   12.01    0.92  1.33  21.65  n/a    0.000
*
   ADD [  0906+  1053]  0906  1  5.0   13.01    1.01  1.33  21.65  n/a    0.000
*
   ADD [  0906+  0902]  0906  3  5.0   30.86    1.46  1.33  19.76  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         0103  1  5.0    9.10    0.22  2.00  16.94 0.28    0.000
   [CN=66.7         ]
   [ N = 3.0:Tp 0.59]
*
   ADD [  0103+  0801]  0903  3  5.0    9.10    0.22  2.00  16.94  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1041  1  5.0    5.61    0.14  1.75  13.01 0.22    0.000
   [CN=59.6         ]
   [ N = 3.0:Tp 0.37]
*
   ADD [  1041+  0903]  0904  3  5.0   14.71    0.34  1.92  15.44  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1042  1  5.0    2.74    0.07  1.67  13.01 0.22    0.000
   [CN=59.6         ]
   [ N = 3.0:Tp 0.36]
*
   ADD [  1042+  0904]  0910  3  5.0   17.45    0.41  1.83  15.06  n/a    0.000
*
   ADD [  0910+  0906]  0910  1  5.0   48.31    1.55  1.33  18.06  n/a    0.000
*
   DUHYD                0802  1  5.0   48.31    1.55  1.33  18.06  n/a    0.000
      MAJOR SYSTEM:     0802  2  5.0   42.91    1.50  1.33  18.06  n/a    0.000
      MINOR SYSTEM:     0802  3  5.0    5.40    0.05  0.50  18.06  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       0106  1  5.0   12.90    1.72  1.50  40.75 0.68    0.000
   [I%=16.0:S%= 2.00]
*
 ** Reservoir
   OUTFLOW:             0401  1  5.0   12.90    0.11  4.08  40.44  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         0107  1  5.0    6.59    0.15  1.92  13.99 0.23    0.000
   [CN=61.0         ]
   [ N = 3.0:Tp 0.49]
*
   ADD [  0107+  0401]  0905  3  5.0   19.49    0.20  2.17  31.50  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1111  1  5.0    6.26    0.13  1.92  14.42 0.24    0.000
   [CN=61.9         ]
   [ N = 3.0:Tp 0.54]
```

```
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1081  1  5.0    1.03    0.08  1.33  21.60 0.36    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1081+  1111]  0907  3  5.0    7.29    0.16  1.83  15.43  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1054  1  5.0    0.92    0.08  1.33  21.64 0.36    0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1054+  0802]  0908  3  5.0   43.83    1.58  1.33  18.14  n/a    0.000
*
   ADD [  0908+  0905]  0908  1  5.0   63.32    1.61  1.33  22.25  n/a    0.000
*
   ADD [  0908+  0907]  0908  3  5.0   70.61    1.72  1.33  21.54  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1112  1  5.0    7.73    0.19  1.83  14.42 0.24    0.000
   [CN=61.9         ]
   [ N = 3.0:Tp 0.46]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1082  1  5.0    0.92    0.08  1.33  21.60 0.36    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1082+  1112]  0914  3  5.0    8.65    0.21  1.83  15.18  n/a    0.000
*
   ADD [  0908+  0914]  0915  3  5.0   79.26    1.84  1.33  20.85  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1113  1  5.0    5.08    0.13  1.83  14.42 0.24    0.000
   [CN=61.9         ]
   [ N = 3.0:Tp 0.44]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1083  1  5.0    0.89    0.07  1.33  21.60 0.36    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1083+  1113]  0916  3  5.0    5.97    0.15  1.75  15.49  n/a    0.000
*
   ADD [  0915+  0916]  0917  3  5.0   85.23    1.94  1.33  20.47  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1114  1  5.0    4.81    0.11  1.92  14.42 0.24    0.000
   [CN=61.9         ]
   [ N = 3.0:Tp 0.50]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
```

```
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.09  1.33  21.60 0.36    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.14  1.83  15.71  n/a    0.000
*
    ADD [  0917+  0918]  0919  3  5.0   91.09    2.04  1.33  20.17  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.35  2.83  14.42 0.24    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  117.64    2.07  1.83  18.87  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.09  1.33  24.40 0.41    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0    6.27    0.14  1.33  18.94  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.05  1.33  24.40 0.41    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0    6.69    0.19  1.33  19.28  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.04  1.33  24.40 0.41    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    7.10    0.24  1.33  19.58  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  24.38 0.41    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    7.32    0.26  1.33  19.72  n/a    0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    2.32  1.33  18.92  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.08  2.00  12.01 0.20    0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    2.33  1.33  18.67  n/a    0.000
*
=================================================================================
==========================
```

```
      V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\fb2148da-83c4-4492-aaa8-f91b8cb9b311\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\fb2148da-83c4-4492-aaa8-f91b8cb9b311\s

DATE: 03-13-2023                           TIME: 05:28:42

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 006 - Chicago-50yr 4hr 10 **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                    min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.33  2.25  20.60 0.31    0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.37  1.33  25.61 0.38    0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.37  1.33  25.61  n/a    0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.37  1.33  25.61  n/a    0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.40  1.33  21.70  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
```

```
 *  CALIB STANDHYD        0102  1  5.0    1.06    0.14  1.33  27.74 0.41   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]   0902  3  5.0   17.85    0.54  1.33  22.06  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD        1051  1  5.0   10.37    0.90  1.33  25.42 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD        1052  1  5.0    1.64    0.16  1.33  25.42 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD        1053  1  5.0    1.00    0.10  1.33  25.41 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3  5.0   12.01    1.06  1.33  25.42  n/a   0.000
*
    ADD [  0906+  1053]   0906  1  5.0   13.01    1.15  1.33  25.42  n/a   0.000
*
    ADD [  0906+  0902]   0906  3  5.0   30.86    1.69  1.33  23.48  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD          0103  1  5.0    9.10    0.27  2.00  20.60 0.31   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]   0903  3  5.0    9.10    0.27  2.00  20.60  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD          1041  1  5.0    5.61    0.17  1.75  16.01 0.24   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]   0904  3  5.0   14.71    0.42  1.83  18.85  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD          1042  1  5.0    2.74    0.09  1.67  16.01 0.24   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]   0910  3  5.0   17.45    0.50  1.83  18.41  n/a   0.000
*
    ADD [  0910+  0906]   0910  1  5.0   48.31    1.81  1.33  21.65  n/a   0.000
*
    DUHYD                 0802  1  5.0   48.31    1.81  1.33  21.65  n/a   0.000
       MAJOR SYSTEM:      0802  2  5.0   43.71    1.76  1.33  21.65  n/a   0.000
       MINOR SYSTEM:      0802  3  5.0    4.60    0.05  0.42  21.65  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
```

```
*
 *  CALIB STANDHYD        0106  1  5.0   12.90    2.03  1.42  46.87 0.70   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:              0401  1  5.0   12.90    0.14  4.08  46.55  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD          0107  1  5.0    6.59    0.18  1.92  17.14 0.26   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]   0905  3  5.0   19.49    0.27  2.08  36.61  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD          1111  1  5.0    6.26    0.17  1.92  17.64 0.26   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD        1081  1  5.0    1.03    0.10  1.33  25.40 0.38   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]   0907  3  5.0    7.29    0.19  1.83  18.74  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD        1054  1  5.0    0.92    0.09  1.33  25.41 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]   0908  3  5.0   44.63    1.85  1.33  21.72  n/a   0.000
*
    ADD [  0908+  0905]   0908  1  5.0   64.12    1.90  1.33  26.25  n/a   0.000
*
    ADD [  0908+  0907]   0908  3  5.0   71.41    2.02  1.33  25.48  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD          1112  1  5.0    7.73    0.23  1.83  17.64 0.26   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD        1082  1  5.0    0.92    0.09  1.33  25.40 0.38   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]   0914  3  5.0    8.65    0.26  1.83  18.47  n/a   0.000
*
    ADD [  0908+  0914]   0915  3  5.0   80.06    2.16  1.33  24.72  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD          1113  1  5.0    5.08    0.16  1.83  17.64 0.26   0.000
```

```
   [CN=61.9          ]
   [ N = 3.0:Tp 0.44]
*
   CHIC STORM                  10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1083  1  5.0    0.89    0.08  1.33  25.40 0.38   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1083+  1113]  0916  3  5.0    5.97    0.18  1.75  18.80  n/a   0.000
*
   ADD [  0915+  0916]  0917  3  5.0   86.03    2.28  1.33  24.31  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         1114  1  5.0    4.81    0.13  1.92  17.64 0.26   0.000
   [CN=61.9          ]
   [ N = 3.0:Tp 0.50]
*
   CHIC STORM                  10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1084  1  5.0    1.05    0.10  1.33  25.40 0.38   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1084+  1114]  0918  3  5.0    5.86    0.17  1.83  19.03  n/a   0.000
*
   ADD [  0917+  0918]  0919  3  5.0   91.89    2.41  1.33  23.98  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         1115  1  5.0   26.55    0.43  2.83  17.64 0.26   0.000
   [CN=61.9          ]
   [ N = 3.0:Tp 1.13]
*
   ADD [  1115+  0919]  0920  3  5.0  118.44    2.58  1.83  22.56  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1091  1  5.0    0.87    0.11  1.33  28.41 0.42   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1091+  0802]  0913  3  5.0    5.47    0.16  1.33  22.72  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1092  1  5.0    0.42    0.05  1.33  28.40 0.42   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1092+  0913]  0912  3  5.0    5.89    0.21  1.33  23.13  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1093  1  5.0    0.41    0.05  1.33  28.39 0.42   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1093+  0912]  0921  3  5.0    6.30    0.26  1.33  23.47  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1094  1  5.0    0.22    0.03  1.33  28.38 0.42   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0    6.52    0.29  1.33  23.63  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    2.71  1.33  22.61  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         0112  1  5.0    4.67    0.10  2.00  14.84 0.22   0.000
   [CN=57.7          ]
   [ N = 3.0:Tp 0.55]
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    2.78  1.83  22.33  n/a   0.000
*
 FINISH

=================================================================================
==========================

=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\a8f68b30-9d23-46d1-839d-8b16e6768bf5\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\a8f68b30-9d23-46d1-839d-8b16e6768bf5\s


DATE: 03-13-2023                           TIME: 05:28:39

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 007 - Chicago-100yr 4hr 1 **
  ************************************************
```

```
  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                   min      ha  '  cms   hrs     mm            cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 ** CALIB NASHYD           0101  1  5.0   13.09    0.39  2.25  24.35 0.33   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD         0110  1  5.0    3.70    0.42  1.33  29.41 0.40   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                  0801  1  5.0    3.70    0.42  1.33  29.41  n/a   0.000
       MAJOR SYSTEM:       0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:       0801  3  5.0    3.70    0.42  1.33  29.41  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.47  2.08  25.46  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD         0102  1  5.0    1.06    0.15  1.33  31.61 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.61  1.33  25.83  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD         1051  1  5.0   10.37    1.10  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD         1052  1  5.0    1.64    0.18  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD         1053  1  5.0    1.00    0.11  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.28  1.33  29.23  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.39  1.33  29.23  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.01  1.33  27.26  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD           0103  1  5.0    9.10    0.32  2.00  24.34 0.33   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.32  2.00  24.34  n/a   0.000
```

```
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD           1041  1  5.0    5.61    0.21  1.75  19.12 0.26   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.51  1.83  22.35  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD           1042  1  5.0    2.74    0.10  1.67  19.12 0.26   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0910  3  5.0   17.45    0.60  1.83  21.85  n/a   0.000
*
    ADD [  0910+  0906]  0910  1  5.0   48.31    2.16  1.33  25.31  n/a   0.000
*
    DUHYD                  0802  1  5.0   48.31    2.16  1.33  25.31  n/a   0.000
       MAJOR SYSTEM:       0802  2  5.0   44.30    2.11  1.33  25.31  n/a   0.000
       MINOR SYSTEM:       0802  3  5.0    4.01    0.05  0.33  25.31  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD         0106  1  5.0   12.90    2.91  1.33  52.88 0.72   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:               0401  1  5.0   12.90    0.18  3.83  52.55  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD           0107  1  5.0    6.59    0.22  1.83  20.39 0.28   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.33  2.00  41.67  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD           1111  1  5.0    6.26    0.20  1.92  20.97 0.29   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD         1081  1  5.0    1.03    0.11  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.23  1.83  22.14  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD         1054  1  5.0    0.92    0.10  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
```

```
    ADD [  1054+  0802]  0908  3  5.0   45.22    2.21  1.33  25.39  n/a   0.000
*
    ADD [  0908+  0905]  0908  1  5.0   64.71    2.26  1.33  30.29  n/a   0.000
*
    ADD [  0908+  0907]  0908  3  5.0   72.00    2.41  1.33  29.47  n/a   0.000
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.28  1.83  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.10  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.31  1.75  21.85  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   80.65    2.58  1.33  28.65  n/a   0.000
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.19  1.83  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.10  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.22  1.75  22.20  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   86.62    2.72  1.33  28.20  n/a   0.000
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.16  1.92  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.11  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.20  1.83  22.45  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   92.48    2.87  1.33  27.84  n/a   0.000
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.51  2.75  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
```

```
    ADD [  1115+  0919]  0920  3  5.0  119.03    3.07  1.83  26.31  n/a   0.000
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.12  1.33  32.43 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0    4.88    0.17  1.33  26.58  n/a   0.000
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.06  1.33  32.43 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0    5.30    0.23  1.33  27.04  n/a   0.000
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.06  1.33  32.43 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    5.71    0.29  1.33  27.43  n/a   0.000
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.03  1.33  32.41 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    5.93    0.32  1.33  27.61  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    3.21  1.33  26.37  n/a   0.000
*
    CHIC STORM                   10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.12  2.00  17.78 0.24   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    3.31  1.83  26.06  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

```
                  *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\6660e912-24e4-4990-91b9-4efd9ad0f52b\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\6660e912-24e4-4990-91b9-4efd9ad0f52b\s


DATE: 03-13-2023                           TIME: 05:28:37

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 008 - SCS-2yr 24hr 15min  **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.17 12.92  13.65 0.26   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.15 12.25  18.39 0.34   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.15 12.25  18.39  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.15 12.25  18.39  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.22 12.75  14.69  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.05 12.25  20.32 0.38   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.26 12.25  15.03  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.39 12.25  18.20 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.07 12.25  18.19 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.04 12.25  18.19 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.46 12.25  18.20  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.50 12.25  18.20  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    0.76 12.25  16.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.14 12.75  13.65 0.26   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.14 12.75  13.65  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.09 12.50  10.33 0.19   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.22 12.67  12.38  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.05 12.50  10.33 0.19   0.000
    [CN=59.6         ]
```

```
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0910  3  5.0   17.45    0.26 12.58  12.06  n/a   0.000
*
    ADD [  0910+  0906]  0910  1  5.0   48.31    0.89 12.25  14.81  n/a   0.000
*
    DUHYD                0802  1  5.0   48.31    0.89 12.25  14.81  n/a   0.000
       MAJOR SYSTEM:     0802  2  5.0   29.50    0.84 12.25  14.81  n/a   0.000
       MINOR SYSTEM:     0802  3  5.0   18.81    0.05 11.08  14.81  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.04 12.25  34.94 0.65   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.03 20.33  34.45  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.09 12.67  11.18 0.21   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.11 12.67  26.58  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.09 12.75  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.10 12.67  12.46  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.04 12.25  18.19 0.34   0.000
    [I%=17.0:S%= 2.00]
*
```

```
    ADD [  1054+  0802]  0908  3  5.0   30.42    0.88 12.25  14.91  n/a   0.000
*
    ADD [  0908+  0905]  0908  1  5.0   49.91    0.94 12.25  19.47  n/a   0.000
*
    ADD [  0908+  0907]  0908  3  5.0   57.20    1.02 12.25  18.58  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.12 12.58  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.14 12.58  12.23  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   65.85    1.11 12.25  17.74  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.08 12.58  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.10 12.50  12.51  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   71.82    1.19 12.25  17.31  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.07 12.67  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                     15.0
    [ Ptot= 53.41 mm ]
```

```
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.09 12.58  12.71  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   77.68    1.27 12.25  16.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.21 13.42  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  104.23    1.36 12.58  15.58  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.05 12.25  20.71 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0   19.68    0.10 12.25  15.07  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.02 12.25  20.70 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0   20.10    0.12 12.25  15.19  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.02 12.25  20.70 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0   20.51    0.14 12.25  15.30  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01 12.25  20.68 0.39   0.000
    [I%=23.0:S%= 2.00]
```

```
*
    ADD [  1094+  0921]  0922  3  5.0   20.73    0.15 12.25  15.36  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.46 12.25  15.54  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.05 12.75   9.49 0.18   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    1.49 12.58  15.32  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
        OOO      T      T    H   H    Y    M   M   OOO
```

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```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\0c7c8899-c883-4160-b005-bac857a8b88c\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\0c7c8899-c883-4160-b005-bac857a8b88c\s


DATE: 03-13-2023                          TIME: 05:28:34

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 009 - SCS-5yr 24hr 15min  **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
```

```
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD          0101  1  5.0    13.09    0.29 12.92  23.29 0.33   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        0110  1  5.0     3.70    0.24 12.25  28.34 0.40   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                 0801  1  5.0     3.70    0.24 12.25  28.34  n/a   0.000
       MAJOR SYSTEM:      0801  2  5.0     0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:      0801  3  5.0     3.70    0.24 12.25  28.34  n/a   0.000
*
    ADD [  0101+  0801]   0901  3  5.0    16.79    0.36 12.75  24.40  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        0102  1  5.0     1.06    0.08 12.25  30.53 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]   0902  3  5.0    17.85    0.42 12.25  24.77  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1051  1  5.0    10.37    0.63 12.25  28.16 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1052  1  5.0     1.64    0.12 12.25  28.16 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1053  1  5.0     1.00    0.07 12.25  28.15 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3  5.0    12.01    0.74 12.25  28.16  n/a   0.000
*
    ADD [  0906+  1053]   0906  1  5.0    13.01    0.82 12.25  28.16  n/a   0.000
*
    ADD [  0906+  0902]   0906  3  5.0    30.86    1.23 12.25  26.20  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          0103  1  5.0     9.10    0.24 12.75  23.29 0.33   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]   0903  3  5.0     9.10    0.24 12.75  23.29  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          1041  1  5.0     5.61    0.16 12.50  18.24 0.25   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]   0904  3  5.0    14.71    0.39 12.67  21.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          1042  1  5.0     2.74    0.08 12.50  18.24 0.25   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]   0910  3  5.0    17.45    0.47 12.58  20.87  n/a   0.000
*
    ADD [  0910+  0906]   0910  1  5.0    48.31    1.48 12.25  24.27  n/a   0.000
*
    DUHYD                 0802  1  5.0    48.31    1.48 12.25  24.27  n/a   0.000
       MAJOR SYSTEM:      0802  2  5.0    35.28    1.43 12.25  24.27  n/a   0.000
       MINOR SYSTEM:      0802  3  5.0    13.03    0.05 10.33  24.27  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        0106  1  5.0    12.90    1.60 12.25  51.20 0.71   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:              0401  1  5.0    12.90    0.11 14.00  50.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
```

```
 *  CALIB NASHYD        0107  1  5.0    6.59    0.17 12.67  19.47 0.27   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.24 12.83  40.14  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1111  1  5.0    6.26    0.15 12.67  20.03 0.28   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1081  1  5.0    1.03    0.07 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.18 12.67  21.18  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1054  1  5.0    0.92    0.07 12.25  28.15 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]  0908  3  5.0   36.20    1.50 12.25  24.37  n/a   0.000
*
    ADD [  0908+  0905]  0908  1  5.0   55.69    1.60 12.25  29.89  n/a   0.000
*
    ADD [  0908+  0907]  0908  3  5.0   62.98    1.74 12.25  28.88  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1112  1  5.0    7.73    0.21 12.58  20.03 0.28   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1082  1  5.0    0.92    0.06 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.24 12.58  20.89  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   71.63    1.91 12.25  27.92  n/a   0.000
```

```
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1113  1  5.0    5.08    0.14 12.58  20.03 0.28   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1083  1  5.0    0.89    0.06 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.17 12.50  21.24  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   77.60    2.05 12.25  27.40  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1114  1  5.0    4.81    0.12 12.67  20.03 0.28   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1084  1  5.0    1.05    0.07 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.15 12.58  21.48  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   83.46    2.20 12.50  26.99  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1115  1  5.0   26.55    0.37 13.42  20.03 0.28   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  110.01    2.38 12.50  25.31  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
```

```
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.07 12.25   31.30 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0   13.90    0.12 12.25   24.71  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.04 12.25   31.29 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0   14.32    0.16 12.25   24.91  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03 12.25   31.29 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0   14.73    0.19 12.25   25.08  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02 12.25   31.28 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0   14.95    0.21 12.25   25.17  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    2.49 12.50   25.29  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.09 12.75   16.95 0.24   0.000
    [CN=57.7           ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    2.57 12.50   24.99  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L               (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M  OOO    TM
```

```
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\048b6e19-a3ee-4fbd-8f6d-972c23ed4cb0\s
  Summary     filename:     C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\048b6e19-a3ee-4fbd-8f6d-972c23ed4cb0\s


DATE: 03-13-2023                            TIME: 05:28:33

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 010 - SCS-10yr 24hr 15min **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.39 12.92   30.47 0.36   0.000
    [CN=66.7           ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.33 12.25   35.56 0.43   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.33 12.25   35.56  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00    0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.33 12.25   35.56  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.47 12.75   31.59  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
```

```
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.11 12.25  37.86 0.45   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.57 12.25  31.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.89 12.25  35.40 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.15 12.25  35.40 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.09 12.25  35.39 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.04 12.25  35.40  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.13 12.25  35.40  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    1.70 12.25  33.41  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.32 12.75  30.47 0.36   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.32 12.75  30.47  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.22 12.50  24.27 0.29   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.52 12.58  28.10  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.11 12.50  24.27 0.29   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0910  3  5.0   17.45    0.62 12.58  27.50  n/a   0.000
*
    ADD [  0910+  0906]  0910  1  5.0   48.31    2.04 12.25  31.28  n/a   0.000
*
    DUHYD                0802  1  5.0   48.31    2.04 12.25  31.28  n/a   0.000
       MAJOR SYSTEM:     0802  2  5.0   37.68    1.99 12.25  31.28  n/a   0.000
       MINOR SYSTEM:     0802  3  5.0   10.63    0.05  9.67  31.28  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.00 12.25  62.25 0.74   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.14 13.83  61.74  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.22 12.67  25.75 0.31   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.34 12.75  49.57  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.20 12.67  26.45 0.32   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.09 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.23 12.58  27.72  n/a   0.000
*
    READ STORM                 15.0
```

```
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.08 12.25  35.39 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]  0908  3  5.0   38.60    2.07 12.25  31.37  n/a   0.000
*
    ADD [  0908+  0905]  0908  1  5.0   58.09    2.20 12.25  37.48  n/a   0.000
*
    ADD [  0908+  0907]  0908  3  5.0   65.38    2.39 12.25  36.39  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.28 12.58  26.44 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.08 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.31 12.58  27.40  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   74.03    2.62 12.25  35.34  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.19 12.58  26.44 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.08 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.23 12.50  27.79  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   80.00    2.80 12.25  34.78  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.16 12.67  26.45 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.10 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.20 12.50  28.06  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   85.86    2.98 12.25  34.32  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.50 13.42  26.45 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  112.41    3.15 12.42  32.46  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.09 12.25  38.90 0.47   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0   11.50    0.14 12.25  31.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.04 12.25  38.90 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0   11.92    0.19 12.25  32.10  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.04 12.25  38.90 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0   12.33    0.23 12.25  32.33  n/a   0.000
*
```

```
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02 12.25  38.88 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0   12.55    0.25 12.25  32.44  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    3.34 12.25  32.46  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 83.66 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.13 12.75  22.67 0.27   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    3.41 12.42  32.11  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\ef361f99-c864-47fd-baf8-6e246f3e9e12\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\ef361f99-c864-47fd-baf8-6e246f3e9e12\s


DATE: 03-13-2023                           TIME: 05:28:41

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 011 - SCS-25yr 24hr 15min **
```

```
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot= 98.64 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.52 12.92  40.16 0.41   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                  15.0
    [ Ptot= 98.64 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.43 12.25  45.18 0.46   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.43 12.25  45.18  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.43 12.25  45.18  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.61 12.75  41.26  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 98.64 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.14 12.25  47.57 0.48   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.75 12.25  41.64  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 98.64 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.16 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 98.64 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.19 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 98.64 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
```

```
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.12 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.35 12.25  45.05  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.47 12.25  45.05  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.21 12.25  43.08  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.43 12.75  40.16 0.41   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.43 12.75  40.16  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.30 12.50  32.55 0.33   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.69 12.58  37.26  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.15 12.50  32.55 0.33   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0910  3  5.0   17.45    0.83 12.58  36.52  n/a   0.000
*
    ADD [  0910+  0906]  0910  1  5.0   48.31    2.68 12.25  40.71  n/a   0.000
*
    DUHYD                0802  1  5.0   48.31    2.68 12.25  40.71  n/a   0.000
       MAJOR SYSTEM:     0802  2  5.0   39.73    2.63 12.25  40.71  n/a   0.000
       MINOR SYSTEM:     0802  3  5.0    8.58    0.05  8.83  40.71  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.51 12.25  76.27 0.77   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.48 12.92  75.76  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.30 12.67  34.34 0.35   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.74 12.83  61.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.27 12.67  35.20 0.36   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.12 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.31 12.58  36.62  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.11 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]  0908  3  5.0   40.65    2.74 12.25  40.81  n/a   0.000
*
    ADD [  0908+  0905]  0908  1  5.0   60.14    2.91 12.25  47.60  n/a   0.000
*
    ADD [  0908+  0907]  0908  3  5.0   67.43    3.16 12.25  46.41  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.38 12.58  35.20 0.36   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
```

```
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.11 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.42 12.50  36.27  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   76.08    3.49 12.42  45.25  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.26 12.58  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.11 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.30 12.50  36.69  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   82.05    3.79 12.42  44.63  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.22 12.67  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.12 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.27 12.50  37.00  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   87.91    4.06 12.42  44.12  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.67 13.42  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  114.46    4.32 12.42  42.05  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.12 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0    9.45    0.17 12.25  41.47  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.06 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0    9.87    0.22 12.25  41.79  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.06 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0   10.28    0.28 12.25  42.07  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.03 12.25  48.94 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0   10.50    0.31 12.25  42.22  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    4.51 12.42  42.07  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 98.64 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.17 12.75  30.58 0.31   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    4.65 12.42  41.65  n/a   0.000
*
================================================================================
==========================
```

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\34306928-f5dc-46d8-9d55-7bd6801ad3c0\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\34306928-f5dc-46d8-9d55-7bd6801ad3c0\s

DATE: 03-13-2023                          TIME: 05:28:35

USER:

COMMENTS: ____________________________________________________________

  *************************************************
  ** SIMULATION : RUN 012 - SCS-50yr 24hr 15min **
  *************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min      ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.62 12.92  48.02 0.44   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.51 12.25  52.93 0.48   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.51 12.25  52.93  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
```

```
       MINOR SYSTEM:     0801  3  5.0    3.70    0.51 12.25  52.93  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.73 12.75  49.10  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.16 12.25  55.36 0.50   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.89 12.25  49.47  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.37 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.23 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.14 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.60 12.25  52.82  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.74 12.25  52.82  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.63 12.25  50.88  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.51 12.75  48.02 0.44   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.51 12.75  48.02  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
```

```
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          1041  1  5.0    5.61    0.36 12.50  39.37 0.36   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.84 12.58  44.72  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          1042  1  5.0    2.74    0.18 12.50  39.36 0.36   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0910  3  5.0   17.45    1.01 12.58  43.88  n/a   0.000
*
    ADD [  0910+  0906]  0910  1  5.0   48.31    3.20 12.25  48.35  n/a   0.000
*
    DUHYD                 0802  1  5.0   48.31    3.20 12.25  48.35  n/a   0.000
       MAJOR SYSTEM:      0802  2  5.0   40.85    3.15 12.25  48.35  n/a   0.000
       MINOR SYSTEM:      0802  3  5.0    7.46    0.05  8.33  48.35  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        0106  1  5.0   12.90    2.91 12.25  87.12 0.79   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:              0401  1  5.0   12.90    0.90 12.67  86.60  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          0107  1  5.0    6.59    0.36 12.67  41.37 0.38   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.26 12.67  71.31  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          1111  1  5.0    6.26    0.33 12.67  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
```

```
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1081  1  5.0    1.03    0.14 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.37 12.58  43.88  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1054  1  5.0    0.92    0.13 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]  0908  3  5.0   41.77    3.28 12.25  48.45  n/a   0.000
*
    ADD [  0908+  0905]  0908  1  5.0   61.26    3.61 12.58  55.72  n/a   0.000
*
    ADD [  0908+  0907]  0908  3  5.0   68.55    3.98 12.58  54.46  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          1112  1  5.0    7.73    0.46 12.58  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1082  1  5.0    0.92    0.13 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.51 12.50  43.51  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   77.20    4.49 12.58  53.24  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          1113  1  5.0    5.08    0.31 12.58  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1083  1  5.0    0.89    0.13 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
```

```
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.37 12.42  43.96  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   83.17    4.84 12.58  52.57  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.27 12.67  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.15 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.32 12.42  44.28  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   89.03    5.16 12.58  52.02  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.81 13.42  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  115.58    5.64 12.58  49.81  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.14 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0    8.33    0.19 12.25  49.26  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.07 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0    8.75    0.26 12.25  49.63  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.07 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    9.16    0.33 12.25  49.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.04 12.25  57.00 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    9.38    0.37 12.25  50.12  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    5.78 12.58  49.83  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.21 12.75  37.10 0.34   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    5.98 12.58  49.37  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\4852f5a6-ccc3-4979-ac90-f289b825c6c4\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\4852f5a6-ccc3-4979-ac90-f289b825c6c4\s


DATE: 03-13-2023                           TIME: 05:28:36
```

```
USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 013 - SCS-100yr 24hr 15mi **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD        0101  1  5.0   13.09    0.72 12.92  55.81 0.46   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      0110  1  5.0    3.70    0.59 12.25  60.57 0.50   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD               0801  1  5.0    3.70    0.59 12.25  60.57  n/a   0.000
       MAJOR SYSTEM:    0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:    0801  3  5.0    3.70    0.59 12.25  60.57  n/a   0.000
*
    ADD [  0101+  0801] 0901  3  5.0   16.79    0.85 12.75  56.86  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      0102  1  5.0    1.06    0.19 12.25  63.03 0.52   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901] 0902  3  5.0   17.85    1.03 12.25  57.23  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1051  1  5.0   10.37    1.59 12.25  60.50 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1052  1  5.0    1.64    0.26 12.25  60.50 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD      1053  1  5.0    1.00    0.18 12.25  60.49 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052] 0906  3  5.0   12.01    1.86 12.25  60.50  n/a   0.000
*
    ADD [  0906+  1053] 0906  1  5.0   13.01    2.04 12.25  60.50  n/a   0.000
*
    ADD [  0906+  0902] 0906  3  5.0   30.86    3.07 12.25  58.61  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        0103  1  5.0    9.10    0.60 12.75  55.81 0.46   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801] 0903  3  5.0    9.10    0.60 12.75  55.81  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1041  1  5.0    5.61    0.42 12.50  46.19 0.38   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903] 0904  3  5.0   14.71    0.98 12.58  52.14  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD        1042  1  5.0    2.74    0.21 12.50  46.19 0.38   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904] 0910  3  5.0   17.45    1.18 12.58  51.21  n/a   0.000
*
    ADD [  0910+  0906] 0910  1  5.0   48.31    3.75 12.25  55.93  n/a   0.000
*
    DUHYD               0802  1  5.0   48.31    3.75 12.25  55.93  n/a   0.000
       MAJOR SYSTEM:    0802  2  5.0   41.68    3.70 12.25  55.93  n/a   0.000
       MINOR SYSTEM:    0802  3  5.0    6.63    0.05  7.83  55.93  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
```

```
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    3.73 12.25  97.53 0.81   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    1.42 12.50  97.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.42 12.67  48.41 0.40   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.83 12.50  80.57  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.39 12.67  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.19 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.43 12.67  51.12  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.17 12.25  60.49 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]  0908  3  5.0   42.60    3.87 12.25  56.03  n/a   0.000
*
    ADD [  0908+  0905]  0908  1  5.0   62.09    4.92 12.42  63.73  n/a   0.000
*
    ADD [  0908+  0907]  0908  3  5.0   69.38    5.32 12.42  62.41  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.54 12.58  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.17 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.58 12.58  50.72  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   78.03    5.89 12.50  61.11  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.36 12.58  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.16 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.42 12.50  51.20  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   84.00    6.30 12.50  60.41  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.31 12.67  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.19 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.36 12.58  51.54  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   89.86    6.67 12.50  59.83  n/a   0.000
*
    READ STORM                 15.0
```

```
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0    26.55    0.95 13.33  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  116.41    7.14 12.50  57.48  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0     0.87    0.17 12.25  64.94 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0     7.50    0.22 12.25  56.98  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0     0.42    0.08 12.25  64.93 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0     7.92    0.31 12.25  57.40  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0     0.41    0.08 12.25  64.93 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0     8.33    0.39 12.25  57.77  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0     0.22    0.04 12.25  64.92 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0     8.55    0.44 12.25  57.95  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    7.31 12.50  57.51  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0     4.67    0.25 12.67  43.66 0.36   0.000
```

```
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    7.53 12.50  57.02  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\164b9019-764f-42e3-9090-084907dc8b5b\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\164b9019-764f-42e3-9090-084907dc8b5b\s


DATE: 03-13-2023                          TIME: 05:28:35

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 014 - Regional-TIMMINS    **
  ************************************************

  W/E COMMAND            HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                 min      ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 ** CALIB NASHYD         0101  1  5.0    13.09    0.79  7.42 112.75 0.58   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
```

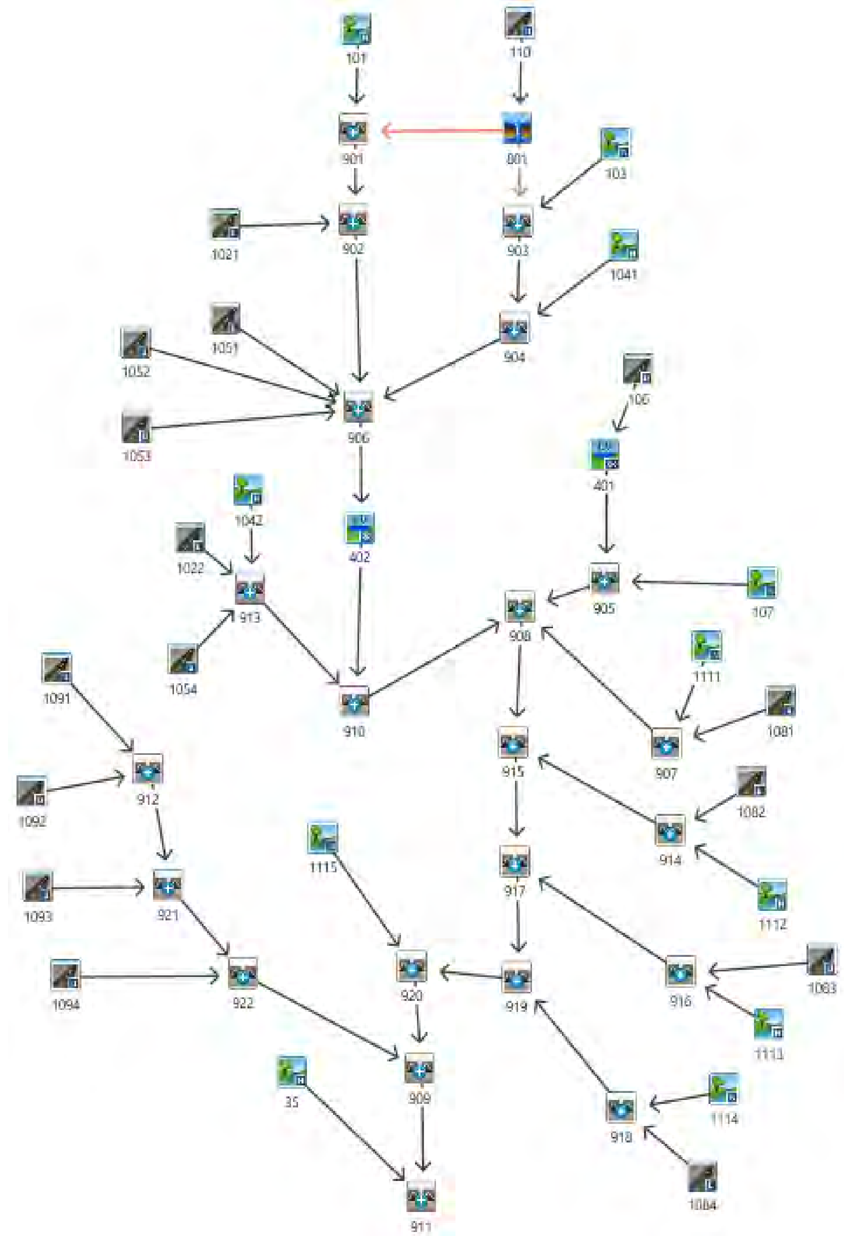
```
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.29  7.00 116.15 0.60   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.29  7.00 116.15  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.29  7.00 116.15  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    1.00  7.25 113.50  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.08  7.00 118.53 0.61   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    1.06  7.25 113.80  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.80  7.00 116.27 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.13  7.00 116.27 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.08  7.00 116.26 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.93  7.00 116.27  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.01  7.00 116.27  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.06  7.00 114.84  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.60  7.25 112.75 0.58   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.60  7.25 112.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.37  7.08  97.54 0.51   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.96  7.17 106.95  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.18  7.08  97.54 0.51   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1042+  0904]  0910  3  5.0   17.45    1.14  7.17 105.47  n/a   0.000
*
    ADD [  0910+  0906]  0910  1  5.0   48.31    3.17  7.00 111.46  n/a   0.000
*
    DUHYD                0802  1  5.0   48.31    3.17  7.00 111.46  n/a   0.000
       MAJOR SYSTEM:     0802  2  5.0   46.03    3.12  7.00 111.46  n/a   0.000
       MINOR SYSTEM:     0802  3  5.0    2.28    0.05  0.17 111.46  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.43  7.00 167.53 0.87   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    1.39  7.00 167.11  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.41  7.17 100.98 0.52   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.79  7.08 144.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
```

```
 *  CALIB NASHYD        1111  1  5.0    6.26    0.39  7.25 102.81 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1081  1  5.0    1.03    0.08  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.45  7.17 104.81  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1054  1  5.0    0.92    0.07  7.00 116.26 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0802]  0908  3  5.0   46.95    3.19  7.00 111.55  n/a   0.000
*
    ADD [  0908+  0905]  0908  1  5.0   66.44    4.97  7.00 121.29  n/a   0.000
*
    ADD [  0908+  0907]  0908  3  5.0   73.73    5.42  7.00 119.66  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD        1112  1  5.0    7.73    0.50  7.17 102.80 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1082  1  5.0    0.92    0.07  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.57  7.08 104.31  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   82.38    5.98  7.00 118.05  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD        1113  1  5.0    5.08    0.34  7.08 102.80 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1083  1  5.0    0.89    0.07  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.40  7.00 104.91  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   88.35    6.38  7.00 117.16  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD        1114  1  5.0    4.81    0.31  7.17 102.80 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1084  1  5.0    1.05    0.08  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.38  7.00 105.34  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   94.21    6.76  7.00 116.42  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD        1115  1  5.0   26.55    1.23  8.08 102.81 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  120.76    7.62  7.08 113.43  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1091  1  5.0    0.87    0.07  7.00 121.98 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  0802]  0913  3  5.0    3.15    0.12  7.00 114.36  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
```

```
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.03  7.00 121.97 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1092+  0913]  0912  3  5.0    3.57    0.16  7.00 115.25  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03  7.00 121.97 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    3.98    0.19  7.00 115.94  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  7.00 121.95 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    4.20    0.21  7.00 116.26  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    7.81  7.00 113.53  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname      :      C:\Users\ALOverholt\AppData\Local\Temp\4caf2f67-9abb-43df-
af11-6ab5eb2490d5\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.26  7.25  93.42 0.48   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    8.06  7.00 112.80  n/a   0.000
*
```

TATHAM ENGINEERING

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863		
		DATE	March 2023		
SUBJECT	VO Schematic	NAME	PK		
	Overall Drainage Plan - Option 4	PAGE	1	OF	1



	NASHYD		ROUTE PIPE		DUHYD
	STANDHYD		ROUTE CHANNEL		DIVERT HYD
	ADDHYD		ROUTE RESERVOIR		SHIFTHYD

```
==================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\ed2f2824-39e0-4e08-8e0f-71a3326dbfdd\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\ed2f2824-39e0-4e08-8e0f-71a3326dbfdd\s


DATE: 03-13-2023                           TIME: 05:27:09

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : RUN 001 - CHIC25MM              **
  **************************************************

  W/E COMMAND             HYD ID   DT    AREA   ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha    '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                   6.0
    [ Ptot= 24.97 mm ]
    fname                 :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.05  2.83   2.86 0.11   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                   6.0
    [ Ptot= 24.97 mm ]
    fname                 :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.10  1.92   6.09 0.24   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.10  1.92   6.09  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.10  1.92   6.09  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.11  1.92   3.57  n/a   0.000
*
    READ STORM                   6.0
    [ Ptot= 24.97 mm ]
    fname                 :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1021  1  5.0    0.63    0.03  1.92   7.26 0.29   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]  0902  3  5.0   17.42    0.13  1.92   3.71  n/a   0.000
*
    READ STORM                   6.0
    [ Ptot= 24.97 mm ]
    fname                 :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.04  2.58   2.86 0.11   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.04  2.58   2.86  n/a   0.000
*
    READ STORM                   6.0
    [ Ptot= 24.97 mm ]
    fname                 :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.03  2.33   1.93 0.08   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.07  2.50   2.51  n/a   0.000
*
    READ STORM                   6.0
    [ Ptot= 24.97 mm ]
    fname                 :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.26  1.92   5.94 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                   6.0
    [ Ptot= 24.97 mm ]
    fname                 :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.05  1.92   5.93 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                   6.0
    [ Ptot= 24.97 mm ]
    fname                 :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
```

```
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.03  1.92   5.92 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.30  1.92   5.94  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.33  1.92   5.93  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.43    0.47  1.92   4.66  n/a   0.000
*
    ADD [  0906+  0904]  0906  1  5.0   45.14    0.47  1.92   3.96  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0402  1  5.0   45.14    0.11  3.58   3.94  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.01  2.33   1.93 0.08   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.03  1.92   5.92 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.02  1.92   7.24 0.29   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.02  1.92   2.65  n/a   0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.05  1.92   3.39  n/a   0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    0.11  3.50   3.90  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    0.41  2.17  12.06 0.48   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.01  4.42  11.81  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.03  2.50   2.22 0.09   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.04  2.58   8.57  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.03  2.58   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.03  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.03  2.50   2.80  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    0.07  2.50   7.00  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    0.16  2.92   4.99  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.04  2.42   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.02  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.04  2.42   2.68  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    0.19  2.75   4.75  n/a   0.000
*
    READ STORM                 6.0
    [ Ptot= 24.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
```

```
 *  CALIB NASHYD         1113  1  5.0    5.08    0.02  2.42   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.02  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.03  2.42   2.83  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    0.22  2.67   4.63  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.02  2.50   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.03  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.03  1.92   2.93  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    0.24  2.58   4.52  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.06  3.33   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    0.29  2.75   4.05  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.02  1.92   7.21 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.03  1.92   7.24 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.02  1.92   7.21 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.05  1.92   7.23  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.07  1.92   7.22  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01  1.92   7.17 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.08  1.92   7.22  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    0.30  2.75   4.09  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.01  2.58   1.69 0.07   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    0.32  2.67   4.01  n/a   0.000
*
===============================================================================
========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****
```

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\f4c00efa-2efe-4be5-9b08-6e01cebc8446\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\f4c00efa-2efe-4be5-9b08-6e01cebc8446\s

DATE: 03-13-2023                          TIME: 05:27:10

USER:

COMMENTS: ____________________________________________________________

  **************************************************
  ** SIMULATION : RUN 002 - Chicago-2yr 4hr 10m **
  **************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 ** CALIB NASHYD          0101  1  5.0   13.09    0.08  2.33    5.18 0.16    0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD        0110  1  5.0    3.70    0.15  1.33    9.01 0.27    0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                 0801  1  5.0    3.70    0.15  1.33    9.01  n/a    0.000
       MAJOR SYSTEM:      0801  2  5.0    0.00    0.00  0.00    0.00  n/a    0.000
       MINOR SYSTEM:      0801  3  5.0    3.70    0.15  1.33    9.01  n/a    0.000
*
    ADD [  0101+  0801]   0901  3  5.0   16.79    0.15  1.33    6.03  n/a    0.000
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD        1021  1  5.0    0.63    0.04  1.33   10.44 0.32    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]   0902  3  5.0   17.42    0.19  1.33    6.19  n/a    0.000
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD          0103  1  5.0    9.10    0.06  2.08    5.18 0.16    0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]   0903  3  5.0    9.10    0.06  2.08    5.18  n/a    0.000
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]

*
 *  CALIB NASHYD          1041  1  5.0    5.61    0.04  1.75    3.67 0.11    0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]   0904  3  5.0   14.71    0.10  1.92    4.61  n/a    0.000
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD        1051  1  5.0   10.37    0.37  1.33    8.83 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD        1052  1  5.0    1.64    0.06  1.33    8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD        1053  1  5.0    1.00    0.04  1.33    8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3  5.0   12.01    0.43  1.33    8.83  n/a    0.000
*
    ADD [  0906+  1053]   0906  1  5.0   13.01    0.47  1.33    8.83  n/a    0.000
*
    ADD [  0906+  0902]   0906  3  5.0   30.43    0.66  1.33    7.32  n/a    0.000
*
    ADD [  0906+  0904]   0906  1  5.0   45.14    0.68  1.33    6.43  n/a    0.000
*
 ** Reservoir
    OUTFLOW:              0402  1  5.0   45.14    0.17  3.25    6.42  n/a    0.000
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD          1042  1  5.0    2.74    0.02  1.75    3.67 0.11    0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD        1054  1  5.0    0.92    0.04  1.33    8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD        1022  1  5.0    0.43    0.02  1.33   10.42 0.32    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]   0913  3  5.0    3.17    0.03  1.33    4.59  n/a    0.000
*
    ADD [  0913+  1054]   0913  1  5.0    4.09    0.07  1.33    5.54  n/a    0.000
*
    ADD [  0402+  0913]   0910  3  5.0   49.23    0.18  3.17    6.35  n/a    0.000
*
    CHIC STORM                    10.0
    [ Ptot= 32.79 mm ]
*
```

```
 *  CALIB STANDHYD       0106  1  5.0   12.90    0.68  1.33  17.87 0.55    0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.02  4.42  17.62  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.04  1.92   4.10 0.13    0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.05  2.00  13.05  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.04  2.00   4.25 0.13    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.04  1.33   8.70 0.27    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.05  1.92   4.88  n/a    0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    0.10  2.00  10.83  n/a    0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    0.24  2.50   7.93  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.05  1.92   4.25 0.13    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.03  1.33   8.70 0.27    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.06  1.83   4.73  n/a    0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    0.29  2.17   7.60  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.03  1.83   4.25 0.13    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.03  1.33   8.70 0.27    0.000
    [I%=16.0:S%= 2.00]
*

    ADD [  1083+  1113]  0916  3  5.0    5.97    0.04  1.83   4.92  n/a    0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    0.33  2.08   7.42  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.03  1.92   4.25 0.13    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.04  1.33   8.70 0.27    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.04  1.33   5.05  n/a    0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    0.37  2.08   7.28  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.10  2.92   4.25 0.13    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    0.44  2.25   6.63  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.02  1.33  10.48 0.32    0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.05  1.33  10.50 0.32    0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.02  1.33  10.48 0.32    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.07  1.33  10.49  n/a    0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.09  1.33  10.49  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01  1.33  10.45 0.32    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.10  1.33  10.49  n/a    0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    0.46  2.17   6.68  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
```

```
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.02  2.08   3.29 0.10    0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    0.48  2.17   6.56  n/a    0.000
*
 FINISH

==================================================================================
==========================

==================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\f4b4ed0c-8a47-4eaf-8c18-929482e610d8\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\f4b4ed0c-8a47-4eaf-8c18-929482e610d8\s


DATE: 03-13-2023                          TIME: 05:27:09

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 003 - Chicago-5yr 4hr 10m **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                  min    ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      -------------------
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.14  2.25   9.31 0.21    0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
```

```
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.21  1.33  13.72 0.31    0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.21  1.33  13.72  n/a    0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.21  1.33  13.72  n/a    0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.22  1.33  10.28  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1021  1  5.0    0.63    0.05  1.33  15.44 0.35    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]  0902  3  5.0   17.42    0.27  1.33  10.47  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.12  2.00   9.31 0.21    0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.12  2.00   9.31  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.07  1.75   6.88 0.16    0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.18  1.92   8.38  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.52  1.33  13.53 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.09  1.33  13.52 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                   10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.06  1.33  13.52 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.61  1.33  13.53  n/a    0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.67  1.33  13.53  n/a    0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.43    0.93  1.33  11.78  n/a    0.000
*
    ADD [  0906+  0904]  0906  1  5.0   45.14    0.97  1.33  10.67  n/a    0.000
```

```
*
 ** Reservoir
    OUTFLOW:             0402  1  5.0   45.14    0.27  3.33  10.66  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.03  1.75   6.88 0.16    0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.05  1.33  13.52 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.03  1.33  15.43 0.35    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.04  1.33   8.04  n/a    0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.09  1.33   9.27  n/a    0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    0.28  3.17  10.54  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.05  1.50  26.71 0.61    0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.02  3.50  26.45  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.08  1.92   7.52 0.17    0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.09  1.92  20.05  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.07  2.00   7.78 0.18    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.05  1.33  13.42 0.31    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.08  1.92   8.57  n/a    0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    0.18  1.92  16.93  n/a    0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    0.42  2.17  12.79  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.10  1.83   7.78 0.18    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.05  1.33  13.42 0.31    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.11  1.83   8.38  n/a    0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    0.53  2.00  12.34  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.07  1.83   7.78 0.18    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.05  1.33  13.42 0.31    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.08  1.75   8.62  n/a    0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    0.60  1.92  12.09  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.06  1.92   7.78 0.18    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.06  1.33  13.42 0.31    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.07  1.83   8.79  n/a    0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    0.67  1.92  11.89  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.19  2.83   7.78 0.18    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    0.79  2.08  11.01  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
```

```
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03  1.33  15.65 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.06  1.33  15.67 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.03  1.33  15.65 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.09  1.33  15.66  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.13  1.33  15.66  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  15.64 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.14  1.33  15.66  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    0.82  2.00  11.08  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.04  2.00   6.26 0.14   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    0.86  2.00  10.90  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U    U    A    L              (v 6.2.2011)
       V    V   I    SS     U    U   A A   L
        V  V    I     SS    U    U  AAAAA  L
        V  V    I      SS   U    U  A   A  L
         VV     I    SSSSS  UUUUU   A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\ac9f1374-b4b3-4ba2-bff5-c340b2de09ee\s
```

```
  Summary     filename:     C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\ac9f1374-b4b3-4ba2-bff5-c340b2de09ee\s


DATE: 03-13-2023                           TIME: 05:27:06

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 004 - Chicago-10yr 4hr 10 **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min      ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.20  2.25  12.51 0.25   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.25  1.33  17.19 0.34   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.25  1.33  17.19  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.25  1.33  17.19  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.27  1.33  13.54  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1021  1  5.0    0.63    0.06  1.33  19.06 0.37   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]  0902  3  5.0   17.42    0.33  1.33  13.74  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.16  2.00  12.51 0.25   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.16  2.00  12.51  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.10  1.75   9.42 0.18   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
```

```
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.25  1.92  11.33  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.64  1.33  16.99 0.33    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.11  1.33  16.99 0.33    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.07  1.33  16.98 0.33    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.75  1.33  16.99  n/a    0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.82  1.33  16.99  n/a    0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.43    1.14  1.33  15.13  n/a    0.000
*
    ADD [  0906+  0904]  0906  1  5.0   45.14    1.19  1.33  13.89  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0402  1  5.0   45.14    0.32  3.42  13.88  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.05  1.75   9.42 0.18    0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.06  1.33  16.98 0.33    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.04  1.33  19.05 0.37    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.06  1.67  10.73  n/a    0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.12  1.33  12.13  n/a    0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    0.35  3.17  13.73  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.34  1.50  32.86 0.64    0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.08  4.17  32.56  n/a    0.000
```

```
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.11  1.92  10.21 0.20    0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.13  1.92  25.00  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.10  2.00  10.54 0.21    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.07  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.12  1.83  11.44  n/a    0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    0.24  1.92  21.31  n/a    0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    0.55  2.00  16.40  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.13  1.83  10.54 0.21    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.06  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.15  1.83  11.22  n/a    0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    0.70  1.92  15.87  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.09  1.83  10.54 0.21    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.06  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.11  1.75  11.49  n/a    0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    0.80  1.92  15.58  n/a    0.000
*
    CHIC STORM                10.0
```

```
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD        1114  1  5.0    4.81    0.08  1.92  10.54 0.21    0.000
   [CN=61.9         ]
   [ N = 3.0:Tp 0.50]
*
   CHIC STORM                10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD      1084  1  5.0    1.05    0.07  1.33  16.90 0.33    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1084+  1114]  0918  3  5.0    5.86    0.10  1.83  11.68  n/a    0.000
*
   ADD [  0917+  0918]  0919  3  5.0   96.49    0.90  1.92  15.35  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD        1115  1  5.0   26.55    0.25  2.83  10.54 0.21    0.000
   [CN=61.9         ]
   [ N = 3.0:Tp 1.13]
*
   ADD [  1115+  0919]  0920  3  5.0  123.04    1.06  2.00  14.31  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD      1093  1  5.0    0.41    0.04  1.33  19.40 0.38    0.000
   [I%=23.0:S%= 2.00]
*
   CHIC STORM                10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD      1091  1  5.0    0.87    0.08  1.33  19.41 0.38    0.000
   [I%=23.0:S%= 2.00]
*
   CHIC STORM                10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD      1092  1  5.0    0.42    0.04  1.33  19.41 0.38    0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1091+  1092]  0912  3  5.0    1.29    0.11  1.33  19.41  n/a    0.000
*
   ADD [  1093+  0912]  0921  3  5.0    1.70    0.15  1.33  19.41  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD      1094  1  5.0    0.22    0.02  1.33  19.38 0.38    0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0    1.92    0.17  1.33  19.40  n/a    0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    1.09  2.00  14.39  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD        0035  1  5.0    4.67    0.06  2.00   8.63 0.17    0.000
   [CN=57.7         ]
   [ N = 3.0:Tp 0.55]
*
```

```
   ADD [  0035+  0909]  0911  3  5.0  129.63    1.15  2.00  14.18  n/a    0.000
*
=================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b99eec08-f7a2-4d75-97a7-6a36a2363368\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b99eec08-f7a2-4d75-97a7-6a36a2363368\s


DATE: 03-13-2023                           TIME: 05:27:07

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 005 - Chicago-25yr 4hr 10 **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                    min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 ** CALIB NASHYD        0101  1  5.0   13.09    0.27  2.25  16.95 0.28    0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD      0110  1  5.0    3.70    0.30  1.33  21.85 0.36    0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD               0801  1  5.0    3.70    0.30  1.33  21.85  n/a    0.000
       MAJOR SYSTEM:    0801  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:    0801  3  5.0    3.70    0.30  1.33  21.85  n/a    0.000
```

```
*
   ADD [  0101+  0801]  0901  3  5.0   16.79    0.33  2.08  18.03  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1021  1  5.0    0.63    0.07  1.33  23.87 0.40    0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  1021+  0901]  0902  3  5.0   17.42    0.40  1.33  18.24  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         0103  1  5.0    9.10    0.22  2.00  16.94 0.28    0.000
   [CN=66.7          ]
   [ N = 3.0:Tp 0.59]
*
   ADD [  0103+  0801]  0903  3  5.0    9.10    0.22  2.00  16.94  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1041  1  5.0    5.61    0.14  1.75  13.01 0.22    0.000
   [CN=59.6          ]
   [ N = 3.0:Tp 0.37]
*
   ADD [  1041+  0903]  0904  3  5.0   14.71    0.34  1.92  15.44  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1051  1  5.0   10.37    0.78  1.33  21.65 0.36    0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1052  1  5.0    1.64    0.14  1.33  21.65 0.36    0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1053  1  5.0    1.00    0.09  1.33  21.65 0.36    0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1051+  1052]  0906  3  5.0   12.01    0.92  1.33  21.65  n/a    0.000
*
   ADD [  0906+  1053]  0906  1  5.0   13.01    1.01  1.33  21.65  n/a    0.000
*
   ADD [  0906+  0902]  0906  3  5.0   30.43    1.41  1.33  19.70  n/a    0.000
*
   ADD [  0906+  0904]  0906  1  5.0   45.14    1.48  1.33  18.31  n/a    0.000
*
** Reservoir
   OUTFLOW:             0402  1  5.0   45.14    0.40  3.50  18.30  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1042  1  5.0    2.74    0.07  1.67  13.01 0.22    0.000
   [CN=59.6          ]
   [ N = 3.0:Tp 0.36]

*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1054  1  5.0    0.92    0.08  1.33  21.64 0.36    0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1022  1  5.0    0.43    0.05  1.33  23.87 0.40    0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  1022+  1042]  0913  3  5.0    3.17    0.08  1.67  14.48  n/a    0.000
*
   ADD [  0913+  1054]  0913  1  5.0    4.09    0.15  1.33  16.09  n/a    0.000
*
   ADD [  0402+  0913]  0910  3  5.0   49.23    0.43  3.50  18.11  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       0106  1  5.0   12.90    1.72  1.50  40.75 0.68    0.000
   [I%=16.0:S%= 2.00]
*
** Reservoir
   OUTFLOW:             0401  1  5.0   12.90    0.11  4.08  40.44  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         0107  1  5.0    6.59    0.15  1.92  13.99 0.23    0.000
   [CN=61.0          ]
   [ N = 3.0:Tp 0.49]
*
   ADD [  0107+  0401]  0905  3  5.0   19.49    0.20  2.17  31.50  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1111  1  5.0    6.26    0.13  1.92  14.42 0.24    0.000
   [CN=61.9          ]
   [ N = 3.0:Tp 0.54]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1081  1  5.0    1.03    0.08  1.33  21.60 0.36    0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1081+  1111]  0907  3  5.0    7.29    0.16  1.83  15.43  n/a    0.000
*
   ADD [  0905+  0907]  0908  3  5.0   26.78    0.34  2.17  27.12  n/a    0.000
*
   ADD [  0908+  0910]  0908  1  5.0   76.01    0.74  2.17  21.29  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         1112  1  5.0    7.73    0.19  1.83  14.42 0.24    0.000
   [CN=61.9          ]
   [ N = 3.0:Tp 0.46]
*
   CHIC STORM                 10.0
```

```
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.08  1.33  21.60 0.36   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.21  1.83  15.18  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    0.92  2.08  20.66  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.13  1.83  14.42 0.24   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.07  1.33  21.60 0.36   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.15  1.75  15.49  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    1.06  1.83  20.32  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.11  1.92  14.42 0.24   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.09  1.33  21.60 0.36   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.14  1.83  15.71  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    1.19  1.83  20.04  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.35  2.83  14.42 0.24   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    1.43  2.17  18.83  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.04  1.33  24.40 0.41   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.09  1.33  24.40 0.41   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.05  1.33  24.40 0.41   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.14  1.33  24.40  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.19  1.33  24.40  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  24.38 0.41   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.21  1.33  24.40  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.46  2.17  18.92  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.08  2.00  12.01 0.20   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    1.54  2.17  18.67  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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```

```

                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\4e7ece0e-4096-4d12-afae-efbf04c8f637\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\4e7ece0e-4096-4d12-afae-efbf04c8f637\s


DATE: 03-13-2023                           TIME: 05:27:03

USER:


COMMENTS: ____________________________________________________________
```

```
 **************************************************
 ** SIMULATION : RUN 006 - Chicago-50yr 4hr 10 **
 **************************************************

 W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                  min     ha   '  cms   hrs      mm            cms

     START @  0.00 hrs
     --------------------
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
** CALIB NASHYD          0101  1  5.0   13.09    0.33  2.25  20.60 0.31    0.000
   [CN=66.7          ]
   [ N = 3.0:Tp 0.75]
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD        0110  1  5.0    3.70    0.37  1.33  25.61 0.38    0.000
   [I%=18.0:S%= 2.00]
*
   DUHYD                 0801  1  5.0    3.70    0.37  1.33  25.61  n/a    0.000
      MAJOR SYSTEM:      0801  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
      MINOR SYSTEM:      0801  3  5.0    3.70    0.37  1.33  25.61  n/a    0.000
*
   ADD [  0101+  0801]  0901  3  5.0   16.79    0.40  1.33  21.70  n/a    0.000
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD        1021  1  5.0    0.63    0.08  1.33  27.73 0.41    0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  1021+  0901]  0902  3  5.0   17.42    0.48  1.33  21.92  n/a    0.000
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD          0103  1  5.0    9.10    0.27  2.00  20.60 0.31    0.000
   [CN=66.7          ]
   [ N = 3.0:Tp 0.59]
*
   ADD [  0103+  0801]  0903  3  5.0    9.10    0.27  2.00  20.60  n/a    0.000
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD          1041  1  5.0    5.61    0.17  1.75  16.01 0.24    0.000
   [CN=59.6          ]
   [ N = 3.0:Tp 0.37]
*
   ADD [  1041+  0903]  0904  3  5.0   14.71    0.42  1.83  18.85  n/a    0.000
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD        1051  1  5.0   10.37    0.90  1.33  25.42 0.38    0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
```

```
*
 * CALIB STANDHYD        1052  1  5.0    1.64    0.16  1.33  25.42 0.38    0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD        1053  1  5.0    1.00    0.10  1.33  25.41 0.38    0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1051+  1052]  0906  3  5.0   12.01    1.06  1.33  25.42  n/a    0.000
*
   ADD [  0906+  1053]  0906  1  5.0   13.01    1.15  1.33  25.42  n/a    0.000
*
   ADD [  0906+  0902]  0906  3  5.0   30.43    1.64  1.33  23.42  n/a    0.000
*
   ADD [  0906+  0904]  0906  1  5.0   45.14    1.73  1.33  21.93  n/a    0.000
*
** Reservoir
   OUTFLOW:             0402  1  5.0   45.14    0.60  3.08  21.92  n/a    0.000
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD          1042  1  5.0    2.74    0.09  1.67  16.01 0.24    0.000
   [CN=59.6          ]
   [ N = 3.0:Tp 0.36]
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD        1054  1  5.0    0.92    0.09  1.33  25.41 0.38    0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD        1022  1  5.0    0.43    0.06  1.33  27.72 0.41    0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  1022+  1042]  0913  3  5.0    3.17    0.10  1.67  17.60  n/a    0.000
*
   ADD [  0913+  1054]  0913  1  5.0    4.09    0.17  1.33  19.36  n/a    0.000
*
   ADD [  0402+  0913]  0910  3  5.0   49.23    0.64  3.08  21.70  n/a    0.000
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD        0106  1  5.0   12.90    2.03  1.42  46.87 0.70    0.000
   [I%=16.0:S%= 2.00]
*
** Reservoir
   OUTFLOW:             0401  1  5.0   12.90    0.14  4.08  46.55  n/a    0.000
*
   CHIC STORM                   10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD          0107  1  5.0    6.59    0.18  1.92  17.14 0.26    0.000
   [CN=61.0          ]
   [ N = 3.0:Tp 0.49]
*
   ADD [  0107+  0401]  0905  3  5.0   19.49    0.27  2.08  36.61  n/a    0.000
*
```

```
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.17  1.92  17.64 0.26   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.10  1.33  25.40 0.38   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.19  1.83  18.74  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    0.46  2.00  31.74  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    0.94  2.92  25.24  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.23  1.83  17.64 0.26   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.09  1.33  25.40 0.38   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.26  1.83  18.47  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    1.14  1.92  24.55  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.16  1.83  17.64 0.26   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.08  1.33  25.40 0.38   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.18  1.75  18.80  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    1.32  1.92  24.17  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.13  1.92  17.64 0.26   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.10  1.33  25.40 0.38   0.000
```

```
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.17  1.83  19.03  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    1.48  1.92  23.86  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.43  2.83  17.64 0.26   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    1.76  2.00  22.52  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.05  1.33  28.39 0.42   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.11  1.33  28.41 0.42   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.05  1.33  28.40 0.42   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.16  1.33  28.40  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.21  1.33  28.40  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.03  1.33  28.38 0.42   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.24  1.33  28.40  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.80  2.00  22.61  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.10  2.00  14.84 0.22   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    1.90  2.00  22.33  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
```

```
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\56fc959b-7f70-4654-80a3-fb620b6267f3\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\56fc959b-7f70-4654-80a3-fb620b6267f3\s


DATE: 03-13-2023                           TIME: 05:27:04

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 007 - Chicago-100yr 4hr 1 **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 ** CALIB NASHYD          0101  1  5.0   13.09    0.39  2.25  24.35 0.33   0.000
    [CN=66.7           ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB STANDHYD        0110  1  5.0    3.70    0.42  1.33  29.41 0.40   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                 0801  1  5.0    3.70    0.42  1.33  29.41  n/a   0.000
       MAJOR SYSTEM:      0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:      0801  3  5.0    3.70    0.42  1.33  29.41  n/a   0.000
*
    ADD [  0101+  0801]   0901  3  5.0   16.79    0.47  2.08  25.46  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB STANDHYD        1021  1  5.0    0.63    0.09  1.33  31.61 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]   0902  3  5.0   17.42    0.55  1.33  25.68  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB NASHYD          0103  1  5.0    9.10    0.32  2.00  24.34 0.33   0.000
    [CN=66.7           ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]   0903  3  5.0    9.10    0.32  2.00  24.34  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB NASHYD          1041  1  5.0    5.61    0.21  1.75  19.12 0.26   0.000
    [CN=59.6           ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]   0904  3  5.0   14.71    0.51  1.83  22.35  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB STANDHYD        1051  1  5.0   10.37    1.10  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB STANDHYD        1052  1  5.0    1.64    0.18  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB STANDHYD        1053  1  5.0    1.00    0.11  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3  5.0   12.01    1.28  1.33  29.23  n/a   0.000
*
    ADD [  0906+  1053]   0906  1  5.0   13.01    1.39  1.33  29.23  n/a   0.000
*
    ADD [  0906+  0902]   0906  3  5.0   30.43    1.95  1.33  27.20  n/a   0.000
*
    ADD [  0906+  0904]   0906  1  5.0   45.14    2.06  1.33  25.62  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              0402  1  5.0   45.14    0.82  2.83  25.61  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB NASHYD          1042  1  5.0    2.74    0.10  1.67  19.12 0.26   0.000
    [CN=59.6           ]
    [ N = 3.0:Tp 0.36]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB STANDHYD        1054  1  5.0    0.92    0.10  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
```

```
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.06  1.33  31.61 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.12  1.67  20.82  n/a   0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.20  1.33  22.71  n/a   0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    0.87  2.83  25.37  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.91  1.33  52.88 0.72   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.18  3.83  52.55  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.22  1.83  20.39 0.28   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.33  2.00  41.67  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.20  1.92  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.11  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.23  1.83  22.14  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    0.56  1.92  36.35  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    1.27  2.67  29.24  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.28  1.83  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.10  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.31  1.75  21.85  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    1.44  2.50  28.48  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.19  1.83  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.10  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.22  1.75  22.20  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    1.57  1.83  28.07  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.16  1.92  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.11  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.20  1.83  22.45  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    1.77  1.83  27.73  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.51  2.75  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    2.18  2.50  26.27  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.06  1.33  32.43 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.12  1.33  32.43 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.06  1.33  32.43 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.18  1.33  32.43  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.24  1.33  32.43  n/a   0.000
*
```

```
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1094  1  5.0    0.22    0.03  1.33  32.41 0.44   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0    1.92    0.27  1.33  32.43  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    2.22  2.50  26.36  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB NASHYD         0035  1  5.0    4.67    0.12  2.00  17.78 0.24   0.000
   [CN=57.7         ]
   [ N = 3.0:Tp 0.55]
*
   ADD [  0035+  0909]  0911  3  5.0  129.63    2.32  2.42  26.06  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\35dc544c-6f8d-4a63-b08d-9a2a5268543f\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\35dc544c-6f8d-4a63-b08d-9a2a5268543f\s


DATE: 03-13-2023                           TIME: 05:27:03

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : RUN 008 - SCS-2yr 24hr 15min  **
  **************************************************


  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                  min     ha   '  cms   hrs      mm           cms

    START @  0.00 hrs
     --------------------
   READ STORM                 15.0
   [ Ptot= 53.41 mm ]
   fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD        0101  1  5.0   13.09    0.17 12.92  13.65 0.26   0.000
   [CN=66.7         ]
   [ N = 3.0:Tp 0.75]
*
   READ STORM                 15.0
   [ Ptot= 53.41 mm ]
   fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 * CALIB STANDHYD       0110  1  5.0    3.70    0.15 12.25  18.39 0.34   0.000
   [I%=18.0:S%= 2.00]
*
   DUHYD                0801  1  5.0    3.70    0.15 12.25  18.39  n/a   0.000
      MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     0801  3  5.0    3.70    0.15 12.25  18.39  n/a   0.000
*
   ADD [  0101+  0801]  0901  3  5.0   16.79    0.22 12.75  14.69  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 53.41 mm ]
   fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 * CALIB STANDHYD       1021  1  5.0    0.63    0.03 12.25  20.31 0.38   0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  1021+  0901]  0902  3  5.0   17.42    0.23 12.25  14.90  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 53.41 mm ]
   fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 * CALIB NASHYD         0103  1  5.0    9.10    0.14 12.75  13.65 0.26   0.000
   [CN=66.7         ]
   [ N = 3.0:Tp 0.59]
*
   ADD [  0103+  0801]  0903  3  5.0    9.10    0.14 12.75  13.65  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 53.41 mm ]
   fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
   remark: 2yr 24hr 15min SCS Type II (MTO)
*
 * CALIB NASHYD         1041  1  5.0    5.61    0.09 12.50  10.33 0.19   0.000
   [CN=59.6         ]
   [ N = 3.0:Tp 0.37]
*
   ADD [  1041+  0903]  0904  3  5.0   14.71    0.22 12.67  12.38  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 53.41 mm ]
   fname                :                C:\Users\ALOverholt\AppData\Local\Temp
```

```
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.39 12.25  18.20 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.07 12.25  18.19 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.04 12.25  18.19 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.46 12.25  18.20  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.50 12.25  18.20  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.43    0.74 12.25  16.31  n/a   0.000
*
    ADD [  0906+  0904]  0906  1  5.0   45.14    0.85 12.25  15.03  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0402  1  5.0   45.14    0.28 13.75  15.01  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.05 12.50  10.33 0.19   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.04 12.25  18.19 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.02 12.25  20.30 0.38   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.05 12.50  11.69  n/a   0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.09 12.25  13.15  n/a   0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    0.30 13.25  14.86  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.04 12.25  34.94 0.65   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.03 20.33  34.45  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.09 12.67  11.18 0.21   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.11 12.67  26.58  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.09 12.75  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.10 12.67  12.46  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    0.22 12.67  22.74  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    0.50 12.75  17.63  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.12 12.58  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
```

```
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.14 12.58  12.23  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    0.62 12.75  17.08  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.08 12.58  11.53 0.22   0.000
    [CN=61.9           ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.10 12.50  12.51  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    0.72 12.67  16.78  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.07 12.67  11.53 0.22   0.000
    [CN=61.9           ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.09 12.58  12.71  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    0.81 12.67  16.53  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.21 13.42  11.53 0.22   0.000
    [CN=61.9           ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    0.95 12.75  15.46  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.02 12.25  20.70 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.05 12.25  20.71 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.02 12.25  20.70 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.07 12.25  20.71  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.09 12.25  20.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01 12.25  20.68 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.10 12.25  20.70  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    0.98 12.75  15.54  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.05 12.75   9.49 0.18   0.000
    [CN=57.7           ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    1.03 12.75  15.32  n/a   0.000
*
================================================================================
```

```
=========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\7d47ce9b-3066-4185-9ba7-cf14f88f2016\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\7d47ce9b-3066-4185-9ba7-cf14f88f2016\s

DATE: 03-13-2023                           TIME: 05:27:04

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 009 - SCS-5yr 24hr 15min  **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                     15.0
    [ Ptot= 71.65 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.29 12.92  23.29 0.33   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                     15.0
    [ Ptot= 71.65 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.24 12.25  28.34 0.40   0.000
    [I%=18.0:S%= 2.00]
*
```

```
    DUHYD                0801  1  5.0    3.70    0.24 12.25  28.34  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.24 12.25  28.34  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.36 12.75  24.40  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 71.65 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1021  1  5.0    0.63    0.05 12.25  30.52 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]  0902  3  5.0   17.42    0.39 12.25  24.62  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 71.65 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.24 12.75  23.29 0.33   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.24 12.75  23.29  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 71.65 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.16 12.50  18.24 0.25   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.39 12.67  21.36  n/a   0.000
*
    READ STORM                     15.0
    [ Ptot= 71.65 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.63 12.25  28.16 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                     15.0
    [ Ptot= 71.65 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.12 12.25  28.16 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                     15.0
    [ Ptot= 71.65 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
```

```
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.07 12.25  28.15 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.74 12.25  28.16  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.82 12.25  28.16  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.43    1.20 12.25  26.14  n/a   0.000
*
    ADD [  0906+  0904]  0906  1  5.0   45.14    1.40 12.25  24.58  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0402  1  5.0   45.14    0.42 13.83  24.57  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.08 12.50  18.24 0.25   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.07 12.25  28.15 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.04 12.25  30.51 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.09 12.42  19.91  n/a   0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.15 12.25  21.76  n/a   0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    0.45 13.75  24.33  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.60 12.25  51.20 0.71   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.11 14.00  50.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.17 12.67  19.47 0.27   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.24 12.83  40.14  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.15 12.67  20.03 0.28   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.07 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.18 12.67  21.18  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    0.41 12.75  34.98  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    0.84 12.75  28.08  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.21 12.58  20.03 0.28   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.06 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.24 12.58  20.89  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    1.06 12.67  27.35  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.14 12.58  20.03 0.28   0.000
```

```
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.06 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.17 12.50  21.24  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    1.22 12.67  26.95  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.12 12.67  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.07 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.15 12.58  21.48  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    1.37 12.67  26.61  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.37 13.42  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    1.63 12.75  25.19  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03 12.25  31.29 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.07 12.25  31.30 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.04 12.25  31.29 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.11 12.25  31.30  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.14 12.25  31.29  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02 12.25  31.28 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.16 12.25  31.29  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.67 12.75  25.29  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.09 12.75  16.95 0.24   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    1.76 12.75  24.99  n/a   0.000
*
==================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L               (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
                   *****  S U M M A R Y   O U T P U T  *****
```

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\8446796a-850f-4190-a3e7-f2a6ebbfb4e7\s
  Summary     filename:     C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\8446796a-850f-4190-a3e7-f2a6ebbfb4e7\s


DATE: 03-13-2023                           TIME: 05:27:05

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 010 - SCS-10yr 24hr 15min **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                  min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname               :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD          0101  1  5.0   13.09    0.39 12.92  30.47 0.36   0.000
    [CN=66.7           ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname               :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        0110  1  5.0    3.70    0.33 12.25  35.56 0.43   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                 0801  1  5.0    3.70    0.33 12.25  35.56  n/a   0.000
       MAJOR SYSTEM:      0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:      0801  3  5.0    3.70    0.33 12.25  35.56  n/a   0.000
*
    ADD [  0101+  0801]   0901  3  5.0   16.79    0.47 12.75  31.59  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname               :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1021  1  5.0    0.63    0.07 12.25  37.85 0.45   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]   0902  3  5.0   17.42    0.53 12.25  31.82  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname               :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          0103  1  5.0    9.10    0.32 12.75  30.47 0.36   0.000
    [CN=66.7           ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]   0903  3  5.0    9.10    0.32 12.75  30.47  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname               :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          1041  1  5.0    5.61    0.22 12.50  24.27 0.29   0.000
    [CN=59.6           ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]   0904  3  5.0   14.71    0.52 12.58  28.10  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname               :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1051  1  5.0   10.37    0.89 12.25  35.40 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname               :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1052  1  5.0    1.64    0.15 12.25  35.40 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname               :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1053  1  5.0    1.00    0.09 12.25  35.39 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3  5.0   12.01    1.04 12.25  35.40  n/a   0.000
*
    ADD [  0906+  1053]   0906  1  5.0   13.01    1.13 12.25  35.40  n/a   0.000
*
    ADD [  0906+  0902]   0906  3  5.0   30.43    1.65 12.25  33.35  n/a   0.000
*
    ADD [  0906+  0904]   0906  1  5.0   45.14    1.93 12.25  31.64  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              0402  1  5.0   45.14    0.75 13.42  31.62  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname               :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
```

```
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.11 12.50  24.27 0.29   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.08 12.25  35.39 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.04 12.25  37.85 0.45   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.13 12.42  26.11  n/a   0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.20 12.25  28.20  n/a   0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    0.79 13.42  31.34  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.00 12.25  62.25 0.74   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.14 13.83  61.74  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.22 12.67  25.75 0.31   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.34 12.75  49.57  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.20 12.67  26.45 0.32   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.09 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.23 12.58  27.72  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    0.57 12.67  43.62  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    1.20 13.17  35.67  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.28 12.58  26.44 0.32   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.08 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.31 12.58  27.40  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    1.39 13.08  34.82  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.19 12.58  26.44 0.32   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.08 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.23 12.50  27.79  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    1.60 12.58  34.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
```

```
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.16 12.67  26.45 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.10 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.20 12.50  28.06  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    1.80 12.58  33.98  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.50 13.42  26.45 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    2.14 12.83  32.35  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.04 12.25  38.90 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.09 12.25  38.90 0.47   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.04 12.25  38.90 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.14 12.25  38.90  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.18 12.25  38.90  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
```

```
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02 12.25  38.88 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.20 12.25  38.90  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    2.18 12.75  32.45  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname              :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.13 12.75  22.67 0.27   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    2.31 12.75  32.10  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                  *****  S U M M A R Y   O U T P U T  *****


  Input    filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\18a472ab-c619-402b-aceb-f87e3841bf03\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\18a472ab-c619-402b-aceb-f87e3841bf03\s


DATE: 03-13-2023                          TIME: 05:27:01

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 011 - SCS-25yr 24hr 15min **
  ************************************************
```

```
  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                    min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD           0101  1  5.0   13.09    0.52 12.92  40.16 0.41   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD         0110  1  5.0    3.70    0.43 12.25  45.18 0.46   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                  0801  1  5.0    3.70    0.43 12.25  45.18  n/a   0.000
       MAJOR SYSTEM:       0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:       0801  3  5.0    3.70    0.43 12.25  45.18  n/a   0.000
*
    ADD [  0101+  0801]    0901  3  5.0   16.79    0.61 12.75  41.26  n/a   0.000
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD         1021  1  5.0    0.63    0.08 12.25  47.57 0.48   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]    0902  3  5.0   17.42    0.69 12.25  41.49  n/a   0.000
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD           0103  1  5.0    9.10    0.43 12.75  40.16 0.41   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]    0903  3  5.0    9.10    0.43 12.75  40.16  n/a   0.000
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD           1041  1  5.0    5.61    0.30 12.50  32.55 0.33   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]    0904  3  5.0   14.71    0.69 12.58  37.26  n/a   0.000
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD         1051  1  5.0   10.37    1.16 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD         1052  1  5.0    1.64    0.19 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD         1053  1  5.0    1.00    0.12 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]    0906  3  5.0   12.01    1.35 12.25  45.05  n/a   0.000
*
    ADD [  0906+  1053]    0906  1  5.0   13.01    1.47 12.25  45.05  n/a   0.000
*
    ADD [  0906+  0902]    0906  3  5.0   30.43    2.16 12.25  43.01  n/a   0.000
*
    ADD [  0906+  0904]    0906  1  5.0   45.14    2.53 12.25  41.14  n/a   0.000
*
 ** Reservoir
    OUTFLOW:               0402  1  5.0   45.14    1.25 13.17  41.12  n/a   0.000
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD           1042  1  5.0    2.74    0.15 12.50  32.55 0.33   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD         1054  1  5.0    0.92    0.11 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
      [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
```

```
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.06 12.25  47.56 0.48   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.17 12.42  34.59  n/a   0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.26 12.25  36.94  n/a   0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    1.33 13.08  40.78  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.51 12.25  76.27 0.77   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.48 12.92  75.76  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.30 12.67  34.34 0.35   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.74 12.83  61.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.27 12.67  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.12 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.31 12.58  36.62  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    1.03 12.83  54.91  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    2.29 12.92  45.76  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.38 12.58  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.11 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.42 12.50  36.27  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    2.62 12.92  44.79  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.26 12.58  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.11 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.30 12.50  36.69  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    2.84 12.92  44.25  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.22 12.67  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname             :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.12 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.27 12.50  37.00  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    3.06 12.83  43.81  n/a   0.000
*
    READ STORM                 15.0
```

```
    [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          1115  1  5.0   26.55    0.67 13.42  35.20 0.36   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    3.64 12.92  41.95  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1093  1  5.0    0.41    0.06 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1091  1  5.0    0.87    0.12 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1092  1  5.0    0.42    0.06 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.17 12.25  48.96  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.23 12.25  48.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD        1094  1  5.0    0.22    0.03 12.25  48.94 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.26 12.25  48.96  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    3.68 12.92  42.06  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD          0035  1  5.0    4.67    0.17 12.75  30.58 0.31   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
```

```
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    3.84 12.92  41.65  n/a   0.000
*
==================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\d2924b0a-9a08-43bc-b3f5-02e39e0c1963\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\d2924b0a-9a08-43bc-b3f5-02e39e0c1963\s

DATE: 03-13-2023                          TIME: 05:27:08

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 012 - SCS-50yr 24hr 15min **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD          0101  1  5.0   13.09    0.62 12.92  48.02 0.44   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
```

```
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.51 12.25  52.93 0.48   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.51 12.25  52.93  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.51 12.25  52.93  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.73 12.75  49.10  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1021  1  5.0    0.63    0.10 12.25  55.36 0.50   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]  0902  3  5.0   17.42    0.82 12.25  49.32  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.51 12.75  48.02 0.44   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.51 12.75  48.02  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.36 12.50  39.37 0.36   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.84 12.58  44.72  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.37 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.23 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.14 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.60 12.25  52.82  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.74 12.25  52.82  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.43    2.57 12.25  50.82  n/a   0.000
*
    ADD [  0906+  0904]  0906  1  5.0   45.14    3.02 12.25  48.83  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0402  1  5.0   45.14    1.62 13.00  48.82  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.18 12.50  39.36 0.36   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.13 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.07 12.25  55.35 0.50   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.21 12.42  41.53  n/a   0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.31 12.25  44.07  n/a   0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    1.74 13.00  48.42  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.91 12.25  87.12 0.79   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.90 12.67  86.60  n/a   0.000
```

```
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.36 12.67  41.37 0.38   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.26 12.67  71.31  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.33 12.67  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.14 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.37 12.58  43.88  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    1.63 12.67  63.84  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    3.20 12.75  53.85  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.46 12.58  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.13 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.51 12.50  43.51  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    3.67 12.75  52.80  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.31 12.58  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.13 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.37 12.42  43.96  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    3.99 12.75  52.21  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.27 12.67  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.15 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.32 12.42  44.28  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    4.29 12.75  51.73  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.81 13.42  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    4.89 12.75  49.71  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=110.08 mm ]
    fname                 :                 C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.07 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
```

```
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.14 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.07 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.21 12.25  57.01  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.28 12.25  57.01  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.04 12.25  57.00 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.32 12.25  57.01  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    4.96 12.75  49.83  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.21 12.75  37.10 0.34   0.000
    [CN=57.7           ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    5.17 12.75  49.37  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```
Developed and Distributed by Smart City Water Inc


```
                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\1c8f0381-7d72-47cf-b56f-d1b336562b16\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\1c8f0381-7d72-47cf-b56f-d1b336562b16\s


DATE: 03-13-2023                           TIME: 05:27:02

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 013 - SCS-100yr 24hr 15mi **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min      ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.72 12.92  55.81 0.46   0.000
    [CN=66.7           ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.59 12.25  60.57 0.50   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.59 12.25  60.57  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.59 12.25  60.57  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.85 12.75  56.86  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1021  1  5.0    0.63    0.12 12.25  63.03 0.52   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]  0902  3  5.0   17.42    0.97 12.25  57.08  n/a   0.000
```

```
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.60 12.75  55.81 0.46   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.60 12.75  55.81  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.42 12.50  46.19 0.38   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.98 12.58  52.14  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.59 12.25  60.50 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.26 12.25  60.50 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.18 12.25  60.49 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.86 12.25  60.50  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    2.04 12.25  60.50  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.43    3.01 12.25  58.54  n/a   0.000
*
    ADD [  0906+  0904]  0906  1  5.0   45.14    3.54 12.25  56.46  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0402  1  5.0   45.14    1.83 13.08  56.44  n/a   0.000
*
    READ STORM                  15.0
```

```
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.21 12.50  46.19 0.38   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.17 12.25  60.49 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.08 12.25  63.02 0.52   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.24 12.42  48.47  n/a   0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.39 12.25  51.18  n/a   0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    1.96 13.00  56.00  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    3.73 12.25  97.53 0.81   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    1.42 12.50  97.00  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.42 12.67  48.41 0.40   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.83 12.50  80.57  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.39 12.67  49.53 0.41   0.000
```

```
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.19 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.43 12.67  51.12  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    2.25 12.50  72.55  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    3.97 12.58  61.84  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.54 12.58  49.53 0.41   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.17 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.58 12.58  50.72  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    4.55 12.58  60.70  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.36 12.58  49.53 0.41   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.16 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.42 12.50  51.20  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    4.96 12.58  60.07  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.31 12.67  49.53 0.41   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.19 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.36 12.58  51.54  n/a   0.000
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    5.32 12.58  59.56  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.95 13.33  49.53 0.41   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    5.88 12.58  57.39  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.08 12.25  64.93 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.17 12.25  64.94 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=120.97 mm ]
    fname               :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.08 12.25  64.93 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.26 12.25  64.94  n/a   0.000
*
```

```
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.34 12.25  64.94  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname            :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.04 12.25  64.92 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.39 12.25  64.93  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    5.98 12.58  57.51  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname            :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0035  1  5.0    4.67    0.25 12.67  43.66 0.36   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    6.22 12.58  57.01  n/a   0.000
*
=================================================================================
=========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b7ca089f-ff57-4a18-aef1-f5a45f33a147\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b7ca089f-ff57-4a18-aef1-f5a45f33a147\s


DATE: 03-13-2023                           TIME: 05:27:06

USER:

COMMENTS: ____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : RUN 014 - Regional-TIMMINS    **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot=193.00 mm ]
    fname            :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.79  7.42 112.75 0.58   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                15.0
    [ Ptot=193.00 mm ]
    fname            :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.29  7.00 116.15 0.60   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.29  7.00 116.15  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.29  7.00 116.15  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    1.00  7.25 113.50  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=193.00 mm ]
    fname            :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1021  1  5.0    0.63    0.05  7.00 118.53 0.61   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1021+  0901]  0902  3  5.0   17.42    1.03  7.25 113.68  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=193.00 mm ]
    fname            :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.60  7.25 112.75 0.58   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.60  7.25 112.75  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=193.00 mm ]
    fname            :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.37  7.08  97.54 0.51   0.000
```

```
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    ADD [  1041+  0903]  0904  3  5.0   14.71    0.96  7.17 106.95  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.80  7.00 116.27 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.13  7.00 116.27 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.08  7.00 116.26 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.93  7.00 116.27  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.01  7.00 116.27  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.43    2.03  7.00 114.79  n/a   0.000
*
    ADD [  0906+  0904]  0906  1  5.0   45.14    2.95  7.00 112.23  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0402  1  5.0   45.14    2.79  7.25 112.22  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.18  7.08  97.54 0.51   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.07  7.00 116.26 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1022  1  5.0    0.43    0.03  7.00 118.52 0.61   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  1022+  1042]  0913  3  5.0    3.17    0.21  7.00 100.39  n/a   0.000
*
    ADD [  0913+  1054]  0913  1  5.0    4.09    0.29  7.00 103.96  n/a   0.000
*
    ADD [  0402+  0913]  0910  3  5.0   49.23    3.03  7.25 111.53  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.43  7.00 167.53 0.87   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    1.39  7.00 167.11  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.41  7.17 100.98 0.52   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.79  7.08 144.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.39  7.25 102.81 0.53   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname              :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.08  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  1111]  0907  3  5.0    7.29    0.45  7.17 104.81  n/a   0.000
*
    ADD [  0905+  0907]  0908  3  5.0   26.78    2.25  7.08 133.88  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0   76.01    5.22  7.17 119.40  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
```

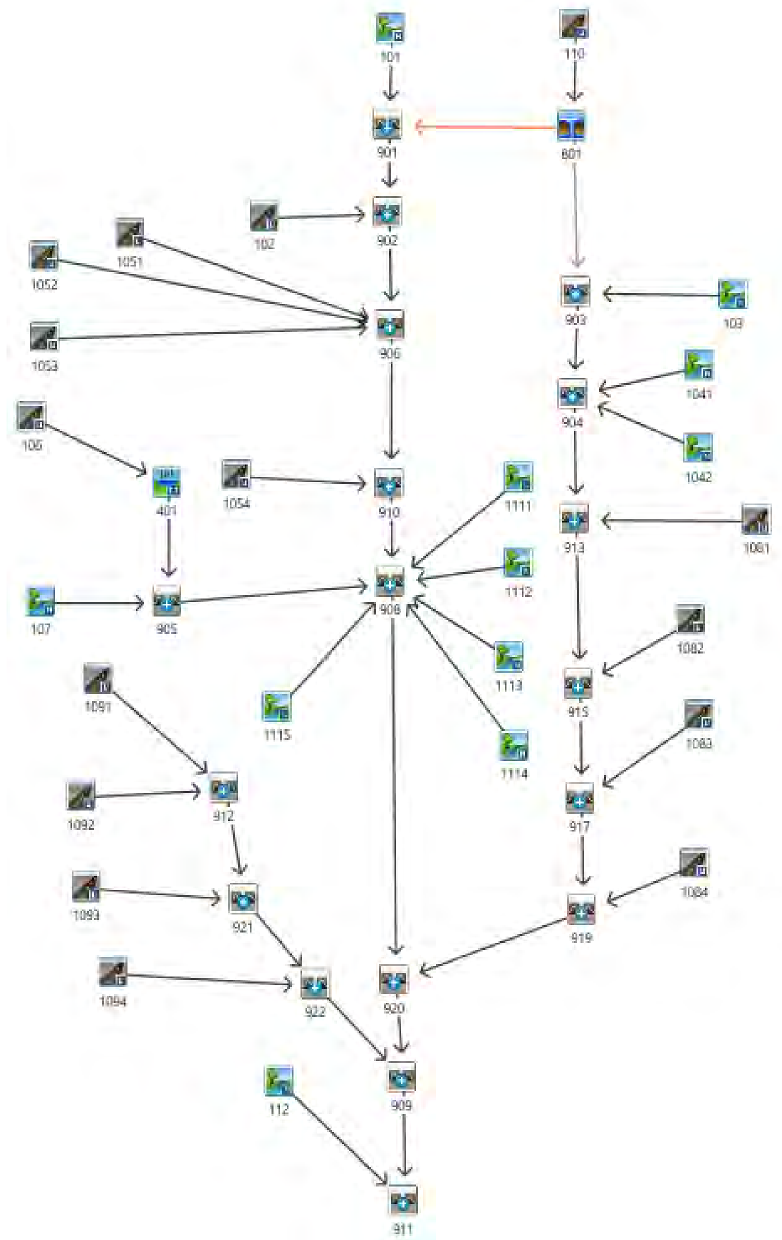
```
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.50  7.17 102.80 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.07  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  1112]  0914  3  5.0    8.65    0.57  7.08 104.31  n/a   0.000
*
    ADD [  0908+  0914]  0915  3  5.0   84.66    5.78  7.17 117.86  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.34  7.08 102.80 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.07  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  1113]  0916  3  5.0    5.97    0.40  7.00 104.91  n/a   0.000
*
    ADD [  0915+  0916]  0917  3  5.0   90.63    6.17  7.17 117.01  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.31  7.17 102.80 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.08  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  1114]  0918  3  5.0    5.86    0.38  7.00 105.34  n/a   0.000
```

```
*
    ADD [  0917+  0918]  0919  3  5.0   96.49    6.55  7.17 116.30  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1115  1  5.0   26.55    1.23  8.08 102.81 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1115+  0919]  0920  3  5.0  123.04    7.51  7.17 113.39  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03  7.00 121.97 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.07  7.00 121.98 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.03  7.00 121.97 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.11  7.00 121.97  n/a   0.000
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.14  7.00 121.97  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  7.00 121.95 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.16  7.00 121.97  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    7.63  7.17 113.52  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname                  :                C:\Users\ALOverholt\AppData\Local\Temp
\4656dc8e-6abd-4d80-92ed-66a4780bbfe6\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
```

```
*
 *  CALIB NASHYD          0035  1  5.0    4.67    0.26  7.25  93.42 0.48   0.000
    [CN=57.7        ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0035+  0909]  0911  3  5.0  129.63    7.89  7.17 112.80  n/a   0.000
*
```

TATHAM
ENGINEERING

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
		DATE	March 2023
SUBJECT	VO Schematic	NAME	PK
	Overall Drainage Plan - Option 5	PAGE	1 OF 1



NASHYD	ROUTE PIPE	DUHYD
STANDHYD	ROUTE CHANNEL	DIVERT HYD
ADDHYD	ROUTE RESERVOIR	SHIFTHYD

```
=====================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\7e7d55d9-e6b9-4383-90a3-035dc7591b2c\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\7e7d55d9-e6b9-4383-90a3-035dc7591b2c\s


DATE: 03-13-2023                            TIME: 05:26:24

USER:


COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 001 - OWEN SOUND CHIC25MM **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min      ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                    6.0
    [ Ptot= 24.97 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.05  2.83   2.86 0.11   0.000
    [CN=66.7        ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                    6.0
    [ Ptot= 24.97 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.10  1.92   6.09 0.24   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.10  1.92   6.09  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.10  1.92   6.09  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.11  1.92   3.57  n/a   0.000
*
    READ STORM                    6.0
    [ Ptot= 24.97 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.04  1.92   7.27 0.29   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.15  1.92   3.79  n/a   0.000
*
    READ STORM                    6.0
    [ Ptot= 24.97 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.26  1.92   5.94 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                    6.0
    [ Ptot= 24.97 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.05  1.92   5.93 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                    6.0
    [ Ptot= 24.97 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.03  1.92   5.92 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.30  1.92   5.94  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.33  1.92   5.93  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    0.48  1.92   4.70  n/a   0.000
*
    READ STORM                    6.0
    [ Ptot= 24.97 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.03  1.92   5.92 0.24   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    0.51  1.92   4.73  n/a   0.000
*
    READ STORM                    6.0
    [ Ptot= 24.97 mm ]
```

```
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    0.41  2.17  12.06 0.48   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.01  4.42  11.81  n/a   0.000
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.03  2.50   2.22 0.09   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.04  2.58   8.57  n/a   0.000
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.03  2.58   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.04  2.42   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.02  2.42   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.02  2.50   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
```

```
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.06  3.33   2.31 0.09   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.06  2.50   2.31  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    0.09  2.50   2.31  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    0.11  2.50   2.31  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    0.15  2.67   2.31  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    0.19  2.58   4.05  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    0.53  1.92   4.26  n/a   0.000
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.04  2.58   2.86 0.11   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.04  2.58   2.86  n/a   0.000
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.03  2.33   1.93 0.08   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.01  2.33   1.93 0.08   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.04  2.33   1.93  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    0.08  2.50   2.42  n/a   0.000
*
    READ STORM                     6.0
    [ Ptot= 24.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.03  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
```

```
*
    ADD [  1081+  0904]  0913  3  5.0   18.48    0.08  2.50   2.61  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.02  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]  0915  3  5.0   19.40    0.09  2.42   2.76  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.02  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]  0917  3  5.0   20.29    0.10  2.42   2.89  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.03  1.92   5.80 0.23   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]  0919  3  5.0   21.34    0.12  1.92   3.03  n/a   0.000
*
    ADD [  0908+  0919]  0920  3  5.0  123.04    0.65  1.92   4.05  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.03  1.92   7.24 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.02  1.92   7.21 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.05  1.92   7.23  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.02  1.92   7.21 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.07  1.92   7.22  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01  1.92   7.17 0.29   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.08  1.92   7.22  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    0.72  1.92   4.10  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\e3800a90-4cf5-4175-85f6-
    remark: OWEN SOUND CHIC25MM
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.01  2.58   1.69 0.07   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    0.72  1.92   4.01  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\f9281024-9ebd-4e79-af18-a18a3b0b7b93\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\f9281024-9ebd-4e79-af18-a18a3b0b7b93\s


DATE: 03-13-2023                           TIME: 05:26:28

USER:
```

```
COMMENTS: ____________________________________________________________

  **************************************************
  ** SIMULATION : RUN 002 - Chicago-2yr 4hr 10m **
  **************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min      ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 ** CALIB NASHYD           0101  1  5.0   13.09    0.08  2.33    5.18 0.16    0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD         0110  1  5.0    3.70    0.15  1.33    9.01 0.27    0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                  0801  1  5.0    3.70    0.15  1.33    9.01  n/a    0.000
       MAJOR SYSTEM:       0801  2  5.0    0.00    0.00  0.00    0.00  n/a    0.000
       MINOR SYSTEM:       0801  3  5.0    3.70    0.15  1.33    9.01  n/a    0.000
*
    ADD [  0101+  0801]    0901  3  5.0   16.79    0.15  1.33    6.03  n/a    0.000
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD         0102  1  5.0    1.06    0.06  1.33   10.45 0.32    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]    0902  3  5.0   17.85    0.21  1.33    6.29  n/a    0.000
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD         1051  1  5.0   10.37    0.37  1.33    8.83 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD         1052  1  5.0    1.64    0.06  1.33    8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD         1053  1  5.0    1.00    0.04  1.33    8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]    0906  3  5.0   12.01    0.43  1.33    8.83  n/a    0.000
*
    ADD [  0906+  1053]    0906  1  5.0   13.01    0.47  1.33    8.83  n/a    0.000
*
    ADD [  0906+  0902]    0906  3  5.0   30.86    0.69  1.33    7.36  n/a    0.000
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD         1054  1  5.0    0.92    0.04  1.33    8.82 0.27    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]    0910  3  5.0   31.78    0.72  1.33    7.40  n/a    0.000
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB STANDHYD         0106  1  5.0   12.90    0.68  1.33   17.87 0.55    0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:               0401  1  5.0   12.90    0.02  4.42   17.62  n/a    0.000
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD           0107  1  5.0    6.59    0.04  1.92    4.10 0.13    0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]    0905  3  5.0   19.49    0.05  2.00   13.05  n/a    0.000
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD           1111  1  5.0    6.26    0.04  2.00    4.25 0.13    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD           1112  1  5.0    7.73    0.05  1.92    4.25 0.13    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD           1113  1  5.0    5.08    0.03  1.83    4.25 0.13    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD           1114  1  5.0    4.81    0.03  1.92    4.25 0.13    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                     10.0
    [ Ptot= 32.79 mm ]
*
 *  CALIB NASHYD           1115  1  5.0   26.55    0.10  2.92    4.25 0.13    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]    0908  3  5.0   13.99    0.09  1.92    4.25  n/a    0.000
*
    ADD [  0908+  1113]    0908  1  5.0   19.07    0.12  1.92    4.25  n/a    0.000
*
```

```
   ADD [  0908+  1114]  0908  3  5.0   23.88    0.15  1.92   4.25  n/a   0.000
*
   ADD [  0908+  1115]  0908  1  5.0   50.43    0.22  2.08   4.25  n/a   0.000
*
   ADD [  0908+  0905]  0908  3  5.0   69.92    0.27  2.08   6.71  n/a   0.000
*
   ADD [  0908+  0910]  0908  1  5.0  101.70    0.76  1.33   6.92  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB NASHYD         0103  1  5.0    9.10    0.06  2.08   5.18 0.16   0.000
   [CN=66.7        ]
   [ N = 3.0:Tp 0.59]
*
   ADD [  0103+  0801]  0903  3  5.0    9.10    0.06  2.08   5.18  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB NASHYD         1041  1  5.0    5.61    0.04  1.75   3.67 0.11   0.000
   [CN=59.6        ]
   [ N = 3.0:Tp 0.37]
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB NASHYD         1042  1  5.0    2.74    0.02  1.75   3.67 0.11   0.000
   [CN=59.6        ]
   [ N = 3.0:Tp 0.36]
*
   ADD [  1041+  1042]  0904  3  5.0    8.35    0.05  1.75   3.67  n/a   0.000
*
   ADD [  0904+  0903]  0904  1  5.0   17.45    0.11  1.92   4.46  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB STANDHYD       1081  1  5.0    1.03    0.04  1.33   8.70 0.27   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1081+  0904]  0913  3  5.0   18.48    0.12  1.83   4.70  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB STANDHYD       1082  1  5.0    0.92    0.03  1.33   8.70 0.27   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1082+  0913]  0915  3  5.0   19.40    0.13  1.83   4.89  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB STANDHYD       1083  1  5.0    0.89    0.03  1.33   8.70 0.27   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1083+  0915]  0917  3  5.0   20.29    0.14  1.83   5.05  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB STANDHYD       1084  1  5.0    1.05    0.04  1.33   8.70 0.27   0.000
   [I%=16.0:S%= 2.00]
```

```
*
   ADD [  1084+  0917]  0919  3  5.0   21.34    0.17  1.33   5.23  n/a   0.000
*
   ADD [  0908+  0919]  0920  3  5.0  123.04    0.93  1.33   6.63  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB STANDHYD       1091  1  5.0    0.87    0.05  1.33  10.50 0.32   0.000
   [I%=23.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB STANDHYD       1092  1  5.0    0.42    0.02  1.33  10.48 0.32   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1091+  1092]  0912  3  5.0    1.29    0.07  1.33  10.49  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB STANDHYD       1093  1  5.0    0.41    0.02  1.33  10.48 0.32   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1093+  0912]  0921  3  5.0    1.70    0.09  1.33  10.49  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB STANDHYD       1094  1  5.0    0.22    0.01  1.33  10.45 0.32   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0    1.92    0.10  1.33  10.49  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    1.03  1.33   6.69  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 32.79 mm ]
*
 * CALIB NASHYD         0112  1  5.0    4.67    0.02  2.08   3.29 0.10   0.000
   [CN=57.7        ]
   [ N = 3.0:Tp 0.55]
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    1.03  1.33   6.57  n/a   0.000
*
 FINISH

=================================================================================
==========================

=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
```

```
      OOO     T      T    H   H    Y    M   M   OOO
```



```
                ***** S U M M A R Y   O U T P U T *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\6086ba18-0889-4449-8dfd-e3ea87684101\s
  Summary     filename:     C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\6086ba18-0889-4449-8dfd-e3ea87684101\s

DATE: 03-13-2023                            TIME: 05:26:23

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 003 - Chicago-5yr 4hr 10m **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs      mm            cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 ** CALIB NASHYD          0101  1  5.0    13.09    0.14  2.25    9.31 0.21    0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        0110  1  5.0     3.70    0.21  1.33   13.72 0.31    0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                 0801  1  5.0     3.70    0.21  1.33   13.72  n/a    0.000
       MAJOR SYSTEM:      0801  2  5.0     0.00    0.00  0.00    0.00  n/a    0.000
       MINOR SYSTEM:      0801  3  5.0     3.70    0.21  1.33   13.72  n/a    0.000
*
    ADD [  0101+  0801]   0901  3  5.0    16.79    0.22  1.33   10.28  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        0102  1  5.0     1.06    0.08  1.33   15.45 0.35    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]   0902  3  5.0    17.85    0.30  1.33   10.59  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        1051  1  5.0    10.37    0.52  1.33   13.53 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        1052  1  5.0     1.64    0.09  1.33   13.52 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        1053  1  5.0     1.00    0.06  1.33   13.52 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]   0906  3  5.0    12.01    0.61  1.33   13.53  n/a    0.000
*
    ADD [  0906+  1053]   0906  1  5.0    13.01    0.67  1.33   13.53  n/a    0.000
*
    ADD [  0906+  0902]   0906  3  5.0    30.86    0.96  1.33   11.83  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        1054  1  5.0     0.92    0.05  1.33   13.52 0.31    0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]   0910  3  5.0    31.78    1.02  1.33   11.88  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD        0106  1  5.0    12.90    1.05  1.50   26.71 0.61    0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:              0401  1  5.0    12.90    0.02  3.50   26.45  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD          0107  1  5.0     6.59    0.08  1.92    7.52 0.17    0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]   0905  3  5.0    19.49    0.09  1.92   20.05  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD          1111  1  5.0     6.26    0.07  2.00    7.78 0.18    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD          1112  1  5.0     7.73    0.10  1.83    7.78 0.18    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD          1113  1  5.0     5.08    0.07  1.83    7.78 0.18    0.000
```

```
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.06  1.92   7.78 0.18   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.19  2.83   7.78 0.18   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.17  1.92   7.78  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    0.23  1.92   7.78  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    0.29  1.92   7.78  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    0.41  2.08   7.78  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    0.50  2.08  11.20  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    1.09  1.33  11.41  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.12  2.00   9.31 0.21   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.12  2.00   9.31  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.07  1.75   6.88 0.16   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.03  1.75   6.88 0.16   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.11  1.75   6.88  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    0.21  1.83   8.15  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.05  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  0904]  0913  3  5.0   18.48    0.23  1.83   8.44  n/a   0.000
*
```

```
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.05  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]  0915  3  5.0   19.40    0.24  1.83   8.68  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.05  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]  0917  3  5.0   20.29    0.26  1.83   8.88  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.06  1.33  13.42 0.31   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]  0919  3  5.0   21.34    0.27  1.83   9.11  n/a   0.000
*
    ADD [  0908+  0919]  0920  3  5.0  123.04    1.34  1.33  11.01  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.06  1.33  15.67 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.03  1.33  15.65 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.09  1.33  15.66  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03  1.33  15.65 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.13  1.33  15.66  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  15.64 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.14  1.33  15.66  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.48  1.33  11.08  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 43.76 mm ]
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.04  2.00   6.26 0.14   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
```

```
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    1.49  1.33  10.91  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M  OOO    TM
       O   O    T      T    H   H   Y Y   MM MM O   O
       O   O    T      T    H   H    Y    M   M O   O
        OOO     T      T    H   H    Y    M   M  OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\4951064b-93fe-4144-ba39-c2d9e60c554c\s
  Summary     filename:     C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\4951064b-93fe-4144-ba39-c2d9e60c554c\s


DATE: 03-13-2023                           TIME: 05:26:21

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : RUN 004 - Chicago-10yr 4hr 10 **
  **************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V.  R.C.    Qbase
                                  min      ha   '  cms   hrs     mm            cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 ** CALIB NASHYD           0101  1  5.0   13.09    0.20  2.25  12.51 0.25   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD         0110  1  5.0    3.70    0.25  1.33  17.19 0.34   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                  0801  1  5.0    3.70    0.25  1.33  17.19  n/a   0.000
       MAJOR SYSTEM:       0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
```

```
       MINOR SYSTEM:       0801  3  5.0    3.70    0.25  1.33  17.19  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.27  1.33  13.54  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD         0102  1  5.0    1.06    0.10  1.33  19.07 0.37   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.37  1.33  13.87  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD         1051  1  5.0   10.37    0.64  1.33  16.99 0.33   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD         1052  1  5.0    1.64    0.11  1.33  16.99 0.33   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD         1053  1  5.0    1.00    0.07  1.33  16.98 0.33   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.75  1.33  16.99  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.82  1.33  16.99  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    1.18  1.33  15.18  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD         1054  1  5.0    0.92    0.06  1.33  16.98 0.33   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    1.24  1.33  15.24  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD         0106  1  5.0   12.90    1.34  1.50  32.86 0.64   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:               0401  1  5.0   12.90    0.08  4.17  32.56  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD           0107  1  5.0    6.59    0.11  1.92  10.21 0.20   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.13  1.92  25.00  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
```

```
*
 *  CALIB NASHYD          1111  1  5.0     6.26    0.10  2.00  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD          1112  1  5.0     7.73    0.13  1.83  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD          1113  1  5.0     5.08    0.09  1.83  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD          1114  1  5.0     4.81    0.08  1.92  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD          1115  1  5.0    26.55    0.25  2.83  10.54 0.21    0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]   0908  3  5.0    13.99    0.23  1.92  10.54  n/a    0.000
*
    ADD [  0908+  1113]   0908  1  5.0    19.07    0.32  1.83  10.54  n/a    0.000
*
    ADD [  0908+  1114]   0908  3  5.0    23.88    0.40  1.92  10.54  n/a    0.000
*
    ADD [  0908+  1115]   0908  1  5.0    50.43    0.56  2.08  10.54  n/a    0.000
*
    ADD [  0908+  0905]   0908  3  5.0    69.92    0.68  2.00  14.57  n/a    0.000
*
    ADD [  0908+  0910]   0908  1  5.0   101.70    1.35  1.33  14.78  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD          0103  1  5.0     9.10    0.16  2.00  12.51 0.25    0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]   0903  3  5.0     9.10    0.16  2.00  12.51  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB NASHYD          1041  1  5.0     5.61    0.10  1.75   9.42 0.18    0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
```

```
 *  CALIB NASHYD          1042  1  5.0     2.74    0.05  1.75   9.42 0.18    0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]   0904  3  5.0     8.35    0.15  1.75   9.42  n/a    0.000
*
    ADD [  0904+  0903]   0904  1  5.0    17.45    0.29  1.83  11.03  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1081  1  5.0     1.03    0.07  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  0904]   0913  3  5.0    18.48    0.31  1.83  11.36  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1082  1  5.0     0.92    0.06  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]   0915  3  5.0    19.40    0.33  1.83  11.62  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1083  1  5.0     0.89    0.06  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]   0917  3  5.0    20.29    0.35  1.83  11.85  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1084  1  5.0     1.05    0.07  1.33  16.90 0.33    0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]   0919  3  5.0    21.34    0.38  1.75  12.10  n/a    0.000
*
    ADD [  0908+  0919]   0920  3  5.0   123.04    1.66  1.33  14.32  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1091  1  5.0     0.87    0.08  1.33  19.41 0.38    0.000
    [I%=23.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1092  1  5.0     0.42    0.04  1.33  19.41 0.38    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]   0912  3  5.0     1.29    0.11  1.33  19.41  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 51.00 mm ]
*
 *  CALIB STANDHYD        1093  1  5.0     0.41    0.04  1.33  19.40 0.38    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]   0921  3  5.0     1.70    0.15  1.33  19.41  n/a    0.000
*
```

```
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  19.38 0.38   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0    1.92    0.17  1.33  19.40  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    1.83  1.33  14.39  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 51.00 mm ]
*
 * CALIB NASHYD         0112  1  5.0    4.67    0.06  2.00   8.63 0.17   0.000
   [CN=57.7         ]
   [ N = 3.0:Tp 0.55]
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    1.84  1.33  14.19  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\52756375-a86d-4d19-a908-863161e36015\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\52756375-a86d-4d19-a908-863161e36015\s


DATE: 03-13-2023                           TIME: 05:26:23

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : RUN 005 - Chicago-25yr 4hr 10 **
  **************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha  '  cms   hrs     mm          cms

      START @  0.00 hrs
```

```
      --------------------
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
** CALIB NASHYD         0101  1  5.0   13.09    0.27  2.25  16.95 0.28   0.000
   [CN=66.7         ]
   [ N = 3.0:Tp 0.75]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       0110  1  5.0    3.70    0.30  1.33  21.85 0.36   0.000
   [I%=18.0:S%= 2.00]
*
   DUHYD                0801  1  5.0    3.70    0.30  1.33  21.85  n/a   0.000
      MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     0801  3  5.0    3.70    0.30  1.33  21.85  n/a   0.000
*
   ADD [  0101+  0801]  0901  3  5.0   16.79    0.33  2.08  18.03  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       0102  1  5.0    1.06    0.12  1.33  23.88 0.40   0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  0102+  0901]  0902  3  5.0   17.85    0.45  1.33  18.37  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1051  1  5.0   10.37    0.78  1.33  21.65 0.36   0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1052  1  5.0    1.64    0.14  1.33  21.65 0.36   0.000
   [I%=17.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1053  1  5.0    1.00    0.09  1.33  21.65 0.36   0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1051+  1052]  0906  3  5.0   12.01    0.92  1.33  21.65  n/a   0.000
*
   ADD [  0906+  1053]  0906  1  5.0   13.01    1.01  1.33  21.65  n/a   0.000
*
   ADD [  0906+  0902]  0906  3  5.0   30.86    1.46  1.33  19.76  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1054  1  5.0    0.92    0.08  1.33  21.64 0.36   0.000
   [I%=17.0:S%= 2.00]
*
   ADD [  1054+  0906]  0910  3  5.0   31.78    1.53  1.33  19.81  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       0106  1  5.0   12.90    1.72  1.50  40.75 0.68   0.000
```

```
    [I%=16.0:S%= 2.00]
 *
  ** Reservoir
    OUTFLOW:             0401  1  5.0    12.90     0.11  4.08  40.44  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB NASHYD         0107  1  5.0     6.59     0.15  1.92  13.99 0.23    0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
 *
    ADD [  0107+  0401]  0905  3  5.0    19.49     0.20  2.17  31.50  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB NASHYD         1111  1  5.0     6.26     0.13  1.92  14.42 0.24    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB NASHYD         1112  1  5.0     7.73     0.19  1.83  14.42 0.24    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB NASHYD         1113  1  5.0     5.08     0.13  1.83  14.42 0.24    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB NASHYD         1114  1  5.0     4.81     0.11  1.92  14.42 0.24    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB NASHYD         1115  1  5.0    26.55     0.35  2.83  14.42 0.24    0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
 *
    ADD [  1111+  1112]  0908  3  5.0    13.99     0.32  1.92  14.42  n/a    0.000
 *
    ADD [  0908+  1113]  0908  1  5.0    19.07     0.44  1.83  14.42  n/a    0.000
 *
    ADD [  0908+  1114]  0908  3  5.0    23.88     0.55  1.83  14.42  n/a    0.000
 *
    ADD [  0908+  1115]  0908  1  5.0    50.43     0.77  2.08  14.42  n/a    0.000
 *
    ADD [  0908+  0905]  0908  3  5.0    69.92     0.97  2.17  19.18  n/a    0.000
 *
    ADD [  0908+  0910]  0908  1  5.0   101.70     1.70  1.33  19.38  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
```

```
  * CALIB NASHYD         0103  1  5.0     9.10     0.22  2.00  16.94 0.28    0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
 *
    ADD [  0103+  0801]  0903  3  5.0     9.10     0.22  2.00  16.94  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB NASHYD         1041  1  5.0     5.61     0.14  1.75  13.01 0.22    0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB NASHYD         1042  1  5.0     2.74     0.07  1.67  13.01 0.22    0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
 *
    ADD [  1041+  1042]  0904  3  5.0     8.35     0.21  1.75  13.01  n/a    0.000
 *
    ADD [  0904+  0903]  0904  1  5.0    17.45     0.41  1.83  15.06  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB STANDHYD       1081  1  5.0     1.03     0.08  1.33  21.60 0.36    0.000
    [I%=16.0:S%= 2.00]
 *
    ADD [  1081+  0904]  0913  3  5.0    18.48     0.43  1.83  15.43  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB STANDHYD       1082  1  5.0     0.92     0.08  1.33  21.60 0.36    0.000
    [I%=16.0:S%= 2.00]
 *
    ADD [  1082+  0913]  0915  3  5.0    19.40     0.46  1.83  15.72  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB STANDHYD       1083  1  5.0     0.89     0.07  1.33  21.60 0.36    0.000
    [I%=16.0:S%= 2.00]
 *
    ADD [  1083+  0915]  0917  3  5.0    20.29     0.48  1.75  15.98  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB STANDHYD       1084  1  5.0     1.05     0.09  1.33  21.60 0.36    0.000
    [I%=16.0:S%= 2.00]
 *
    ADD [  1084+  0917]  0919  3  5.0    21.34     0.51  1.75  16.25  n/a    0.000
 *
    ADD [  0908+  0919]  0920  3  5.0   123.04     2.12  1.83  18.84  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
 *
  * CALIB STANDHYD       1091  1  5.0     0.87     0.09  1.33  24.40 0.41    0.000
    [I%=23.0:S%= 2.00]
 *
```

```
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1092  1  5.0    0.42    0.05  1.33  24.40 0.41   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1091+  1092]  0912  3  5.0    1.29    0.14  1.33  24.40  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1093  1  5.0    0.41    0.04  1.33  24.40 0.41   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1093+  0912]  0921  3  5.0    1.70    0.19  1.33  24.40  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB STANDHYD       1094  1  5.0    0.22    0.02  1.33  24.38 0.41   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0    1.92    0.21  1.33  24.40  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    2.32  1.33  18.92  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 60.03 mm ]
*
 * CALIB NASHYD         0112  1  5.0    4.67    0.08  2.00  12.01 0.20   0.000
   [CN=57.7         ]
   [ N = 3.0:Tp 0.55]
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    2.33  1.33  18.67  n/a   0.000
*
=================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\42fdfaa3-c757-441b-b324-46e70eecfcec\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\42fdfaa3-c757-441b-b324-46e70eecfcec\s
```

```
DATE: 03-13-2023                           TIME: 05:26:21

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 006 - Chicago-50yr 4hr 10 **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.33  2.25  20.60 0.31   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.37  1.33  25.61 0.38   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.37  1.33  25.61  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.37  1.33  25.61  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.40  1.33  21.70  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.14  1.33  27.74 0.41   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.54  1.33  22.06  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.90  1.33  25.42 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.16  1.33  25.42 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.10  1.33  25.41 0.38   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.06  1.33  25.42  n/a   0.000
*
```

```
     ADD [  0906+  1053]  0906  1  5.0    13.01     1.15  1.33  25.42  n/a    0.000
*
     ADD [  0906+  0902]  0906  3  5.0    30.86     1.69  1.33  23.48  n/a    0.000
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB STANDHYD       1054  1  5.0     0.92     0.09  1.33  25.41 0.38    0.000
     [I%=17.0:S%= 2.00]
*
     ADD [  1054+  0906]  0910  3  5.0    31.78     1.78  1.33  23.53  n/a    0.000
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB STANDHYD       0106  1  5.0    12.90     2.03  1.42  46.87 0.70    0.000
     [I%=16.0:S%= 2.00]
*
 ** Reservoir
     OUTFLOW:             0401  1  5.0    12.90     0.14  4.08  46.55  n/a    0.000
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB NASHYD         0107  1  5.0     6.59     0.18  1.92  17.14 0.26    0.000
     [CN=61.0          ]
     [ N = 3.0:Tp 0.49]
*
     ADD [  0107+  0401]  0905  3  5.0    19.49     0.27  2.08  36.61  n/a    0.000
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB NASHYD         1111  1  5.0     6.26     0.17  1.92  17.64 0.26    0.000
     [CN=61.9          ]
     [ N = 3.0:Tp 0.54]
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB NASHYD         1112  1  5.0     7.73     0.23  1.83  17.64 0.26    0.000
     [CN=61.9          ]
     [ N = 3.0:Tp 0.46]
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB NASHYD         1113  1  5.0     5.08     0.16  1.83  17.64 0.26    0.000
     [CN=61.9          ]
     [ N = 3.0:Tp 0.44]
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB NASHYD         1114  1  5.0     4.81     0.13  1.92  17.64 0.26    0.000
     [CN=61.9          ]
     [ N = 3.0:Tp 0.50]
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB NASHYD         1115  1  5.0    26.55     0.43  2.83  17.64 0.26    0.000
     [CN=61.9          ]
     [ N = 3.0:Tp 1.13]
```

```
*
     ADD [  1111+  1112]  0908  3  5.0    13.99     0.39  1.92  17.64  n/a    0.000
*
     ADD [  0908+  1113]  0908  1  5.0    19.07     0.55  1.83  17.64  n/a    0.000
*
     ADD [  0908+  1114]  0908  3  5.0    23.88     0.68  1.83  17.64  n/a    0.000
*
     ADD [  0908+  1115]  0908  1  5.0    50.43     0.95  2.08  17.64  n/a    0.000
*
     ADD [  0908+  0905]  0908  3  5.0    69.92     1.22  2.08  22.93  n/a    0.000
*
     ADD [  0908+  0910]  0908  1  5.0   101.70     2.00  1.83  23.12  n/a    0.000
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB NASHYD         0103  1  5.0     9.10     0.27  2.00  20.60 0.31    0.000
     [CN=66.7          ]
     [ N = 3.0:Tp 0.59]
*
     ADD [  0103+  0801]  0903  3  5.0     9.10     0.27  2.00  20.60  n/a    0.000
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB NASHYD         1041  1  5.0     5.61     0.17  1.75  16.01 0.24    0.000
     [CN=59.6          ]
     [ N = 3.0:Tp 0.37]
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB NASHYD         1042  1  5.0     2.74     0.09  1.67  16.01 0.24    0.000
     [CN=59.6          ]
     [ N = 3.0:Tp 0.36]
*
     ADD [  1041+  1042]  0904  3  5.0     8.35     0.26  1.75  16.01  n/a    0.000
*
     ADD [  0904+  0903]  0904  1  5.0    17.45     0.50  1.83  18.41  n/a    0.000
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB STANDHYD       1081  1  5.0     1.03     0.10  1.33  25.40 0.38    0.000
     [I%=16.0:S%= 2.00]
*
     ADD [  1081+  0904]  0913  3  5.0    18.48     0.53  1.83  18.80  n/a    0.000
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB STANDHYD       1082  1  5.0     0.92     0.09  1.33  25.40 0.38    0.000
     [I%=16.0:S%= 2.00]
*
     ADD [  1082+  0913]  0915  3  5.0    19.40     0.56  1.83  19.11  n/a    0.000
*
     CHIC STORM                 10.0
     [ Ptot= 66.87 mm ]
*
 *   CALIB STANDHYD       1083  1  5.0     0.89     0.08  1.33  25.40 0.38    0.000
     [I%=16.0:S%= 2.00]
*
     ADD [  1083+  0915]  0917  3  5.0    20.29     0.59  1.75  19.39  n/a    0.000
*
```

```
   CHIC STORM                10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1084  1  5.0    1.05    0.10  1.33  25.40 0.38   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1084+  0917]  0919  3  5.0   21.34    0.63  1.67  19.68  n/a   0.000
*
   ADD [  0908+  0919]  0920  3  5.0  123.04    2.63  1.83  22.52  n/a   0.000
*
   CHIC STORM                10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1091  1  5.0    0.87    0.11  1.33  28.41 0.42   0.000
   [I%=23.0:S%= 2.00]
*
   CHIC STORM                10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1092  1  5.0    0.42    0.05  1.33  28.40 0.42   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1091+  1092]  0912  3  5.0    1.29    0.16  1.33  28.40  n/a   0.000
*
   CHIC STORM                10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1093  1  5.0    0.41    0.05  1.33  28.39 0.42   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1093+  0912]  0921  3  5.0    1.70    0.21  1.33  28.40  n/a   0.000
*
   CHIC STORM                10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB STANDHYD       1094  1  5.0    0.22    0.03  1.33  28.38 0.42   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0    1.92    0.24  1.33  28.40  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0  124.96    2.71  1.33  22.61  n/a   0.000
*
   CHIC STORM                10.0
   [ Ptot= 66.87 mm ]
*
 * CALIB NASHYD         0112  1  5.0    4.67    0.10  2.00  14.84 0.22   0.000
   [CN=57.7           ]
   [ N = 3.0:Tp 0.55]
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    2.78  1.83  22.33  n/a   0.000
*
=================================================================================
==========================


      V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O     T      T    H   H   Y Y   MM MM  O   O
      O   O     T      T    H   H    Y    M   M  O   O
```

```
       OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output     filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\f495a280-6ff7-4c33-82ac-48a046cdbfba\s
  Summary    filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\f495a280-6ff7-4c33-82ac-48a046cdbfba\s


DATE: 03-13-2023                           TIME: 05:26:28

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 007 - Chicago-100yr 4hr 1 **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                    min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.39  2.25  24.35 0.33   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB STANDHYD       0110  1  5.0    3.70    0.42  1.33  29.41 0.40   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.42  1.33  29.41  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.42  1.33  29.41  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.47  2.08  25.46  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB STANDHYD       0102  1  5.0    1.06    0.15  1.33  31.61 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.61  1.33  25.83  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
  * CALIB STANDHYD       1051  1  5.0   10.37    1.10  1.33  29.23 0.40   0.000
```

```
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.18  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.11  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.28  1.33  29.23  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.39  1.33  29.23  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.01  1.33  27.26  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.10  1.33  29.23 0.40   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    2.11  1.33  27.32  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.91  1.33  52.88 0.72   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.18  3.83  52.55  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.22  1.83  20.39 0.28   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.33  2.00  41.67  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.20  1.92  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.28  1.83  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.19  1.83  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.16  1.92  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.51  2.75  20.97 0.29   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.47  1.83  20.97  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    0.66  1.83  20.97  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    0.82  1.83  20.97  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    1.14  2.00  20.97  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    1.47  2.00  26.74  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    2.38  1.83  26.92  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.32  2.00  24.34 0.33   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.32  2.00  24.34  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.21  1.75  19.12 0.26   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.10  1.67  19.12 0.26   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.31  1.67  19.12  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    0.60  1.83  21.85  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.11  1.33  29.25 0.40   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  0904]  0913  3  5.0   18.48    0.64  1.83  22.26  n/a   0.000
*
```

```
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1082  1  5.0     0.92    0.10  1.33  29.25 0.40   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1082+  0913]  0915  3  5.0    19.40    0.67  1.75  22.59  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1083  1  5.0     0.89    0.10  1.33  29.25 0.40   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1083+  0915]  0917  3  5.0    20.29    0.71  1.75  22.88  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1084  1  5.0     1.05    0.11  1.33  29.25 0.40   0.000
   [I%=16.0:S%= 2.00]
*
   ADD [  1084+  0917]  0919  3  5.0    21.34    0.75  1.67  23.20  n/a   0.000
*
   ADD [  0908+  0919]  0920  3  5.0   123.04    3.12  1.83  26.28  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1091  1  5.0     0.87    0.12  1.33  32.43 0.44   0.000
   [I%=23.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1092  1  5.0     0.42    0.06  1.33  32.43 0.44   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1091+  1092]  0912  3  5.0     1.29    0.18  1.33  32.43  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1093  1  5.0     0.41    0.06  1.33  32.43 0.44   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1093+  0912]  0921  3  5.0     1.70    0.24  1.33  32.43  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB STANDHYD       1094  1  5.0     0.22    0.03  1.33  32.41 0.44   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  1094+  0921]  0922  3  5.0     1.92    0.27  1.33  32.43  n/a   0.000
*
   ADD [  0920+  0922]  0909  3  5.0   124.96    3.21  1.33  26.37  n/a   0.000
*
   CHIC STORM                 10.0
   [ Ptot= 73.48 mm ]
*
 * CALIB NASHYD         0112  1  5.0     4.67    0.12  2.00  17.78 0.24   0.000
   [CN=57.7          ]
   [ N = 3.0:Tp 0.55]
```

```
*
   ADD [  0112+  0909]  0911  3  5.0  129.63    3.31  1.83  26.06  n/a   0.000
*
===================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```



```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\a4c9584f-b3a9-4ccf-b560-2a201a7b0af4\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\a4c9584f-b3a9-4ccf-b560-2a201a7b0af4\s


DATE: 03-13-2023                          TIME: 05:26:25

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : RUN 008 - SCS-2yr 24hr 15min  **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD        0101  1  5.0   13.09    0.17 12.92  13.65 0.26   0.000
    [CN=66.7        ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
```

```
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.15 12.25  18.39 0.34   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.15 12.25  18.39  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.15 12.25  18.39  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.22 12.75  14.69  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.05 12.25  20.32 0.38   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.26 12.25  15.03  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.39 12.25  18.20 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.07 12.25  18.19 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.04 12.25  18.19 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.46 12.25  18.20  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.50 12.25  18.20  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    0.76 12.25  16.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.04 12.25  18.19 0.34   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    0.79 12.25  16.42  n/a   0.000
```

```
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.04 12.25  34.94 0.65   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.03 20.33  34.45  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.09 12.67  11.18 0.21   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.11 12.67  26.58  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.09 12.75  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.12 12.58  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.08 12.58  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.07 12.67  11.53 0.22   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
```

```
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.21 13.42  11.53 0.22   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.20 12.67  11.53  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    0.28 12.67  11.53  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    0.35 12.67  11.53  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    0.50 12.75  11.53  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    0.61 12.75  15.73  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    1.07 12.58  15.94  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.14 12.75  13.65 0.26   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.14 12.75  13.65  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.09 12.50  10.33 0.19   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.05 12.50  10.33 0.19   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.14 12.50  10.33  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    0.26 12.58  12.06  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  0904]  0913  3  5.0   18.48    0.28 12.58  12.40  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]  0915  3  5.0   19.40    0.30 12.58  12.67  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]  0917  3  5.0   20.29    0.32 12.50  12.91  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.04 12.25  18.12 0.34   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]  0919  3  5.0   21.34    0.34 12.50  13.17  n/a   0.000
*
    ADD [  0908+  0919]  0920  3  5.0  123.04    1.41 12.58  15.46  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.05 12.25  20.71 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.02 12.25  20.70 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.07 12.25  20.71  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 53.41 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
```

```
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.02 12.25  20.70 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.09 12.25  20.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.01 12.25  20.68 0.39   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.10 12.25  20.70  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    1.46 12.25  15.54  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3a42fa8b-e691-4fb5-b718-
    remark: 2yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.05 12.75   9.49 0.18   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    1.49 12.58  15.32  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\d4a08141-8e4f-4ceb-899d-6a9d310741e9\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\d4a08141-8e4f-4ceb-899d-6a9d310741e9\s


DATE: 03-13-2023                           TIME: 05:26:27


USER:


COMMENTS: ____________________________________________________________


  **********************************************
  ** SIMULATION : RUN 009 - SCS-5yr 24hr 15min  **
  **********************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.29 12.92  23.29 0.33   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.24 12.25  28.34 0.40   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.24 12.25  28.34  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.24 12.25  28.34  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.36 12.75  24.40  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.08 12.25  30.53 0.43   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.42 12.25  24.77  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.63 12.25  28.16 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
```

```
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.12 12.25  28.16 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.07 12.25  28.15 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    0.74 12.25  28.16  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    0.82 12.25  28.16  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    1.23 12.25  26.20  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.07 12.25  28.15 0.39   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    1.30 12.25  26.25  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    1.60 12.25  51.20 0.71   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.11 14.00  50.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.17 12.67  19.47 0.27   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.24 12.83  40.14  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.15 12.67  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.21 12.58  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.14 12.58  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.12 12.67  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.37 13.42  20.03 0.28   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.36 12.67  20.03  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    0.50 12.58  20.03  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    0.62 12.67  20.03  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    0.88 12.75  20.03  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    1.12 12.75  25.63  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    1.84 12.50  25.83  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.24 12.75  23.29 0.33   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.24 12.75  23.29  n/a   0.000
```

```
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.16 12.50  18.24 0.25   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.08 12.50  18.24 0.25   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.24 12.50  18.24  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    0.47 12.58  20.87  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.07 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  0904]  0913  3  5.0   18.48    0.49 12.58  21.28  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.06 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]  0915  3  5.0   19.40    0.52 12.58  21.61  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.06 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]  0917  3  5.0   20.29    0.55 12.50  21.89  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.07 12.25  28.16 0.39   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]  0919  3  5.0   21.34    0.58 12.50  22.20  n/a   0.000
*
    ADD [  0908+  0919]  0920  3  5.0  123.04    2.43 12.50  25.20  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.07 12.25  31.30 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.04 12.25  31.29 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.11 12.25  31.30  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03 12.25  31.29 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.14 12.25  31.29  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02 12.25  31.28 0.44   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.16 12.25  31.29  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    2.49 12.50  25.29  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 71.65 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\c68df0a0-b7d5-4f4d-a4ae-
    remark: 5yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.09 12.75  16.95 0.24   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    2.57 12.50  24.99  n/a   0.000
*
=================================================================================
```

```
=========================

       V    V   I    SSSSS  U   U    A    L            (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\84a11bfe-221d-49f6-97e3-828e093dba89\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\84a11bfe-221d-49f6-97e3-828e093dba89\s

DATE: 03-13-2023                           TIME: 05:26:24

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 010 - SCS-10yr 24hr 15min **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD        0101  1  5.0   13.09    0.39 12.92  30.47 0.36   0.000
    [CN=66.7        ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.33 12.25  35.56 0.43   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                   0801  1  5.0    3.70    0.33 12.25  35.56  n/a   0.000
       MAJOR SYSTEM:        0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:        0801  3  5.0    3.70    0.33 12.25  35.56  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.47 12.75  31.59  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.11 12.25  37.86 0.45   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.57 12.25  31.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    0.89 12.25  35.40 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.15 12.25  35.40 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.09 12.25  35.39 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.04 12.25  35.40  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.13 12.25  35.40  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    1.70 12.25  33.41  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.08 12.25  35.39 0.42   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    1.78 12.25  33.47  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
```

```
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.00 12.25  62.25 0.74   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.14 13.83  61.74  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.22 12.67  25.75 0.31   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.34 12.75  49.57  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.20 12.67  26.45 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.28 12.58  26.44 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.19 12.58  26.44 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.16 12.67  26.45 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.50 13.42  26.45 0.32   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.48 12.67  26.44  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    0.67 12.58  26.44  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    0.83 12.58  26.44  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    1.17 12.75  26.45  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    1.52 12.75  32.89  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    2.44 12.25  33.07  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.32 12.75  30.47 0.36   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.32 12.75  30.47  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.22 12.50  24.27 0.29   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.11 12.50  24.27 0.29   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.33 12.50  24.27  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    0.62 12.58  27.50  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.09 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
```

```
    ADD [  1081+  0904]  0913  3  5.0   18.48    0.66 12.58  27.95  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.08 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]  0915  3  5.0   19.40    0.69 12.50  28.30  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.08 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]  0917  3  5.0   20.29    0.73 12.50  28.62  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.10 12.25  35.47 0.42   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]  0919  3  5.0   21.34    0.78 12.42  28.95  n/a   0.000
*
    ADD [  0908+  0919]  0920  3  5.0  123.04    3.20 12.42  32.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.09 12.25  38.90 0.47   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.04 12.25  38.90 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.14 12.25  38.90  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.04 12.25  38.90 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.18 12.25  38.90  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02 12.25  38.88 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.20 12.25  38.90  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    3.34 12.25  32.46  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname          :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\18317f7f-eab2-4a6e-81f5-
    remark: 10yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.13 12.75  22.67 0.27   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    3.41 12.42  32.11  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
        OOO      T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

```

                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b98f43b0-2e42-4363-bfde-e7815555de9b\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\b98f43b0-2e42-4363-bfde-e7815555de9b\s


DATE: 03-13-2023                           TIME: 05:26:25

USER:


COMMENTS: ____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : RUN 011 - SCS-25yr 24hr 15min **
  ************************************************

  W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.52 12.92  40.16 0.41   0.000
    [CN=66.7        ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.43 12.25  45.18 0.46   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.43 12.25  45.18  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.43 12.25  45.18  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.61 12.75  41.26  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.14 12.25  47.57 0.48   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.75 12.25  41.64  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.16 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.19 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
```

```
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.12 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.35 12.25  45.05  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.47 12.25  45.05  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.21 12.25  43.08  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.11 12.25  45.05 0.46   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    2.32 12.25  43.13  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.51 12.25  76.27 0.77   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.48 12.92  75.76  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.30 12.67  34.34 0.35   0.000
    [CN=61.0        ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    0.74 12.83  61.75  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.27 12.67  35.20 0.36   0.000
    [CN=61.9        ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname           :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
```

```
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.38 12.58  35.20 0.36   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.26 12.58  35.20 0.36   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.22 12.67  35.20 0.36   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.67 13.42  35.20 0.36   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.64 12.67  35.20  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    0.90 12.58  35.20  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    1.12 12.58  35.20  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    1.58 12.75  35.20  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    2.31 12.83  42.60  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    3.36 12.75  42.77  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.43 12.75  40.16 0.41   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.43 12.75  40.16  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.30 12.50  32.55 0.33   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.15 12.50  32.55 0.33   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.44 12.50  32.55  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    0.83 12.58  36.52  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.12 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  0904]  0913  3  5.0   18.48    0.88 12.58  37.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.11 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]  0915  3  5.0   19.40    0.93 12.50  37.39  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.11 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]  0917  3  5.0   20.29    0.98 12.50  37.73  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.12 12.25  45.21 0.46   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]  0919  3  5.0   21.34    1.06 12.42  38.10  n/a   0.000
```

```
*
    ADD [  0908+  0919]  0920  3  5.0  123.04    4.37 12.42  41.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.12 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.06 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.17 12.25  48.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.06 12.25  48.96 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.23 12.25  48.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.03 12.25  48.94 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.26 12.25  48.96  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    4.51 12.42  42.07  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 98.64 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\28671e7b-f7d6-44d3-ade4-
    remark: 25yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.17 12.75  30.58 0.31   0.000
    [CN=57.7           ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    4.65 12.42  41.65  n/a   0.000
*
==================================================================================
==========================

       V    V   I    SSSSS  U    U    A    L              (v 6.2.2011)
        V    V   I    SS     U    U   A A   L
         V  V    I     SS    U    U  AAAAA  L
         V  V    I      SS   U    U  A   A  L
          VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\4adf60a9-44bb-487e-8dc8-da6446da40ab\s
  Summary    filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\4adf60a9-44bb-487e-8dc8-da6446da40ab\s

DATE: 03-13-2023                           TIME: 05:26:22

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 012 - SCS-50yr 24hr 15min **
  ************************************************

  W/E COMMAND            HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.62 12.92  48.02 0.44   0.000
    [CN=66.7           ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname           :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.51 12.25  52.93 0.48   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.51 12.25  52.93  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.51 12.25  52.93  n/a   0.000
*
```

```
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.73 12.75  49.10  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.16 12.25  55.36 0.50   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    0.89 12.25  49.47  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.37 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.23 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.14 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.60 12.25  52.82  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    1.74 12.25  52.82  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    2.63 12.25  50.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.13 12.25  52.82 0.48   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    2.76 12.25  50.94  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    2.91 12.25  87.12 0.79   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    0.90 12.67  86.60  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.36 12.67  41.37 0.38   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.26 12.67  71.31  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.33 12.67  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.46 12.58  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.31 12.58  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.27 12.67  42.37 0.38   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname          :             C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.81 13.42  42.37 0.38   0.000
```

```
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.78 12.67  42.37  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    1.09 12.58  42.37  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    1.35 12.58  42.37  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    1.91 12.75  42.37  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    3.15 12.67  50.44  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    4.53 12.67  50.59  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.51 12.75  48.02 0.44   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.51 12.75  48.02  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.36 12.50  39.37 0.36   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.37]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.18 12.50  39.36 0.36   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.54 12.50  39.36  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    1.01 12.58  43.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.14 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  0904]  0913  3  5.0   18.48    1.06 12.58  44.39  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.13 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]  0915  3  5.0   19.40    1.12 12.50  44.80  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.13 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]  0917  3  5.0   20.29    1.18 12.42  45.16  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.15 12.25  53.05 0.48   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]  0919  3  5.0   21.34    1.28 12.42  45.55  n/a   0.000
*
    ADD [  0908+  0919]  0920  3  5.0  123.04    5.69 12.58  49.72  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.14 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.07 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.21 12.25  57.01  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.07 12.25  57.01 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.28 12.25  57.01  n/a   0.000
*
```

```
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.04 12.25  57.00 0.52   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.32 12.25  57.01  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    5.78 12.58  49.83  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\8289b8b5-d0e8-4721-bfd2-
    remark: 50yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.21 12.75  37.10 0.34   0.000
    [CN=57.7         ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    5.98 12.58  49.37  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\cf11e61b-b791-4d46-9470-37266ff079c3\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\cf11e61b-b791-4d46-9470-37266ff079c3\s


DATE: 03-13-2023                           TIME: 05:26:26

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : RUN 013 - SCS-100yr 24hr 15mi **
  **************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 ** CALIB NASHYD         0101  1  5.0   13.09    0.72 12.92  55.81 0.46   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0110  1  5.0    3.70    0.59 12.25  60.57 0.50   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD                0801  1  5.0    3.70    0.59 12.25  60.57  n/a   0.000
       MAJOR SYSTEM:     0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0801  3  5.0    3.70    0.59 12.25  60.57  n/a   0.000
*
    ADD [  0101+  0801]  0901  3  5.0   16.79    0.85 12.75  56.86  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0102  1  5.0    1.06    0.19 12.25  63.03 0.52   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901]  0902  3  5.0   17.85    1.03 12.25  57.23  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1051  1  5.0   10.37    1.59 12.25  60.50 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1052  1  5.0    1.64    0.26 12.25  60.50 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
```

```
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1053  1  5.0    1.00    0.18 12.25  60.49 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052]  0906  3  5.0   12.01    1.86 12.25  60.50  n/a   0.000
*
    ADD [  0906+  1053]  0906  1  5.0   13.01    2.04 12.25  60.50  n/a   0.000
*
    ADD [  0906+  0902]  0906  3  5.0   30.86    3.07 12.25  58.61  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1054  1  5.0    0.92    0.17 12.25  60.49 0.50   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906]  0910  3  5.0   31.78    3.24 12.25  58.66  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       0106  1  5.0   12.90    3.73 12.25  97.53 0.81   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   12.90    1.42 12.50  97.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.42 12.67  48.41 0.40   0.000
    [CN=61.0         ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.83 12.50  80.57  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.39 12.67  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.54 12.58  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.36 12.58  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.31 12.67  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1115  1  5.0   26.55    0.95 13.33  49.53 0.41   0.000
    [CN=61.9         ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.92 12.67  49.53  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    1.28 12.58  49.53  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    1.59 12.58  49.53  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    2.24 12.75  49.53  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    3.91 12.58  58.18  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    5.79 12.50  58.33  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.60 12.75  55.81 0.46   0.000
    [CN=66.7         ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.60 12.75  55.81  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.42 12.50  46.19 0.38   0.000
```

```
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.21 12.50  46.19 0.38   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.64 12.50  46.19  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    1.18 12.58  51.21  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.19 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  0904]  0913  3  5.0   18.48    1.23 12.58  51.74  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.17 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]  0915  3  5.0   19.40    1.28 12.50  52.17  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.16 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]  0917  3  5.0   20.29    1.34 12.50  52.55  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.19 12.25  60.79 0.50   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]  0919  3  5.0   21.34    1.41 12.42  52.95  n/a   0.000
*
    ADD [  0908+  0919]  0920  3  5.0  123.04    7.19 12.50  57.40  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.17 12.25  64.94 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.08 12.25  64.93 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.26 12.25  64.94  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.08 12.25  64.93 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.34 12.25  64.94  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.04 12.25  64.92 0.54   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.39 12.25  64.93  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    7.31 12.50  57.51  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=120.97 mm ]
    fname           :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\3ec9f296-b625-4bf6-9cbf-
    remark: 100yr 24hr 15min SCS Type II (MTO)
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.25 12.67  43.66 0.36   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    7.53 12.50  57.02  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL
```

```
       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\d681dc75-427e-45b3-b8f0-00298bd3cef0\s
  Summary     filename:    C:\Users\ALOverholt\AppData\Local\Civica\VH5\ba948c0a-
a4ea-460e-abeb-862c609ff3aa\d681dc75-427e-45b3-b8f0-00298bd3cef0\s

DATE: 03-13-2023                           TIME: 05:26:27

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : RUN 014 - Regional-TIMMINS    **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname           :               C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 ** CALIB NASHYD        0101  1  5.0   13.09    0.79  7.42 112.75 0.58   0.000
    [CN=66.7        ]
    [ N = 3.0:Tp 0.75]
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname           :               C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      0110  1  5.0    3.70    0.29  7.00 116.15 0.60   0.000
    [I%=18.0:S%= 2.00]
*
    DUHYD               0801  1  5.0    3.70    0.29  7.00 116.15  n/a   0.000
       MAJOR SYSTEM:    0801  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:    0801  3  5.0    3.70    0.29  7.00 116.15  n/a   0.000
*
    ADD [  0101+  0801] 0901  3  5.0   16.79    1.00  7.25 113.50  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname           :               C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      0102  1  5.0    1.06    0.08  7.00 118.53 0.61   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0102+  0901] 0902  3  5.0   17.85    1.06  7.25 113.80  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname           :               C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1051  1  5.0   10.37    0.80  7.00 116.27 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname           :               C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1052  1  5.0    1.64    0.13  7.00 116.27 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname           :               C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1053  1  5.0    1.00    0.08  7.00 116.26 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1051+  1052] 0906  3  5.0   12.01    0.93  7.00 116.27  n/a   0.000
*
    ADD [  0906+  1053] 0906  1  5.0   13.01    1.01  7.00 116.27  n/a   0.000
*
    ADD [  0906+  0902] 0906  3  5.0   30.86    2.06  7.00 114.84  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname           :               C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      1054  1  5.0    0.92    0.07  7.00 116.26 0.60   0.000
    [I%=17.0:S%= 2.00]
*
    ADD [  1054+  0906] 0910  3  5.0   31.78    2.14  7.00 114.88  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=193.00 mm ]
    fname           :               C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD      0106  1  5.0   12.90    1.43  7.00 167.53 0.87   0.000
    [I%=16.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:            0401  1  5.0   12.90    1.39  7.00 167.11  n/a   0.000
```

```
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0107  1  5.0    6.59    0.41  7.17 100.98 0.52   0.000
    [CN=61.0          ]
    [ N = 3.0:Tp 0.49]
*
    ADD [  0107+  0401]  0905  3  5.0   19.49    1.79  7.08 144.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1111  1  5.0    6.26    0.39  7.25 102.81 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.54]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1112  1  5.0    7.73    0.50  7.17 102.80 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.46]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1113  1  5.0    5.08    0.34  7.08 102.80 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.44]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1114  1  5.0    4.81    0.31  7.17 102.80 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 0.50]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1115  1  5.0   26.55    1.23  8.08 102.81 0.53   0.000
    [CN=61.9          ]
    [ N = 3.0:Tp 1.13]
*
    ADD [  1111+  1112]  0908  3  5.0   13.99    0.89  7.17 102.80  n/a   0.000
*
    ADD [  0908+  1113]  0908  1  5.0   19.07    1.23  7.17 102.80  n/a   0.000
*
    ADD [  0908+  1114]  0908  3  5.0   23.88    1.53  7.17 102.80  n/a   0.000
*
    ADD [  0908+  1115]  0908  1  5.0   50.43    2.54  7.33 102.81  n/a   0.000
*
    ADD [  0908+  0905]  0908  3  5.0   69.92    4.25  7.17 114.50  n/a   0.000
*
    ADD [  0908+  0910]  0908  1  5.0  101.70    6.26  7.08 114.62  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0103  1  5.0    9.10    0.60  7.25 112.75 0.58   0.000
    [CN=66.7          ]
    [ N = 3.0:Tp 0.59]
*
    ADD [  0103+  0801]  0903  3  5.0    9.10    0.60  7.25 112.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1041  1  5.0    5.61    0.37  7.08  97.54 0.51   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.37]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         1042  1  5.0    2.74    0.18  7.08  97.54 0.51   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.36]
*
    ADD [  1041+  1042]  0904  3  5.0    8.35    0.55  7.08  97.54  n/a   0.000
*
    ADD [  0904+  0903]  0904  1  5.0   17.45    1.14  7.17 105.47  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1081  1  5.0    1.03    0.08  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1081+  0904]  0913  3  5.0   18.48    1.21  7.08 106.11  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :            C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
```

```
 *  CALIB STANDHYD       1082  1  5.0    0.92    0.07  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1082+  0913]  0915  3  5.0   19.40    1.27  7.08 106.63  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1083  1  5.0    0.89    0.07  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1083+  0915]  0917  3  5.0   20.29    1.33  7.08 107.08  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1084  1  5.0    1.05    0.08  7.00 116.97 0.61   0.000
    [I%=16.0:S%= 2.00]
*
    ADD [  1084+  0917]  0919  3  5.0   21.34    1.41  7.00 107.57  n/a   0.000
*
    ADD [  0908+  0919]  0920  3  5.0  123.04    7.67  7.08 113.39  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1091  1  5.0    0.87    0.07  7.00 121.98 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1092  1  5.0    0.42    0.03  7.00 121.97 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1091+  1092]  0912  3  5.0    1.29    0.11  7.00 121.97  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1093  1  5.0    0.41    0.03  7.00 121.97 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1093+  0912]  0921  3  5.0    1.70    0.14  7.00 121.97  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB STANDHYD       1094  1  5.0    0.22    0.02  7.00 121.95 0.63   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  1094+  0921]  0922  3  5.0    1.92    0.16  7.00 121.97  n/a   0.000
*
    ADD [  0920+  0922]  0909  3  5.0  124.96    7.81  7.00 113.53  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=193.00 mm ]
    fname            :           C:\Users\ALOverholt\AppData\Local\Temp\bc1da0bf-
e80b-401d-8ded-8bce9ea10779\b29bb920-3f40-4408-8df3-
    remark: TIMMINS
*
 *  CALIB NASHYD         0112  1  5.0    4.67    0.26  7.25  93.42 0.48   0.000
    [CN=57.7          ]
    [ N = 3.0:Tp 0.55]
*
    ADD [  0112+  0909]  0911  3  5.0  129.63    8.06  7.00 112.80  n/a   0.000
*
```

Appendix E: Proposed Conditions Hydraulic Analysis

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 2, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	320	**118.8%**
Section B	NASHYD 1052					5							0.116	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	265	71.7%
Section C	NASHYD 1053					5							0.071	0.013	12.1	2.4%	375	2.46	0.272	1.94	0.10	227	26.1%
Section E	ADDHYD 908					5							1.787	0.024	7.8	1.5%	**1000**	2.00	1.575	2.00	0.06	1048	**113.5%**
Section F	ADDHYD 915					5							1.961	0.024	9.6	1.5%	**1000**	2.00	1.575	2.00	0.08	1085	**124.5%**
Section G	ADDHYD 917					5							2.101	0.024	9.0	1.5%	**1000**	2.00	1.575	2.00	0.07	1114	**133.4%**
Section H	ADDHYD 919					5							2.247	0.024	7.5	1.5%	**1000**	2.00	1.575	2.00	0.06	1142	**142.7%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.013	75.0	1.4%	900	3.37	2.142	2.36	0.53	462	16.9%
Section B	ADDHYD 902					5							0.416	0.013	180.0	2.7%	900	4.68	2.975	3.13	0.96	430	14.0%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 2, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					5							1.232	0.013	8.7	2.4%	1050	4.89	4.230	3.98	0.04	661	29.1%
Section E	STANDHYD 1091					5							0.073	0.013	15.9	0.5%	375	1.12	0.124	1.09	0.24	307	58.9%
Section F	ADDHYD 912					5							0.109	0.013	9.4	0.5%	375	1.12	0.124	1.12	0.14	357	87.9%
Sectoin G	ADDHYD 921					5							0.143	0.013	14.2	1.0%	375	1.59	0.175	1.59	0.15	347	81.6%
Section H	ADDHYD 922					5							0.162	0.013	7.8	2.0%	375	2.25	0.248	2.25	0.06	320	65.3%
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.013	3.0	1.0%	**985**	3.02	2.303	3.02	0.02	1026	**111.6%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 2, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	386	**196.6%**
Section B	NASHYD 1052					25							0.192	0.013	115.6	2.8%	**300**	2.29	0.162	2.29	0.84	320	**118.7%**
Section C	NASHYD 1053					25							0.118	0.013	12.1	2.4%	375	2.46	0.272	2.23	0.09	274	43.4%
Section E	ADDHYD 908					25							3.206	0.024	7.8	1.5%	**1000**	2.00	1.575	2.00	0.06	1305	**203.6%**
Section F	ADDHYD 915					25							3.538	0.024	9.6	1.5%	**1000**	2.00	1.575	2.00	0.08	1354	**224.7%**
Section G	ADDHYD 917					25							3.84	0.024	9.0	1.5%	**1000**	2.00	1.575	2.00	0.07	1396	**243.9%**
Section H	ADDHYD 919					25							4.107	0.024	7.5	1.5%	**1000**	2.00	1.575	2.00	0.06	1432	**260.8%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.013	75.0	1.4%	900	3.37	2.142	2.72	0.46	563	28.6%
Section B	ADDHYD 902					25							0.747	0.013	180.0	2.7%	900	4.68	2.975	3.66	0.82	536	25.1%

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Driveway Culvert Conveyance Analysis
Option 2, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					25							2.214	0.013	8.7	2.4%	1050	4.89	4.230	4.67	0.03	823	52.3%
Section E	STANDHYD 1091					25							0.117	0.013	15.9	0.5%	375	1.12	0.124	1.12	0.24	367	94.4%
Section F	ADDHYD 912					25							0.174	0.013	9.4	0.5%	450	1.27	0.202	1.27	0.12	426	86.3%
Sectoin G	ADDHYD 921					25							0.229	0.013	14.2	1.0%	450	1.79	0.285	1.79	0.13	414	80.3%
Section H	ADDHYD 922					25							0.259	0.013	7.8	2.0%	450	2.54	0.403	2.54	0.05	381	64.2%
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.013	3.0	1.0%	**985**	3.02	2.303	3.02	0.02	1281	**201.9%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 2, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.264	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	435	**270.3%**
Section B	NASHYD 1052					25							0.264	0.013	115.6	2.8%	**300**	2.29	0.162	2.29	0.84	360	**163.2%**
Section C	NASHYD 1053					25							0.183	0.013	12.1	2.4%	375	2.46	0.272	2.46	0.08	323	67.4%
Section E	ADDHYD 908					25							5.371	0.024	7.8	1.5%	**1000**	2.00	1.575	2.00	0.06	1584	**341.1%**
Section F	ADDHYD 915					25							5.938	0.024	9.6	1.5%	**1000**	2.00	1.575	2.00	0.08	1644	**377.1%**
Section G	ADDHYD 917					25							6.353	0.024	9.0	1.5%	**1000**	2.00	1.575	2.00	0.07	1687	**403.5%**
Section H	ADDHYD 919					25							6.717	0.024	7.5	1.5%	**1000**	2.00	1.575	2.00	0.06	1722	**426.6%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.85	0.013	75.0	1.4%	900	3.37	2.142	2.97	0.42	636	39.7%
Section B	ADDHYD 902					25							1.033	0.013	180.0	2.7%	900	4.68	2.975	4.00	0.75	605	34.7%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 2, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					25							3.074	0.013	8.7	2.4%	1050	4.89	4.230	4.89	0.03	931	72.7%
Section E	STANDHYD 1091					25							0.174	0.013	15.9	0.5%	450	1.27	0.202	1.27	0.21	426	86.3%
Section F	ADDHYD 912					25							0.259	0.013	9.4	0.5%	525	1.40	0.304	1.40	0.11	494	85.2%
Sectoin G	ADDHYD 921					25							0.342	0.013	14.2	1.0%	525	1.99	0.430	1.99	0.12	482	79.5%
Section H	ADDHYD 922					25							0.386	0.013	7.8	2.0%	450	2.54	0.403	2.54	0.05	443	95.7%
West Side of Town Line																							
Section J	ADDHYD 911					25							7.533	0.013	3.0	1.0%	**985**	3.02	2.303	3.02	0.02	1536	**327.1%**

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Driveway Culvert Conveyance Analysis
Option 3, 1:5-Year Storm

TATHAM ENGINEERING

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	320	**118.8%**
Section B	NASHYD 1052					5							0.116	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	265	71.7%
Section C	NASHYD 1053					5							0.071	0.013	12.1	2.4%	375	2.46	0.272	1.94	0.10	227	26.1%
Section E	ADDHYD 908					5							1.477	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	976	**170.1%**
Section F	ADDHYD 915					5							1.651	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	1018	**190.1%**
Section G	ADDHYD 917					5							1.791	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	1049	**150.6%**
Section H	ADDHYD 919					5							1.937	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	1080	**162.9%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.013	75.0	1.4%	900	3.37	2.142	2.36	0.53	462	16.9%
Section B	ADDHYD 902					5							0.416	0.013	180.0	2.7%	900	4.68	2.975	3.13	0.96	430	14.0%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 3, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					5							1.232	0.013	8.7	2.4%	1050	4.89	4.230	3.98	0.04	661	29.1%
Section E	ADDHYD 913					5							0.383	0.024	15.9	0.5%	900	1.09	0.693	1.05	0.25	720	55.2%
Section F	ADDHYD 912					5							0.419	0.024	9.4	0.5%	900	1.09	0.693	1.07	0.15	745	60.4%
Sectoin G	ADDHYD 921					5							0.453	0.024	14.2	0.5%	900	1.09	0.693	1.09	0.22	767	65.3%
Section H	ADDHYD 922					5							0.472	0.024	7.8	0.5%	900	1.09	0.693	1.09	0.12	779	68.1%
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.013	3.0	1.0%	**985**	3.02	2.303	3.02	0.02	1026	**111.6%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 3, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	386	**196.6%**
Section B	NASHYD 1052					25							0.192	0.013	115.6	2.8%	**300**	2.29	0.162	2.29	0.84	320	**118.7%**
Section C	NASHYD 1053					25							0.118	0.013	12.1	2.4%	375	2.46	0.272	2.23	0.09	274	43.4%
Section E	ADDHYD 908					25							2.896	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	1256	**333.5%**
Section F	ADDHYD 915					25							3.226	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	1308	**371.5%**
Section G	ADDHYD 917					25							3.53	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	1353	**296.9%**
Section H	ADDHYD 919					25							3.797	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	1391	**319.4%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.013	75.0	1.4%	900	3.37	2.142	2.72	0.46	563	28.6%
Section B	ADDHYD 902					25							0.747	0.013	180.0	2.7%	900	4.68	2.975	3.66	0.82	536	25.1%

Driveway Culvert Conveyance Analysis
Option 3, 1:25-Year Storm

TATHAM ENGINEERING

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					25							2.214	0.013	8.7	2.4%	1050	4.89	4.230	4.67	0.03	823	52.3%
Section E	ADDHYD 913					25							0.427	0.024	15.9	0.5%	900	1.09	0.693	1.08	0.25	750	61.6%
Section F	ADDHYD 912					25							0.484	0.024	9.4	0.5%	900	1.09	0.693	1.09	0.14	786	69.8%
Sectoin G	ADDHYD 921					25							0.539	0.024	14.2	0.5%	900	1.09	0.693	1.09	0.22	819	77.7%
Section H	ADDHYD 922					25							0.569	0.024	7.8	0.5%	900	1.09	0.693	1.09	0.12	835	82.1%
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.013	3.0	1.0%	**985**	3.02	2.303	3.02	0.02	1281	**201.9%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 3, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	435	270.3%
Section B	NASHYD 1052					100							0.264	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	360	163.2%
Section C	NASHYD 1053					100							0.183	0.013	12.1	2.4%	375	2.46	0.272	2.46	0.08	323	67.4%
Section E	ADDHYD 908					100							5.061	0.024	7.8	1.5%	800	1.73	0.868	1.73	0.08	1549	582.8%
Section F	ADDHYD 915					100							5.628	0.024	9.6	1.5%	800	1.73	0.868	1.73	0.09	1612	648.1%
Section G	ADDHYD 917					100							6.043	0.024	9.0	1.5%	900	1.87	1.189	1.87	0.08	1655	508.3%
Section H	ADDHYD 919					100							6.407	0.024	7.5	1.5%	900	1.87	1.189	1.87	0.07	1692	538.9%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.013	75.0	1.4%	900	3.37	2.142	2.97	0.42	636	39.7%
Section B	ADDHYD 902					100							1.033	0.013	180.0	2.7%	900	4.68	2.975	4.00	0.75	605	34.7%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 3, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					100							3.074	0.013	8.7	2.4%	1050	4.89	4.230	4.89	0.03	931	72.7%
Section E	ADDHYD 913					100							0.484	0.024	15.9	0.5%	900	1.09	0.693	1.09	0.24	786	69.8%
Section F	ADDHYD 912					100							0.569	0.024	9.4	0.5%	900	1.09	0.693	1.09	0.14	835	82.1%
Sectoin G	ADDHYD 921					100							0.652	0.024	14.2	0.5%	900	1.09	0.693	1.09	0.22	879	94.0%
Section H	ADDHYD 922					100							0.696	0.024	7.8	0.5%	900	1.09	0.693	1.09	0.12	901	100.4%
West Side of Town Line																							
Section J	ADDHYD 911					100							7.533	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	1536	327.1%

Driveway Culvert Conveyance Analysis
Option 4, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	320	**118.8%**
Section B	NASHYD 1052					5							0.116	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	265	71.7%
Section C	NASHYD 1053					5							0.071	0.013	12.1	2.4%	375	2.46	0.272	1.94	0.10	227	26.1%
Section E	ADDHYD 908					5							0.838	0.024	7.8	1.5%	800	1.73	0.868	1.73	0.08	789	96.5%
Section F	ADDHYD 915					5							1.059	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	861	**121.9%**
Section G	ADDHYD 917					5							1.22	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	908	**102.6%**
Section H	ADDHYD 919					5							1.368	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	948	**115.1%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.013	75.0	1.4%	900	3.37	2.142	2.36	0.53	462	16.9%
Section B	ADDHYD 902					5							0.386	0.013	180.0	2.7%	900	4.68	2.975	3.07	0.98	418	13.0%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 4, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	STANDHYD 1022					5							0.036	0.013	8.7	2.4%	1050	4.89	4.230	1.53	0.09	176	0.9%
Section E	STANDHYD 1091					5							0.073	0.013	15.9	0.5%	400	1.17	0.147	1.09	0.24	307	49.6%
Section F	ADDHYD 912					5							0.109	0.013	9.4	0.5%	400	1.17	0.147	1.17	0.13	357	74.0%
Sectoin G	ADDHYD 921					5							0.143	0.013	14.2	1.0%	400	1.66	0.208	1.66	0.14	347	68.7%
Section H	ADDHYD 922					5							0.162	0.013	7.8	2.0%	400	2.34	0.295	2.26	0.06	320	55.0%
West Side of Town Line																							
Section J	ADDHYD 911					5							1.76	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	890	76.4%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 4, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	386	196.6%
Section B	NASHYD 1052					25							0.192	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	320	118.7%
Section C	NASHYD 1053					25							0.118	0.013	12.1	2.4%	375	2.46	0.272	2.23	0.09	274	43.4%
Section E	ADDHYD 908					25							2.293	0.013	7.8	1.5%	800	3.19	1.603	3.19	0.04	915	143.0%
Section F	ADDHYD 915					25							2.621	0.013	9.6	1.5%	800	3.19	1.603	3.19	0.05	962	163.5%
Section G	ADDHYD 917					25							2.84	0.013	9.0	1.5%	900	3.45	2.195	3.45	0.04	991	129.4%
Section H	ADDHYD 919					25							3.06	0.013	7.5	1.5%	900	3.45	2.195	3.45	0.04	1019	139.4%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.013	75.0	1.4%	900	3.37	2.142	2.72	0.46	563	28.6%
Section B	ADDHYD 902					25							0.691	0.013	180.0	2.7%	900	4.68	2.975	3.59	0.84	520	23.2%

Driveway Culvert Conveyance Analysis
Option 4, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	STANDHYD 1022					25							0.057	0.013	8.7	2.4%	1050	4.89	4.230	1.74	0.08	209	1.3%
Section E	STANDHYD 1091					25							0.117	0.013	15.9	0.5%	400	1.17	0.147	1.17	0.23	367	79.5%
Section F	ADDHYD 912					25							0.174	0.013	9.4	0.5%	400	1.17	0.147	1.17	0.13	426	118.2%
Sectoin G	ADDHYD 921					25							0.229	0.013	14.2	1.0%	400	1.66	0.208	1.66	0.14	414	110.0%
Section H	ADDHYD 922					25							0.259	0.013	7.8	2.0%	400	2.34	0.295	2.34	0.06	381	87.9%
West Side of Town Line																							
Section J	ADDHYD 911					25							3.837	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	1192	166.6%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 4, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	435	270.3%
Section B	NASHYD 1052					100							0.264	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	360	163.2%
Section C	NASHYD 1053					100							0.183	0.013	12.1	2.4%	375	2.46	0.272	2.46	0.08	323	67.4%
Section E	ADDHYD 908					100							3.966	0.024	7.8	1.5%	800	1.73	0.868	1.73	0.08	1413	456.7%
Section F	ADDHYD 915					100							4.549	0.024	9.6	1.5%	800	1.73	0.868	1.73	0.09	1488	523.8%
Section G	ADDHYD 917					100							4.957	0.024	9.0	1.5%	900	1.87	1.189	1.87	0.08	1537	416.9%
Section H	ADDHYD 919					100							5.322	0.024	7.5	1.5%	900	1.87	1.189	1.87	0.07	1578	447.6%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.013	75.0	1.4%	900	3.37	2.142	2.97	0.42	636	39.7%
Section B	ADDHYD 902					100							0.968	0.013	180.0	2.7%	900	4.68	2.975	3.93	0.76	591	32.5%

TATHAM
ENGINEERING

Driveway Culvert Conveyance Analysis
Option 4, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	STANDHYD 1022					100							0.084	0.013	8.7	2.4%	1050	4.89	4.230	1.93	0.08	241	2.0%
Section E	STANDHYD 1091					100							0.174	0.013	15.9	0.5%	400	1.17	0.147	1.17	0.23	426	118.2%
Section F	ADDHYD 912					100							0.259	0.013	9.4	0.5%	400	1.17	0.147	1.17	0.13	494	175.9%
Sectoin G	ADDHYD 921					100							0.342	0.013	14.2	1.0%	400	1.66	0.208	1.66	0.14	482	164.2%
Section H	ADDHYD 922					100							0.386	0.013	7.8	2.0%	400	2.34	0.295	2.34	0.06	443	131.1%
West Side of Town Line																							
Section J	ADDHYD 911					100							6.217	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	1429	270.0%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 5, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	320	118.8%
Section B	NASHYD 1052					5							0.116	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	265	71.7%
Section C	NASHYD 1053					5							0.071	0.013	12.1	2.4%	375	2.46	0.272	1.94	0.10	227	26.1%
Section E	ADDHYD 913					5							0.494	0.024	7.8	1.5%	800	1.73	0.868	1.68	0.08	647	56.9%
Section F	ADDHYD 915					5							0.519	0.024	9.6	1.5%	800	1.73	0.868	1.70	0.09	659	59.8%
Section G	ADDHYD 917					5							0.549	0.024	9.0	1.5%	900	1.87	1.189	1.72	0.09	673	46.2%
Section H	ADDHYD 919					5							0.584	0.024	7.5	1.5%	900	1.87	1.189	1.75	0.07	689	49.1%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.013	75.0	1.4%	900	3.37	2.142	2.36	0.53	462	16.9%
Section B	ADDHYD 902					5							0.416	0.013	180.0	2.7%	900	4.68	2.975	3.13	0.96	430	14.0%

Driveway Culvert Conveyance Analysis
Option 5, 1:5-Year Storm

Version Number: 1 | Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					5							1.232	0.013	8.7	2.4%	1050	4.89	4.230	3.98	0.04	661	29.1%
Section E	ADDHYD 1091					5							0.073	0.013	15.9	0.5%	400	1.17	0.147	1.09	0.24	307	49.6%
Section F	ADDHYD 912					5							0.109	0.013	9.4	0.5%	400	1.17	0.147	1.17	0.13	357	74.0%
Sectoin G	ADDHYD 921					5							0.143	0.013	14.2	1.0%	400	1.66	0.208	1.66	0.14	347	68.7%
Section H	ADDHYD 922					5							0.162	0.013	7.8	2.0%	400	2.34	0.295	2.26	0.06	320	55.0%
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.013	3.0	1.0%	**985**	3.02	2.303	3.02	0.02	1026	**111.6%**

Driveway Culvert Conveyance Analysis
Option 5, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	386	**196.6%**
Section B	NASHYD 1052					25							0.192	0.013	115.6	2.8%	**300**	2.29	0.162	2.29	0.84	320	**118.7%**
Section C	NASHYD 1053					25							0.118	0.013	12.1	2.4%	375	2.46	0.272	2.23	0.09	274	43.4%
Section E	ADDHYD 913					25							0.878	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	803	**101.1%**
Section F	ADDHYD 915					25							0.927	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	820	**106.7%**
Section G	ADDHYD 917					25							0.977	0.024	9.0	1.5%	900	1.87	1.189	1.87	0.08	836	82.2%
Section H	ADDHYD 919					25							1.055	0.024	7.5	1.5%	900	1.87	1.189	1.87	0.07	860	88.7%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.013	75.0	1.4%	900	3.37	2.142	2.72	0.46	563	28.6%
Section B	ADDHYD 902					25							0.747	0.013	180.0	2.7%	900	4.68	2.975	3.66	0.82	536	25.1%

Driveway Culvert Conveyance Analysis
Option 5, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					25							2.214	0.013	8.7	2.4%	1050	4.89	4.230	4.67	0.03	823	52.3%
Section E	ADDHYD 1091					25							0.117	0.013	15.9	0.5%	400	1.17	0.147	1.17	0.23	367	79.5%
Section F	ADDHYD 912					25							0.174	0.013	9.4	0.5%	**400**	1.17	0.147	1.17	0.13	426	**118.2%**
Sectoin G	ADDHYD 921					25							0.229	0.013	14.2	1.0%	**400**	1.66	0.208	1.66	0.14	414	**110.0%**
Section H	ADDHYD 922					25							0.259	0.013	7.8	2.0%	400	2.34	0.295	2.34	0.06	381	87.9%
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.013	3.0	1.0%	**985**	3.02	2.303	3.02	0.02	1281	**201.9%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 5, 1:100-Year Storm

Version Number: 1 Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	435	**270.3%**
Section B	NASHYD 1052					100							0.264	0.013	115.6	2.8%	**300**	2.29	0.162	2.29	0.84	360	**163.2%**
Section C	NASHYD 1053					100							0.183	0.013	12.1	2.4%	375	2.46	0.272	2.46	0.08	323	67.4%
Section E	ADDHYD 913					100							1.233	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	912	**142.0%**
Section F	ADDHYD 915					100							1.28	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	925	**147.4%**
Section G	ADDHYD 917					100							1.34	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	941	**112.7%**
Section H	ADDHYD 919					100							1.411	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	959	**118.7%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.013	75.0	1.4%	900	3.37	2.142	2.97	0.42	636	39.7%
Section B	ADDHYD 902					100							1.033	0.013	180.0	2.7%	900	4.68	2.975	4.00	0.75	605	34.7%

Driveway Culvert Conveyance Analysis
Option 5, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section C	ADDHYD 906					100							3.074	0.013	8.7	2.4%	1050	4.89	4.230	4.89	0.03	931	72.7%
Section E	ADDHYD 1091					100							0.174	0.013	15.9	0.5%	**400**	1.17	0.147	1.17	0.23	426	**118.2%**
Section F	ADDHYD 912					100							0.259	0.013	9.4	0.5%	**400**	1.17	0.147	1.17	0.13	494	**175.9%**
Sectoin G	ADDHYD 921					100							0.342	0.013	14.2	1.0%	**400**	1.66	0.208	1.66	0.14	482	**164.2%**
Section H	ADDHYD 922					100							0.386	0.013	7.8	2.0%	**400**	2.34	0.295	2.34	0.06	443	**131.1%**
West Side of Town Line																							
Section J	ADDHYD 911					100							7.533	0.013	3.0	1.0%	**985**	3.02	2.303	3.02	0.02	1536	**327.1%**

S:\2022\322863 - Warminster SR Drainage Improv., Oro-Medonte\Design\Existing Conditons\Option 5 - Divert Flows to North Conveyance Channel\Option 5 - Divert Flows to North Conveyance Channel - Storm Sewer Design Sheet.xlsx

TATHAM ENGINEERING

Storm Sewer Design Sheet
Option 6, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	320	118.8%
Section B	NASHYD 1052					5							0.116	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	265	71.7%
Section C	NASHYD 1053					5							0.071	0.013	12.1	2.4%	300	2.12	0.150	1.96	0.10	227	47.4%
Section E	ADDHYD 908					5							1.787	0.013	91.3	0.7%	1350	3.03	4.336	2.70	0.56	968	41.2%
	-					5							1.787	0.013	99.6	1.9%	1350	5.09	7.279	3.96	0.42	797	24.5%
Section F	ADDHYD 915					5							1.961	0.013	97.6	2.2%	1350	5.47	7.826	4.28	0.38	803	25.1%
Section G	ADDHYD 917					5							2.101	0.013	99.4	2.1%	1350	5.35	7.661	4.29	0.39	831	27.4%
	-					5							2.101	0.013	100.5	1.6%	1350	4.72	6.751	3.91	0.43	871	31.1%
Section H	ADDHYD 919					5							2.247	0.013	112.0	1.2%	1500	4.31	7.613	3.52	0.53	949	29.5%
	ADDHYD 920					5							2.425	0.013	9.8	4.4%	1500	8.38	14.811	5.87	0.03	761	16.4%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.013	75.0	1.4%	900	3.37	2.142	2.36	0.53	462	16.9%

TATHAM ENGINEERING

Storm Sewer Design Sheet
Option 6, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					5							0.416	0.013	180.0	2.7%	900	4.68	2.975	3.13	0.96	430	14.0%
Section C	ADDHYD 906					5							1.232	0.013	8.7	2.4%	1050	4.89	4.230	3.98	0.04	661	29.1%
Section E	STANDHYD 1091					5							0.073	0.013	15.9	0.5%	375	1.12	0.124	1.09	0.24	307	58.9%
Section F	ADDHYD 912					5							0.109	0.013	9.4	0.5%	375	1.12	0.124	1.12	0.14	357	87.9%
Sectoin G	ADDHYD 921					5							0.143	0.013	14.2	1.0%	375	1.59	0.175	1.59	0.15	347	81.6%
Section H	ADDHYD 922					5							0.162	0.013	7.8	2.0%	375	2.25	0.248	2.25	0.06	320	65.3%
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	1026	111.6%

TATHAM ENGINEERING

Storm Sewer Design Sheet
Option 6, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	386	196.6%
Section B	NASHYD 1052					25							0.192	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	320	118.7%
Section C	NASHYD 1053					25							0.118	0.013	12.1	2.4%	300	2.12	0.150	2.12	0.10	274	78.8%
Section E	ADDHYD 908					25							3.206	0.013	91.3	0.7%	1350	3.03	4.336	3.03	0.50	1205	73.9%
	-					25							3.206	0.013	99.6	1.9%	1350	5.09	7.279	4.63	0.36	992	44.0%
Section F	ADDHYD 915					25							3.538	0.013	97.6	2.2%	1350	5.47	7.826	5.02	0.32	1002	45.2%
Section G	ADDHYD 917					25							3.84	0.013	99.4	2.1%	1350	5.35	7.661	5.05	0.33	1042	50.1%
	-					25							3.84	0.013	100.5	1.6%	1350	4.72	6.751	4.60	0.36	1092	56.9%
Section H	ADDHYD 919					25							4.107	0.013	112.0	1.2%	1500	4.31	7.613	4.14	0.45	1190	53.9%
	ADDHYD 920					25							4.374	0.013	9.8	4.4%	1500	8.38	14.811	6.89	0.02	949	29.5%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.013	75.0	1.4%	900	3.37	2.142	2.72	0.46	563	28.6%

Storm Sewer Design Sheet
Option 6, 1:25-Year Storm

Version Number: 1 | Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					25							0.747	0.013	180.0	2.7%	900	4.68	2.975	3.66	0.82	536	25.1%
Section C	ADDHYD 906					25							2.214	0.013	8.7	2.4%	1050	4.89	4.230	4.67	0.03	823	52.3%
Section E	STANDHYD 1091					25							0.117	0.013	15.9	0.5%	375	1.12	0.124	1.12	0.24	367	94.4%
Section F	ADDHYD 912					25							0.174	0.013	9.4	0.5%	450	1.27	0.202	1.27	0.12	426	86.3%
Sectoin G	ADDHYD 921					25							0.229	0.013	14.2	1.0%	450	1.79	0.285	1.79	0.13	414	80.3%
Section H	ADDHYD 922					25							0.259	0.013	7.8	2.0%	450	2.54	0.403	2.54	0.05	381	64.2%
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	1281	**201.9%**

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Storm Sewer Design Sheet
Option 6, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	435	**270.3%**
Section B	NASHYD 1052					100							0.264	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	360	**163.2%**
Section C	NASHYD 1053					100							0.183	0.013	12.1	2.4%	375	2.46	0.272	2.46	0.08	323	67.4%
Section E	ADDHYD 908					100							5.371	0.013	91.3	0.7%	1350	3.03	4.336	3.03	0.50	1462	**123.9%**
	-					100							5.371	0.013	99.6	1.9%	1350	5.09	7.279	5.09	0.33	1204	73.8%
Section F	ADDHYD 915					100							5.938	0.013	97.6	2.2%	1350	5.47	7.826	5.47	0.30	1217	75.9%
Section G	ADDHYD 917					100							6.353	0.013	99.4	2.1%	1350	5.35	7.661	5.35	0.31	1258	82.9%
	-					100							6.353	0.013	100.5	1.6%	1350	4.72	6.751	4.72	0.36	1319	94.1%
Section H	ADDHYD 919					100							6.717	0.013	112.0	1.2%	1500	4.31	7.613	4.31	0.43	1431	88.2%
	ADDHYD 920					100							7.192	0.013	9.8	4.4%	1500	8.38	14.811	7.88	0.02	1144	48.6%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.013	75.0	1.4%	900	3.37	2.142	2.97	0.42	636	39.7%

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Storm Sewer Design Sheet
Option 6, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					100							1.033	0.013	180.0	2.7%	900	4.68	2.975	4.00	0.75	605	34.7%
Section C	ADDHYD 906					100							3.074	0.013	8.7	2.4%	1050	4.89	4.230	4.89	0.03	931	72.7%
Section E	STANDHYD 1091					100							0.174	0.013	15.9	0.5%	450	1.27	0.202	1.27	0.21	426	86.3%
Section F	ADDHYD 912					100							0.259	0.013	9.4	0.5%	525	1.40	0.304	1.40	0.11	494	85.2%
Sectoin G	ADDHYD 921					100							0.342	0.013	14.2	1.0%	525	1.99	0.430	1.99	0.12	482	79.5%
Section H	ADDHYD 922					100							0.386	0.013	7.8	2.0%	450	2.54	0.403	2.54	0.05	443	95.7%
West Side of Town Line																							
Section J	ADDHYD 911					100							7.533	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	1536	**327.1%**

Driveway Culvert Conveyance Analysis
Option 6, 1:5-Year Storm

Version Number: 1 Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO/DRT	Aug 2022

Reviewed By

ARO/DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section 5																							
-	905					5							0.17	0.013	7.8	1.5%	375	1.92	0.213	1.92	0.07	345	80.0%
Section 6																							
-	907					5							0.176	0.013	9.6	1.5%	375	1.92	0.213	1.92	0.08	349	82.8%
Section 7																							
-	914					5							0.236	0.013	9.0	1.5%	450	2.17	0.346	2.17	0.07	390	68.3%
Section 8																							
-	916					5							0.17	0.013	7.5	1.5%	375	1.92	0.213	1.92	0.06	345	80.0%

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Driveway Culvert Conveyance Analysis
Option 6, 1:25-Year Storm

Version Number: 1 | Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO/DRT	Aug 2022

Reviewed By

ARO/DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section 5																							
-	905					25							0.306	0.013	7.8	1.5%	450	2.17	0.346	2.17	0.06	430	88.5%
Section 6																							
-	907					25							0.311	0.013	9.6	1.5%	450	2.17	0.346	2.17	0.07	432	90.0%
Section 7																							
-	914					25							0.419	0.013	9.0	1.5%	525	2.41	0.521	2.41	0.06	483	80.4%
Section 8																							
-	916					25							0.303	0.013	7.5	1.5%	450	2.17	0.346	2.17	0.06	428	87.7%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Option 6, 1:100-Year Storm

Version Number: 1 Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO/DRT	Aug 2022

Reviewed By

ARO/DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section 5																							
-	905					100							0.436	0.013	7.8	1.5%	525	2.41	0.521	2.41	0.05	491	83.6%
Section 6																							
-	907					100							0.43	0.013	9.6	1.5%	525	2.41	0.521	2.41	0.07	488	82.5%
Section 7																							
-	914					100							0.583	0.013	9.0	1.5%	600	2.63	0.744	2.63	0.06	547	78.3%
Section 8																							
-	916					100							0.415	0.013	7.5	1.5%	525	2.41	0.521	2.41	0.05	482	79.6%

TATHAM ENGINEERING

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
		DATE	Sept 2022
SUBJECT	Conveyance Capacity	NAME	ARO
		PAGE	1 OF 1

Manning's Equation Proposed Conditions: Section 1 - North Side of Warminster Sideroad East of Richelieu Road

Channel

Manning's n 0.035
Slope 0.02 m/m
Bottom Width 0.3 m
Side Slopes 3 :1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.15	0.02	0.62	0.04	0.01
0.10	0.30	0.06	0.93	0.06	0.04
0.15	0.45	0.11	1.25	0.09	0.09
0.20	0.60	0.18	1.56	0.12	0.17
0.25	0.75	0.26	1.88	0.14	0.29
0.30	0.90	0.36	2.20	0.16	0.44

Q_5 = 0.04 m^3/s
Q_{25} = 0.07 m^3/s
Q_{100} = 0.10 m^3/s

Design Flow: 0.10 m^3/s
Design Flow Depth: 0.15 m
Design Flow Velocity: 0.8 m/s
Maximum Flow: 0.4 m^3/s
Maximum Flow Depth: 0.30 m
Maximum Flow Velocity: 1.2 m/s

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
		DATE	Sept 2022
SUBJECT	Conveyance Capacity	NAME	ARO
		PAGE	1 OF 1

Manning's Equation

Proposed Conditions: Section 1 - North Side of Warminster Sideroad West of Richelieu Road

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Channel

Manning's n	0.035	
Slope	0.02	m/m
Bottom Width	0.4	m
Side Slopes	3	:1

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.15	0.03	0.72	0.04	0.01
0.10	0.30	0.07	1.03	0.07	0.05
0.15	0.45	0.13	1.35	0.09	0.11
0.20	0.60	0.20	1.66	0.12	0.20
0.25	0.75	0.29	1.98	0.15	0.32
0.30	0.90	0.39	2.30	0.17	0.48
0.35	1.05	0.51	2.61	0.19	0.69
0.40	1.20	0.64	2.93	0.22	0.94
0.45	1.35	0.79	3.25	0.24	1.24
0.50	1.50	0.95	3.56	0.27	1.59
0.55	1.65	1.13	3.88	0.29	2.00
0.60	1.80	1.32	4.19	0.31	2.47
0.65	1.95	1.53	4.51	0.34	3.00
0.70	2.10	1.75	4.83	0.36	3.60
0.75	2.25	1.99	5.14	0.39	4.26

Q_5 =	0.04	m^3/s
Q_{25} =	0.08	m^3/s
Q_{100} =	0.17	m^3/s

Design Flow:	0.17	m^3/s
Design Flow Depth:	0.18	m
Design Flow Velocity:	1.0	m/s
Maximum Flow:	4.3	m^3/s
Maximum Flow Depth:	0.75	m
Maximum Flow Velocity:	2.1	m/s

TATHAM ENGINEERING

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
		DATE	Sept 2022
SUBJECT	Conveyance Capacity	NAME	ARO
		PAGE	1 OF 1

Manning's Equation

Proposed Conditions: Section 1 - South Side of Warminster Sideroad East of Richelieu Road

Channel

Manning's n 0.035
Slope 0.013 m/m
Bottom Width 0.6 m
Side Slopes 3 :1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.15	0.04	0.92	0.04	0.01
0.10	0.30	0.09	1.23	0.07	0.05
0.15	0.45	0.16	1.55	0.10	0.11
0.20	0.60	0.24	1.86	0.13	0.20
0.25	0.75	0.34	2.18	0.15	0.32
0.30	0.90	0.45	2.50	0.18	0.47

Q_5 = 0.04 m^3/s
Q_{25} = 0.07 m^3/s
Q_{100} = 0.10 m^3/s

Design Flow: 0.10 m^3/s
Design Flow Depth: 0.14 m
Design Flow Velocity: 0.7 m/s
Maximum Flow: 0.5 m^3/s
Maximum Flow Depth: 0.30 m
Maximum Flow Velocity: 1.0 m/s

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
		DATE	Sept 2022
SUBJECT	Conveyance Capacity	NAME	ARO
		PAGE	1 OF 1

Manning's Equation

Proposed Conditions: Section 1 - South Side of Warminster Sideroad West of Richelieu Road

Channel

Manning's n 0.035
Slope 0.015 m/m
Bottom Width 0.6 m
Side Slopes 2.5 :1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.13	0.04	0.87	0.04	0.02
0.10	0.25	0.09	1.14	0.07	0.05
0.15	0.38	0.15	1.41	0.10	0.11
0.20	0.50	0.22	1.68	0.13	0.20
0.25	0.63	0.31	1.95	0.16	0.31
0.30	0.75	0.41	2.22	0.18	0.46
0.35	0.88	0.52	2.48	0.21	0.63
0.40	1.00	0.64	2.75	0.23	0.85
0.45	1.13	0.78	3.02	0.26	1.10
0.50	1.25	0.93	3.29	0.28	1.39
0.55	1.38	1.09	3.56	0.30	1.72
0.60	1.50	1.26	3.83	0.33	2.10
0.65	1.63	1.45	4.10	0.35	2.53
0.70	1.75	1.65	4.37	0.38	3.00
0.75	1.88	1.86	4.64	0.40	3.53

Q_5 = 1.2 m^3/s
Q_{25} = 2.2 m^3/s
Q_{100} = 3.1 m^3/s

Design Flow: 3.07 m^3/s
Design Flow Depth: 0.71 m
Design Flow Velocity: 1.9 m/s
Maximum Flow: 3.5 m^3/s
Maximum Flow Depth: 0.75 m
Maximum Flow Velocity: 1.9 m/s

PROJECT	Warminster Sideroad Drainage Improvements	FILE	322863
		DATE	Sept 2022
SUBJECT	Conveyance Capacity	NAME	ARO
		PAGE	1 OF 1

Manning's Equation

Proposed Conditions: Section 1 - South Side of Warminster Sideroad Bend at Danny McHugh Memorial Park to #1945 Warminster Sideroad

Channel

Manning's n 0.035
Slope 0.005 m/m
Bottom Width 0.9 m
Side Slopes 2.5 :1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.13	0.05	1.17	0.04	0.01
0.10	0.25	0.12	1.44	0.08	0.04
0.15	0.38	0.19	1.71	0.11	0.09
0.20	0.50	0.28	1.98	0.14	0.15
0.25	0.63	0.38	2.25	0.17	0.24
0.30	0.75	0.50	2.52	0.20	0.34
0.35	0.88	0.62	2.78	0.22	0.46
0.40	1.00	0.76	3.05	0.25	0.61
0.45	1.13	0.91	3.32	0.27	0.78
0.50	1.25	1.08	3.59	0.30	0.97
0.55	1.38	1.25	3.86	0.32	1.19
0.60	1.50	1.44	4.13	0.35	1.44
0.65	1.63	1.64	4.40	0.37	1.72
0.70	1.75	1.86	4.67	0.40	2.03
0.75	1.88	2.08	4.94	0.42	2.36
0.80	2.00	2.32	5.21	0.45	2.73
0.85	2.13	2.57	5.48	0.47	3.14
0.90	2.25	2.84	5.75	0.49	3.58
0.95	2.38	3.11	6.02	0.52	4.05
1.00	2.50	3.40	6.29	0.54	4.56

Q_5 = 1.3 m^3/s
Q_{25} = 2.3 m^3/s
Q_{100} = 3.2 m^3/s

Design Flow: 3.24 m^3/s
Design Flow Depth: 0.86 m
Design Flow Velocity: 1.2 m/s
Maximum Flow: 4.6 m^3/s
Maximum Flow Depth: 1.00 m
Maximum Flow Velocity: 1.3 m/s

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Manning's Equation

Proposed Conditions: Section 2 - Option 2 North Side of Warminster Sideroad from #1944 Warminster Sideroad to Town Line

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Channel

Manning's n 0.035
Slope 0.015 m/m
Bottom Width 0.9 m
Side Slopes 2 :1

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.10	0.05	1.12	0.04	0.02
0.10	0.20	0.11	1.35	0.08	0.07
0.15	0.30	0.18	1.57	0.11	0.15
0.20	0.40	0.26	1.79	0.14	0.25
0.25	0.50	0.35	2.02	0.17	0.38
0.30	0.60	0.45	2.24	0.20	0.54
0.35	0.70	0.56	2.47	0.23	0.73
0.40	0.80	0.68	2.69	0.25	0.95
0.45	0.90	0.81	2.91	0.28	1.21
0.50	1.00	0.95	3.14	0.30	1.50
0.55	1.10	1.10	3.36	0.33	1.83
0.60	1.20	1.26	3.58	0.35	2.20
0.65	1.30	1.43	3.81	0.38	2.61
0.70	1.40	1.61	4.03	0.40	3.06
0.75	1.50	1.80	4.25	0.42	3.55
0.80	1.60	2.00	4.48	0.45	4.09
0.85	1.70	2.21	4.70	0.47	4.68
0.90	1.80	2.43	4.92	0.49	5.31
0.95	1.90	2.66	5.15	0.52	5.99
1.00	2.00	2.90	5.37	0.54	6.73
1.05	2.10	3.15	5.60	0.56	7.51
1.10	2.20	3.41	5.82	0.59	8.36
1.12	2.24	3.52	5.91	0.60	8.71

Q_5 = 2.2 m^3/s
Q_{25} = 4.1 m^3/s
Q_{100} = 6.7 m^3/s

Design Flow: 6.70 m^3/s
Design Flow Depth: 1.00 m
Design Flow Velocity: 2.3 m/s
Maximum Flow: 8.7 m^3/s
Maximum Flow Depth: 1.12 m
Maximum Flow Velocity: 2.5 m/s

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Manning's Equation

Proposed Conditions: Section 2 - Option 3 South Side of Warminster Sideroad from #1945 Warminster Sideroad to Town Line

Channel

Manning's n 0.035
Slope 0.005 m/m
Bottom Width 1.1 m
Side Slopes 2 :1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.10	0.06	1.32	0.05	0.02
0.10	0.20	0.13	1.55	0.08	0.05
0.15	0.30	0.21	1.77	0.12	0.10
0.20	0.40	0.30	1.99	0.15	0.17
0.25	0.50	0.40	2.22	0.18	0.26
0.30	0.60	0.51	2.44	0.21	0.36
0.35	0.70	0.63	2.67	0.24	0.49
0.40	0.80	0.76	2.89	0.26	0.63
0.45	0.90	0.90	3.11	0.29	0.80
0.50	1.00	1.05	3.34	0.31	0.98
0.55	1.10	1.21	3.56	0.34	1.19
0.60	1.20	1.38	3.78	0.36	1.42
0.65	1.30	1.56	4.01	0.39	1.68
0.70	1.40	1.75	4.23	0.41	1.96
0.75	1.50	1.95	4.45	0.44	2.27
0.80	1.60	2.16	4.68	0.46	2.61
0.85	1.70	2.38	4.90	0.49	2.97
0.90	1.80	2.61	5.12	0.51	3.36
0.95	1.90	2.85	5.35	0.53	3.78
1.00	2.00	3.10	5.57	0.56	4.24
1.05	2.10	3.36	5.80	0.58	4.72

Q_5 = 0.47 m^3/s
Q_{25} = 0.57 m^3/s
Q_{100} = 0.70 m^3/s

Design Flow: 0.70 m^3/s
Design Flow Depth: 0.42 m
Design Flow Velocity: 0.9 m/s
Maximum Flow: 4.7 m^3/s
Maximum Flow Depth: 1.05 m
Maximum Flow Velocity: 1.4 m/s

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Manning's Equation

Proposed Conditions: Section 2 - Option 5 North Drainage Channel from #1922 Warminster Sideroad to Town Line

Channel

Manning's n	0.035
Slope	0.01 m/m
Bottom Width	4 m
Side Slopes	2.5 :1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.13	0.21	4.27	0.05	0.06
0.10	0.25	0.43	4.54	0.09	0.18
0.15	0.38	0.66	4.81	0.14	0.35
0.20	0.50	0.90	5.08	0.18	0.57
0.25	0.63	1.16	5.35	0.22	0.84
0.30	0.75	1.43	5.62	0.25	1.15
0.35	0.88	1.71	5.88	0.29	1.51
0.40	1.00	2.00	6.15	0.32	1.91
0.45	1.13	2.31	6.42	0.36	2.35
0.50	1.25	2.63	6.69	0.39	2.84
0.55	1.38	2.96	6.96	0.42	3.37
0.60	1.50	3.30	7.23	0.46	3.95
0.65	1.63	3.66	7.50	0.49	4.58
0.70	1.75	4.03	7.77	0.52	5.25
0.75	1.88	4.41	8.04	0.55	5.96
0.80	2.00	4.80	8.31	0.58	6.73
0.85	2.13	5.21	8.58	0.61	7.54
0.90	2.25	5.63	8.85	0.64	8.40
0.95	2.38	6.06	9.12	0.66	9.32
1.00	2.50	6.50	9.39	0.69	10.28

Q_5 = 1.8 m^3/s
Q_{25} = 3.4 m^3/s
Q_{100} = 5.8 m^3/s

Design Flow:	5.80 m^3/s
Design Flow Depth:	0.74 m
Design Flow Velocity:	1.4 m/s
Maximum Flow:	10.3 m^3/s
Maximum Flow Depth:	1.00 m
Maximum Flow Velocity:	1.6 m/s

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Manning's Equation

Proposed Conditions: Section 2 - Option 6 North Side of Warminster Sideroad from #1944 Warminster Sideroad to Town Line

Channel

Manning's n	0.035	
Slope	0.015	m/m
Bottom Width	0.6	m
Side Slopes	3	:1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.15	0.04	0.92	0.04	0.02
0.10	0.30	0.09	1.23	0.07	0.06
0.15	0.45	0.16	1.55	0.10	0.12
0.20	0.60	0.24	1.86	0.13	0.21
0.25	0.75	0.34	2.18	0.15	0.34
0.30	0.90	0.45	2.50	0.18	0.50
0.35	1.05	0.58	2.81	0.21	0.70
0.40	1.20	0.72	3.13	0.23	0.95
0.45	1.35	0.88	3.45	0.25	1.23
0.50	1.50	1.05	3.76	0.28	1.57
0.55	1.65	1.24	4.08	0.30	1.96
0.60	1.80	1.44	4.39	0.33	2.39
0.65	1.95	1.66	4.71	0.35	2.89
0.70	2.10	1.89	5.03	0.38	3.45
0.75	2.25	2.14	5.34	0.40	4.06
0.80	2.40	2.40	5.66	0.42	4.74
0.85	2.55	2.68	5.98	0.45	5.49
0.90	2.70	2.97	6.29	0.47	6.30

Q_5 = 0.20 m^3/s
Q_{25} = 0.40 m^3/s
Q_{100} = 0.60 m^3/s

Design Flow:	0.60	m^3/s
Design Flow Depth:	0.32	m
Design Flow Velocity:	1.2	m/s
Maximum Flow:	6.3	m^3/s
Maximum Flow Depth:	0.90	m
Maximum Flow Velocity:	2.1	m/s

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Manning's Equation

Proposed Conditions: Section 3 - West Side of Town Line from Warminster Sideroad to Merrington Avenue

Channel

Manning's n 0.035
Slope 0.012 m/m
Bottom Width 1 m
Side Slopes 2.5 :1

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Depth m	Slope Width m	Area m^2	Wetted Perimeter m	Hyraulic Radius m	Discharge m^3/s
0.05	0.13	0.06	1.27	0.04	0.02
0.10	0.25	0.13	1.54	0.08	0.07
0.15	0.38	0.21	1.81	0.11	0.15
0.20	0.50	0.30	2.08	0.14	0.26
0.25	0.63	0.41	2.35	0.17	0.39
0.30	0.75	0.53	2.62	0.20	0.56
0.35	0.88	0.66	2.88	0.23	0.77
0.40	1.00	0.80	3.15	0.25	1.00
0.45	1.13	0.96	3.42	0.28	1.28
0.50	1.25	1.13	3.69	0.30	1.59
0.55	1.38	1.31	3.96	0.33	1.95
0.60	1.50	1.50	4.23	0.35	2.35
0.65	1.63	1.71	4.50	0.38	2.80
0.70	1.75	1.93	4.77	0.40	3.29
0.75	1.88	2.16	5.04	0.43	3.83
0.80	2.00	2.40	5.31	0.45	4.43
0.85	2.13	2.66	5.58	0.48	5.07
0.90	2.25	2.93	5.85	0.50	5.77
0.95	2.38	3.21	6.12	0.52	6.52
1.00	2.50	3.50	6.39	0.55	7.34

Q_5 = 2.3 m^3/s
Q_{25} = 4.5 m^3/s
Q_{100} = 7.3 m^3/s

Design Flow: 7.30 m^3/s
Design Flow Depth: 1.00 m
Design Flow Velocity: 2.1 m/s
Maximum Flow: 7.3 m^3/s
Maximum Flow Depth: 1.00 m
Maximum Flow Velocity: 2.1 m/s

HY-8 Culvert Analysis Report

Proposed Conditions: Culvert A

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 280.78 m

Outlet Station: 13.50 m

Outlet Elevation: 280.64 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 900.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Table 1 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	1.35 cms	1.35 cms	281.97	1.19	1.061	5-S2n	0.54	0.69	0.58	0.48	3.08	1.45
1:50	1.60 cms	1.47 cms	282.07	1.29	1.149	5-S2n	0.57	0.72	0.62	0.52	3.16	1.51
1:100	1.86 cms	1.51 cms	282.11	1.33	1.185	5-S2n	0.58	0.73	0.63	0.55	3.19	1.57

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 280.78 m,

Outlet Elevation (invert): 280.64 m

Culvert Length: 13.50 m,

Culvert Slope: 0.0104

Tailwater Data for Crossing: Crossing 1 Prop

Table 2 - Downstream Channel Rating Curve (Crossing: Crossing 1 Prop)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
1.35	281.05	0.48	1.45	65.70	0.85
1.60	281.09	0.52	1.51	71.08	0.86
1.86	281.12	0.55	1.57	76.02	0.87

Tailwater Channel Data - Crossing 1 Prop

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.75 m

Side Slope (H:V): 2.50 (_:1)

Channel Slope: 0.0140

Channel Manning's n: 0.0350

Channel Invert Elevation: 280.57 m

Roadway Data for Crossing: Crossing 1 Prop

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 7.40 m

Crest Elevation: 282.02 m

Roadway Surface: Paved

Roadway Top Width: 12.50 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 3 - Summary of Culvert Flows at Crossing: Crossing 1 Prop

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
281.97	1:25	1.35	1.35	0.00	1
282.07	1:50	1.60	1.47	0.13	8
282.11	1:100	1.86	1.51	0.34	5
282.02	Overtopping	1.41	1.41	0.00	Overtopping

Proposed Conditions: Culvert B

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 280.86 m

Outlet Station: 13.20 m

Outlet Elevation: 280.60 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 525.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Table 4 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	0.12 cms	0.12 cms	281.18	0.32	0.0*	1-S2n	0.15	0.23	0.16	0.14	2.18	0.75
1:50	0.14 cms	0.14 cms	281.22	0.36	0.034	1-S2n	0.16	0.25	0.17	0.16	2.28	0.79
1:100	0.18 cms	0.18 cms	281.29	0.43	0.102	1-S2n	0.19	0.29	0.20	0.18	2.42	0.85

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 280.86 m,

Outlet Elevation (invert): 280.60 m

Culvert Length: 13.20 m,

Culvert Slope: 0.0197

Tailwater Data for Crossing: Crossing 2 Prop

Table 5 - Downstream Channel Rating Curve (Crossing: Crossing 2 Prop)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
0.12	280.71	0.14	0.75	19.58	0.73
0.14	280.73	0.16	0.79	21.44	0.73
0.18	280.75	0.18	0.85	24.69	0.75

Tailwater Channel Data - Crossing 2 Prop

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.75 m

Side Slope (H:V): 2.50 (_:1)

Channel Slope: 0.0140

Channel Manning's n: 0.0350

Channel Invert Elevation: 280.57 m

Roadway Data for Crossing: Crossing 2 Prop

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 7.40 m

Crest Elevation: 281.69 m

Roadway Surface: Paved

Roadway Top Width: 12.50 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 6 - Summary of Culvert Flows at Crossing: Crossing 2 Prop

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
281.18	1:25	0.12	0.12	0.00	1
281.22	1:50	0.14	0.14	0.00	1
281.29	1:100	0.18	0.18	0.00	1
281.69	Overtopping	0.42	0.42	0.00	Overtopping

Proposed Conditions: Culvert C

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 275.85 m

Outlet Station: 13.70 m

Outlet Elevation: 274.50 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Table 7 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	0.11 cms	0.11 cms	276.17	0.32	0.0*	1-S2n	0.10	0.23	0.10	0.12	4.04	0.70
1:50	0.13 cms	0.13 cms	276.21	0.36	0.0*	1-S2n	0.11	0.25	0.12	0.13	4.02	0.74
1:100	0.17 cms	0.17 cms	276.28	0.43	0.0*	1-S2n	0.13	0.29	0.14	0.15	4.16	0.80

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 275.85 m,

Outlet Elevation (invert): 274.50 m

Culvert Length: 13.77 m,

Culvert Slope: 0.0985

Tailwater Data for Crossing: Crossing 3 Prop

Table 8 - Downstream Channel Rating Curve (Crossing: Crossing 3 Prop)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
0.11	274.62	0.12	0.70	16.96	0.74
0.13	274.63	0.13	0.74	18.61	0.75
0.17	274.65	0.15	0.80	21.48	0.76

Tailwater Channel Data - Crossing 3 Prop

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 1.00 m

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0150

Channel Manning's n: 0.0350

Channel Invert Elevation: 274.50 m

Roadway Data for Crossing: Crossing 3 Prop

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 8.45 m

Crest Elevation: 276.69 m

Roadway Surface: Paved

Roadway Top Width: 12.50 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 9 - Summary of Culvert Flows at Crossing: Crossing 3 Prop

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
276.17	1:25	0.11	0.11	0.00	1
276.21	1:50	0.13	0.13	0.00	1
276.28	1:100	0.17	0.17	0.00	1
276.69	Overtopping	0.33	0.33	0.00	Overtopping

Proposed Condition: Culvert D (Option 2, Option 3)

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 273.83 m

Outlet Station: 12.60 m

Outlet Elevation: 273.80 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Pipe Arch

Barrel Span: 1803.40 mm

Barrel Rise: 1193.80 mm

Barrel Material: Steel or Aluminum

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Projecting (Ke=0.9)

Inlet Depression: None

Table 10 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	2.79 cms	2.79 cms	275.11	1.19	1.284	3-M2t	1.19	0.68	0.83	0.83	2.10	2.14
1:50	3.33 cms	3.33 cms	275.29	1.38	1.462	3-M2t	1.19	0.75	0.89	0.89	2.36	2.24
1:100	3.91 cms	3.80 cms	275.46	1.57	1.628	3-M2t	1.19	0.81	0.95	0.95	2.56	2.33

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 273.83 m,

Outlet Elevation (invert): 273.80 m

Culvert Length: 12.60 m,

Culvert Slope: 0.0024

Tailwater Data for Crossing: Crossing 4 Prop OPT 2

Table 11 - Downstream Channel Rating Curve (Crossing: Crossing 4 Prop OPT 2)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
2.79	274.63	0.83	2.14	122.39	1.03
3.33	274.69	0.89	2.24	131.26	1.04
3.91	274.75	0.95	2.33	139.87	1.05

Tailwater Channel Data - Crossing 4 Prop OPT 2

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.15 m

Side Slope (H:V): 1.70 (_:1)

Channel Slope: 0.0150

Channel Manning's n: 0.0300

Channel Invert Elevation: 273.80 m

Roadway Data for Crossing: Crossing 4 Prop OPT 2

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 275.40 m

Roadway Surface: Paved

Roadway Top Width: 9.00 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 12 - Summary of Culvert Flows at Crossing: Crossing 4 Prop OPT 2

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
275.11	1:25	2.79	2.79	0.00	1
275.29	1:50	3.33	3.33	0.00	1
275.46	1:100	3.91	3.80	0.11	5
275.40	Overtopping	3.65	3.65	0.00	Overtopping

Proposed Condition: Culvert D (Option 4)

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 273.83 m

Outlet Station: 12.60 m

Outlet Elevation: 273.80 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Pipe Arch

Barrel Span: 1447.80 mm

Barrel Rise: 965.20 mm

Barrel Material: Steel or Aluminum

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Projecting (Ke=0.9)

Inlet Depression: None

Table 23 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	1.74 cms	1.74 cms	274.93	1.02	1.098	3-M2t	0.97	0.57	0.69	0.69	1.97	1.90
1:50	1.96 cms	1.96 cms	275.03	1.12	1.202	3-M2t	0.97	0.61	0.72	0.72	2.13	1.96
1:100	3.03 cms	2.72 cms	275.51	1.61	1.682	7-M2t	0.97	0.73	0.86	0.86	2.60	2.19

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 273.83 m,

Outlet Elevation (invert): 273.80 m

Culvert Length: 12.60 m,

Culvert Slope: 0.0024

Tailwater Data for Crossing: Crossing 4 Prop OPT 4

Table 24 - Downstream Channel Rating Curve (Crossing: Crossing 4 Prop OPT 4)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
1.74	274.49	0.69	1.90	101.57	1.00
1.96	274.52	0.72	1.96	106.45	1.01
3.03	274.66	0.86	2.19	126.56	1.04

Tailwater Channel Data - Crossing 4 Prop OPT 4

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.15 m

Side Slope (H:V): 1.70 (_:1)

Channel Slope: 0.0150

Channel Manning's n: 0.0300

Channel Invert Elevation: 273.80 m

Roadway Data for Crossing: Crossing 4 Prop OPT 4

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 275.40 m

Roadway Surface: Paved

Roadway Top Width: 9.00 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 25 - Summary of Culvert Flows at Crossing: Crossing 4 Prop OPT 4

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
274.93	1:25	1.74	1.74	0.00	1
275.03	1:50	1.96	1.96	0.00	1
275.51	1:100	3.03	2.72	0.31	6
275.40	Overtopping	2.58	2.58	0.00	Overtopping

Proposed Condition: Culvert D (Option 5)

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 273.83 m

Outlet Station: 12.60 m

Outlet Elevation: 273.80 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 900.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Table 29 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	0.83 cms	0.83 cms	274.69	0.82	0.861	2-M2c	0.65	0.54	0.54	0.51	2.10	1.58
1:50	1.01 cms	1.01 cms	274.80	0.93	0.970	7-M2c	0.79	0.59	0.59	0.55	2.26	1.66
1:100	1.18 cms	1.18 cms	274.91	1.06	1.080	7-M2c	0.90	0.64	0.64	0.59	2.43	1.73

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 273.83 m,

Outlet Elevation (invert): 273.80 m

Culvert Length: 12.60 m,

Culvert Slope: 0.0024

Tailwater Data for Crossing: Crossing 4 Prop OPT 5

Table 30 - Downstream Channel Rating Curve (Crossing: Crossing 4 Prop OPT 5)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
0.83	274.31	0.51	1.58	75.52	0.96
1.01	274.35	0.55	1.66	81.57	0.97
1.18	274.39	0.59	1.73	87.00	0.98

Tailwater Channel Data - Crossing 4 Prop OPT 5

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.15 m

Side Slope (H:V): 1.70 (_:1)

Channel Slope: 0.0150

Channel Manning's n: 0.0300

Channel Invert Elevation: 273.80 m

Roadway Data for Crossing: Crossing 4 Prop OPT 5

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 275.40 m

Roadway Surface: Paved

Roadway Top Width: 9.00 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 31 - Summary of Culvert Flows at Crossing: Crossing 4 Prop OPT 5

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
274.69	1:25	0.83	0.83	0.00	1
274.80	1:50	1.01	1.01	0.00	1
274.91	1:100	1.18	1.18	0.00	1
275.40	Overtopping	1.74	1.74	0.00	Overtopping

Proposed Condition: Culvert G

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 262.95 m

Outlet Station: 12.30 m

Outlet Elevation: 262.75 m

Number of Barrels: 3

Culvert Data Summary - Culvert 1

Barrel Shape: Elliptical

Barrel Span: 1143.00 mm

Barrel Rise: 736.60 mm

Barrel Material: Concrete

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Projecting (Ke=0.2)

Inlet Depression: None

Table 17 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	4.37 cms	4.37 cms	263.92	0.97	0.733	5-S2n	0.38	0.60	0.45	0.60	3.30	1.65
1:50	5.69 cms	5.51 cms	264.20	1.25	1.019	5-S2n	0.44	0.65	0.52	0.69	3.55	1.78
1:100	7.19 cms	5.98 cms	264.33	1.38	1.204	5-S2n	0.46	0.67	0.55	0.79	3.66	1.90

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 262.95 m,

Outlet Elevation (invert): 262.75 m

Culvert Length: 12.30 m,

Culvert Slope: 0.0163

Tailwater Data for Crossing: Crossing 6 Prop

Table 18 - Downstream Channel Rating Curve (Crossing: Crossing 6 Prop)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
4.37	263.35	0.60	1.65	59.13	0.78
5.69	263.44	0.69	1.78	68.08	0.79
7.19	263.54	0.79	1.90	77.00	0.80

Tailwater Channel Data - Crossing 6 Prop

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 3.00 m

Side Slope (H:V): 2.30 (_:1)

Channel Slope: 0.0100

Channel Manning's n: 0.0350

Channel Invert Elevation: 262.75 m

Roadway Data for Crossing: Crossing 6 Prop

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 8.50 m

Crest Elevation: 264.14 m

Roadway Surface: Paved

Roadway Top Width: 9.25 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 19 - Summary of Culvert Flows at Crossing: Crossing 6 Prop

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
263.92	1:25	4.37	4.37	0.00	1
264.20	1:50	5.69	5.51	0.18	4
264.33	1:100	7.19	5.98	1.20	4
264.14	Overtopping	5.30	5.30	0.00	Overtopping

Proposed Condition: Culvert H

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 260.32 m

Outlet Station: 16.40 m

Outlet Elevation: 260.24 m

Number of Barrels: 4

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Table 13 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	4.65 cms	1.74 cms	261.31	0.71	0.986	4-FFf	0.46	0.43	0.60	0.81	1.54	1.28
1:50	5.98 cms	1.65 cms	261.38	0.68	1.063	4-FFf	0.44	0.42	0.60	0.92	1.46	1.37
1:100	7.53 cms	1.55 cms	261.46	0.65	1.140	4-FFf	0.42	0.41	0.60	1.02	1.37	1.46

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 260.32 m,

Outlet Elevation (invert): 260.24 m

Culvert Length: 16.40 m,

Culvert Slope: 0.0049

Culvert Data: Culvert 2

Site Data - Culvert 2

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 260.50 m

Outlet Station: 37.00 m

Outlet Elevation: 260.20 m

Number of Barrels: 2

Culvert Data Summary - Culvert 2

Barrel Shape: Pipe Arch

Barrel Span: 889.00 mm

Barrel Rise: 609.60 mm

Barrel Material: Steel or Aluminum

Embedment: 0.00 mm

Barrel Manning's n: 0.0250

Culvert Type: Straight

Inlet Configuration: Projecting (Ke=0.9)

Inlet Depression: None

Table 14 - Culvert Summary Table: Culvert 2

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	4.65 cms	0.76 cms	261.31	0.50	0.806	4-FFf	0.38	0.30	0.61	0.81	0.88	1.28
1:50	5.98 cms	0.72 cms	261.38	0.48	0.883	4-FFf	0.36	0.29	0.61	0.92	0.83	1.37
1:100	7.53 cms	0.68 cms	261.46	0.46	0.960	4-FFf	0.34	0.28	0.61	1.02	0.78	1.46

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 260.50 m,

Outlet Elevation (invert): 260.20 m

Culvert Length: 37.00 m,

Culvert Slope: 0.0081

Tailwater Data for Crossing: Crossing 7 Prop

Table 15 - Downstream Channel Rating Curve (Crossing: Crossing 7 Prop)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
4.65	261.05	0.81	1.28	39.94	0.57
5.98	261.16	0.92	1.37	44.98	0.57
7.53	261.26	1.02	1.46	50.07	0.58

Tailwater Channel Data - Crossing 7 Prop

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 m

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0350

Channel Invert Elevation: 260.24 m

Roadway Data for Crossing: Crossing 7 Prop

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 16.00 m

Crest Elevation: 261.12 m

Roadway Surface: Paved

Roadway Top Width: 8.50 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 16 - Summary of Culvert Flows at Crossing: Crossing 7 Prop

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Culvert 2 Discharge (cms)	Roadway Discharge (cms)	Iterations
261.31	1:25	4.65	1.74	0.76	2.15	5
261.38	1:50	5.98	1.65	0.72	3.61	4
261.46	1:100	7.53	1.55	0.68	5.31	4
261.12	Overtopping	2.59	1.79	0.79	0.00	Overtopping

Proposed Condition: Culvert F (Option 3)

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 271.61 m

Outlet Station: 20.00 m

Outlet Elevation: 271.55 m

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Pipe Arch

Barrel Span: 1066.80 mm

Barrel Rise: 736.60 mm

Barrel Material: Steel or Aluminum

Embedment: 0.00 mm

Barrel Manning's n: 0.0250

Culvert Type: Straight

Inlet Configuration: Projecting

Inlet Depression: None

Table 20 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	0.60 cms	0.60 cms	272.27	0.60	0.664	3-M2t	0.74	0.36	0.37	0.37	1.69	0.79
1:100	0.70 cms	0.70 cms	272.35	0.67	0.739	3-M2t	0.74	0.39	0.40	0.40	1.81	0.82

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 271.61 m,

Outlet Elevation (invert): 271.55 m

Culvert Length: 20.00 m,

Culvert Slope: 0.0030

Tailwater Data for Crossing: Crossing 5 Prop

Table 21 - Downstream Channel Rating Curve (Crossing: Crossing 5 Prop)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
0.60	271.92	0.37	0.79	18.31	0.50
0.70	271.95	0.40	0.82	19.77	0.50

Tailwater Channel Data - Crossing 5 Prop

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 1.10 m

Side Slope (H:V): 2.50 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0350

Channel Invert Elevation: 271.55 m

Roadway Data for Crossing: Crossing 5 Prop

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 14.00 m

Crest Elevation: 272.55 m

Roadway Surface: Paved

Roadway Top Width: 17.00 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 22 - Summary of Culvert Flows at Crossing: Crossing 5 Prop

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
272.27	1:25 Year	0.60	0.60	0.00	1
272.35	1:100-Year	0.70	0.70	0.00	1
272.55	Overtopping	0.94	0.94	0.00	Overtopping

Proposed Condition: New Crossing Warminster Sideroad at Danny McHugh Memorial Park (Option 5)

Culvert Data: Culvert 1

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 274.70 m

Outlet Station: 50.00 m

Outlet Elevation: 274.20 m

Number of Barrels: 2

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 900.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Table 26 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:25	2.32 cms	2.32 cms	275.74	1.04	0.567	5-S2n	0.50	0.64	0.51	0.51	3.15	1.12
1:50	2.76 cms	2.76 cms	275.91	1.21	0.904	5-S2n	0.56	0.70	0.57	0.56	3.27	1.18
1:100	3.24 cms	3.24 cms	276.14	1.44	1.160	5-S2n	0.62	0.75	0.63	0.61	3.40	1.23

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 274.70 m,

Outlet Elevation (invert): 274.20 m

Culvert Length: 50.00 m,

Culvert Slope: 0.0100

Tailwater Data for Crossing: OPT 5 New Crossing

Table 27 - Downstream Channel Rating Curve (Crossing: OPT 5 New Crossing)

Flow (cms)	Water Surface Elev (m)	Velocity (m/s)	Depth (m)	Shear (Pa)	Froude Number
2.32	274.71	0.51	1.12	50.16	0.59
2.76	274.76	0.56	1.18	54.86	0.60
3.24	274.81	0.61	1.23	59.55	0.60

Tailwater Channel Data - OPT 5 New Crossing

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.50 m

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0100

Channel Manning's n: 0.0450

Channel Invert Elevation: 274.20 m

Roadway Data for Crossing: OPT 5 New Crossing

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 16.00 m

Crest Elevation: 276.15 m

Roadway Surface: Paved

Roadway Top Width: 18.00 m

Crossing Discharge Data

Discharge Selection Method: User Defined

Table 28 - Summary of Culvert Flows at Crossing: OPT 5 New Crossing

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
275.74	25 Yr	2.32	2.32	0.00	1
275.91	50 Yr	2.76	2.76	0.00	1
276.14	100 Yr	3.24	3.24	0.00	1
276.15	Overtopping	3.26	3.26	0.00	Overtopping

Appendix B: Warminster Sideroad & Highway 12 Intersection Review

TATHAM ENGINEERING

Enhancing our communities

Warminster Sideroad & Highway 12

INTERSECTION REVIEW

Township of Oro-Medonte

File 321892 | August 19, 2021

Document Control

File:	Prepared by:	Prepared for:
321892	**Tatham Engineering Limited** 10 Diana Drive, Building 9, Unit 7 Orillia, Ontario L3V 8K8	**Township of Oro-Medonte** 148 Line 7 South Oro-Medonte, Ontario L0L 2E0
Date: **August 19, 2021**	**T** 705-444-2565 **tathameng.com**	

Authored by:	Reviewed by:
LICENSED PROFESSIONAL ENGINEER M. J. CULLIP 90512237 August 19, 2021 PROVINCE OF ONTARIO	
Michael Cullip B.Eng. & Mgmt., P.Eng. Vice President Head Office Operations	David Perks M.Sc., PTP Transportation Planner, Project Manager

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Issue	Date	Description
1	August 19, 2021	Final report

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1 Introduction

Tatham Engineering Limited has been retained by the Township of Oro-Medonte to review the traffic operations at the intersection of Warminster Sideroad with Highway 12. In particular, the review considers:

- existing and future traffic volumes;
- existing and future traffic operations; and
- need for intersection improvements.

In addition, a review of the recently completed *Operational and Safety Review Highway 12 at Warminster Sideroad Intersection*[1] has also been completed, the results of which are documented herein.

[1] *Operational and Safety Review Highway 12 at Warminster Sideroad Intersection.* MTO Design and Engineering Branch, Central Region Traffic. January 2021.

2 Existing Conditions

2.1 ROAD NETWORK

The location of intersection of Warminster Sideroad with Highway 12 is illustrated in Figure 1, whereas its existing configuration is evident in Figure 2 with additional details provided below.

Highway 12

Highway 12 is a provincial highway under the jurisdiction of the Ministry of Transportation (MTO) oriented in a northwest – southeast direction (referred to as north-south for purposes of this report). Through Warminster, the highway has a posted speed limit of 60 km/h, provides one lane of travel per direction and has paved shoulders on both sides.

Warminster Sideroad

Warminster Sideroad is a Township of Oro-Medonte road. It consists of one travel lane per direction with unpaved shoulders of varying widths and open ditches. The posted speed limit for Warminster Sideroad is 50 km/h. Warminster Sideroad is considered to run east-west for purposes of this report.

Highway 12 & Warminster Sideroad Intersection

The intersection of Highway 12 and Warminster Sideroad has the following configuration:

- 4-leg intersection with stop control on Warminster Sideroad;
- single lane approaches (ie. no turn lanes) on Warminster Sideroad;
- exclusive left turn lanes in both directions on Highway 12 and a right turn taper on the south approach; and
- designated pedestrian crossover on the south approach of Highway 12 (which includes enhanced crosswalk pavement markings, overhead pedestrian crossing signs, and flashing beacons with signs on both sides of the highway – refer to Figure 3).

The pedestrian crossover was implemented by MTO in 2017 in conjunction with the Highway 12 improvement program, in consideration of the adjacent elementary school and the need for a protected crossing (prior to this, there was a standard crosswalk, albeit with enhanced pavement markings and a school crossing sign with flashing lights).

2.2 TRAFFIC VOLUMES

2016 & 2019 Traffic Counts

To determine existing traffic volumes on the study area road network, traffic counts were obtained from MTO for the intersection of Warminster Sideroad with Highway 12, conducted on:

- November 13, 2019 from 7:00 to 9:00, 11:00 to 14:00 and 15:00 to 18:00; and
- April 29, 2016 from 7:00 to 9:00 and 15:00 to 19:00.

The corresponding traffic count details are provided in Appendix A, whereas the corresponding peak hour volumes are illustrated in Figure 4 and Figure 5.

A summary of the peak hour volumes is provided in Table 1 for each leg of the intersection (total of 2-way traffic volumes), and the intersection as a whole. The resulting annual growth rates as realized over the 2016 to 2019 period are also noted. As indicated, there has been considerable growth in the intersection peak hour traffic volumes over the course of the past 3 years, particularly in the PM peak hour. This is likely attributed to continued development in the Warminster Area, continued development in the City of Orillia and areas beyond (thus leading to increased through volumes on Highway 12), and also variability in daily traffic counts (given the lower volumes on Warminster Sideroad, minor increases can result in significant growth).

Table 1: 2016 & 2019 Peak Hour Volumes

LOCATION		2016 VOLUMES		2019 VOLUMES		ANNUAL GROWTH	
		AM	PM	AM	PM	AM	PM
Highway 12	south leg	732	970	816	1512	3.7%	15.9%
	north leg	685	946	780	1461	4.4%	15.6%
Warminster Sideroad	west leg	93	106	86	205	-2.6%	24.6%
	east leg	86	96	82	200	-1.6%	27.7%
Total Intersection		**798**	**1059**	**882**	**1689**	**3.4%**	**16.8%**

As noted in Figure 5, the 2019 peak hour volumes on Warminster Sideroad are in the order of 33 to 123 vehicles per hour per direction west of Highway 12 and 23 to 112 vehicles per hour per direction east of Highway 12. Volumes on Highway 12 are in the order of 253 to 930 vehicles per hour per direction.

Background Growth

To address 2021 traffic volumes, the 2019 traffic data was increased as follows:

- 4% per annum on Highway 12; and
- 2% per annum on Warminster Sideroad.

While the growth rates presented in Table 1 suggest increased growth, such is not considered sustainable over extended periods. Additional consideration will also be given to development specific growth in the immediate area, which is otherwise captured in the realized growth rates.

Development Growth

As per the 2012 *Warminster Developments Consolidated Traffic Study*[2], a number of residential developments have been proposed within the Warminster area. A summary of the corresponding unit counts and status is provided in Table 2 with locations indicated in Figure 6. Where developments have not been completed, assumptions have been made with respect to their completion dates (based on information in the *Warminster Developments Consolidated Traffic Impact Study* and following a review of historical aerial photography).

Table 2: Warminster Area Developments

DEVELOPMENT	UNITS	UNITS BUILT IN 2019	UNITS BUILT IN 2021	BUILD-OUT
Teskey Subdivision	29	29	29	complete
Meadow Acres	71	16	35	+5 years
Isabella Estates	22	22	22	complete
Pine Meadows Estates	28	28	28	complete
9647 Highway 12	12	0	0	+5 years
10 Lots	10	0	0	+5 years
3 Lots	3	0	0	+5 years

[2] *Warminster Developments Consolidated Traffic Study*. C.C. Tatham & Associates Ltd., February 22, 2012.

As noted, the Teskey, Isabella Estates and Pine Meadows Estates were complete at the time of the 2019 traffic count and hence associated volumes would be captured in the count. No further consideration for these developments is therefore necessary.

The number of vehicle trips to be generated by the 19 units at Meadow Acres completed between 2019 and 2021 has been determined based on published ITE trip generation rates for the single family detached land use (ITE code 210). The trip rates and resulting trip estimates are provided in Table 3.

Table 3: Development Growth - 2021

LAND USE	RATE/ ESTIMATE	VARIABLE/ SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
single family detached (ITE code 210)	rate	unit	0.19	0.56	0.74	0.62	0.37	0.99
Meadow Acres	estimate	19 units	4	11	15	12	7	19

2021 Traffic Volumes

Traffic volumes for the existing 2021 horizon been estimated based on the following:

- 2019 traffic count;
- background growth rate; and
- additional development growth realized over the period 2019 to 2021 (19 units associated with Meadow Acres).

The resulting 2021 traffic volumes are illustrated in Figure 7.

2.3 INTERSECTION OPERATIONS

The assessment of existing conditions establishes the baseline operating conditions of the road network and provides an indication of the available capacity within the system. The capacity, and hence operations, of a road system is effectively dictated by its intersections. As such, the analysis focused on the operations of the intersection of Warminster Sideroad and Highway considering the 2021 traffic volumes, the existing intersection configuration and procedures outlined in the *2000 Highway Capacity Manual*[3] (using Synchro v.10 software). For signalized intersections, the analysis considers the average delay (measured in seconds), level of service

[3] *Highway Capacity Manual.* Transportation Research Board. Washington D.C. 2000

(LOS) and volume to capacity (v/c) for each movement and the overall intersection. For unsignalized intersections, the analysis considers the same metrics (i.e. delay, LOS and v/c) for the stop control movements. Level of service 'A' corresponds to the best operating condition with minimal delays whereas level of service 'F' corresponds to poor operations resulting from high intersection delays. A v/c ratio of less than 1.0 indicates the intersection movement/approach is operating at less than capacity while v/c of 1.0 indicates capacity has been reached.

A summary of the analysis is provided in Table 4, whereas detailed operations worksheets for the existing traffic conditions are included in Appendix B. As noted, acceptable operations are currently provided during the AM peak hour. However, during the PM peak hour, high delays and hence poor levels of service result for both the west and east approaches of Warminster Sideroad. This is attributed primarily to the increased traffic volumes on Highway 12 and the difficulties in completing turning movements from the side street.

Table 4: Intersection Operations – 2021

INTERSECTION & MOVEMENT		CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Warminster S/R & Highway 12	EB	stop	19	C	0.23	**310**	**F**	**1.34**
	WB	stop	22	C	0.25	**340**	**F**	**1.40**

Similar operating levels result under the 2019 traffic volumes (established through the traffic counts), as summarized in Table 5. This confirms that the assumptions employed regarding growth over the period 2019 to 2021 (to establish 2021 traffic volumes) do not have significant implications with respect to traffic volumes and hence traffic operations (level of service F will result during the PM peak hour regardless of the growth levels assumed).

Table 5: Intersection Operations – 2019

INTERSECTION & MOVEMENT		CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Warminster S/R & Highway 12	EB	stop	15	C	0.14	**101**	**F**	**0.76**
	WB	stop	18	C	0.19	**112**	**F**	**0.82**

2.4 INTERSECTION IMPROVEMENTS

The levels of service F realized during the PM peak hour reflect the need for intersection operational improvements. While all-way stop control is feasible, such will not adequately service all intersection approaches. In this regard, traffic signal control is required to ensure appropriate intersection operations.

2.4.1 Traffic Signal Warrants

The provision of traffic signals at the intersection of Warminster Sideroad with Highway 12 was assessed based on the following:

- MTO traffic signal warrants;
- the projected AM and PM peak hour traffic volumes for the 2021 horizon;
- MTO guidelines to establish traffic volumes for the remaining 6 hours (the warrants are based on data for the 8 busiest hours of the day, 2 hours of which are addressed by the AM and PM peak hours); and
- both restricted and free-flow traffic flow conditions.

With respect to traffic flow conditions, the Ontario Traffic Manual Book 12 defines the following conditions:

- *Free Flow Conditions represent roads with operating or posted speeds equal to or greater than 70 km/h and are normally encountered in rural areas or on controlled access roads in urban areas. As driving characteristics in small urban communities can be different from those in larger urban areas, free flow conditions are also used for isolated communities with a population of less than 10,000 and located outside the community influence of a large urban center, even if the operating speed is less than 70 km/h.*
- *Restricted Flow Conditions represent roads with operating or posted speeds of less than 70 km/h and are normally encountered in urban areas where side friction on the roadway (due to parking, numerous entrances, etc.) reduces the operating speed.*

A summary of the signal warrant analysis is provided in Table 6, whereas the completed warrants are provided in Appendix C. As illustrated, under “free flow conditions”, which reflects the rural nature of the study area and thus is considered most appropriate, the warrant for signal control is nearly met (either 100% of Warrants 1A and 1B or 2A and 2B, or 80% of 1A/1B and 2A/2B).

Notwithstanding, traffic signals are recommended to address the poor operating conditions and long delays anticipated. It is noted that the poor operations and resulting traffic signal recommendation are a result of the increased volumes on Highway 12 and cumulative growth in traffic volumes through the study area.

Table 6: Traffic Signal Warrants – 2021

INTERSECTION & TRAFFIC FLOW CONDITIONS		WARRANT				
		1A	1B	2A	2B	Warranted
Warminster S/R & Highway 12	Free Flow	100%	78%	100%	85%	no
	Restricted Flow	99%	60%	90%	64%	no

2.4.2 Intersection Operations with Traffic Signals

The subject intersection was again reviewed with consideration for traffic signal control, the results of which are summarized in Table 7 with detailed operational worksheets provided in Appendix B. A simple signal timing plan was assumed, with advance green for the northbound and southbound left turn movements during the PM peak hour (not necessary in the AM peak).

Table 7: Intersection Operations – 2021 + Traffic Signals

INTERSECTION & MOVEMENT			CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
				Delay	LOS	V/C	Delay	LOS	V/C
Warminster S/R & Highway 12	EB	LTR	signal	17	B	0.25	22	C	0.35
	WB	LTR	signal	17	B	0.33	22	C	0.31
	NB	L	signal	4	A	0.05	5	A	0.19
	NB	T	signal	4	A	0.24	9	A	0.75
	NB	R	signal	3	A	0.01	3	A	0.05
	SB	L	signal	3	A	0.02	6	A	0.15
	SB	LT	signal	5	A	0.53	10	B	0.65
	overall		signal	7	A	0.50	10	B	0.72

L left R right T thru LT left-thru TR thru-right LTR left-thru-right

As noted, improved operations will be provided, with better accommodation for all movements thus further substantiating the need for traffic signal control. The provision of traffic signal control will also provide improved pedestrian crossing opportunities as compared to the current pedestrian crossover.

3 Future Conditions

3.1 TRAFFIC VOLUMES

For the purpose of this study, the 2026 horizon (ie. 5 year horizon) has been considered to assess the impact of the development on the road network.

Background Growth

As discussed in Section 2.2, a background growth rate of 4% per annum has been applied to Highway 12 through volumes and 2% to the remaining.

Development Growth

The following developments (as illustrated in Figure 6) are assumed to be completed by 2026:

- Meadow Acres (36 remaining units);
- 9647 Highway 12 (12 units);
- 10 Lot development (10 units); and
- 3 Lot development (3 units).

The number of vehicle trips to be generated by the above noted developments is indicated in Table 8, employing the same methodology as previously considered (single family detached land use with ITE trip generation rates).

Table 8: Development Growth - 2026

LAND USE	RATE/ ESTIMATE	VARIABLE/ SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
single family detached 210)	rate	unit	0.19	0.56	0.74	0.62	0.37	0.99
Meadow Acres	estimate	36 units	7	20	27	22	13	36
9647 Hwy 12	estimate	12 units	2	7	9	7	4	12
10 Lots	estimate	10 units	2	6	7	6	4	10
3 Lots	estimate	3 units	1	2	2	2	1	3
Total			**11**	**34**	**45**	**38**	**22**	**60**

As noted, 45 to 60 additional peak hour trips have been considered, assigned to the local road system and subject intersection in consideration of the respective development location, site access and overall distribution (as per the *Warminster Developments Consolidated Traffic Study*).

2026 Traffic Volumes

The traffic volumes for the 2026 horizon are provided in Figure 8, reflective of the 2021 traffic volumes adjusted to consider annual growth and background development growth over the period 2021 to 2026.

3.2 INTERSECTION OPERATIONS

The operations of the intersection of Warminster Sideroad with Highway 12 were again investigated considering the 2026 traffic volumes. The results of the operational review are summarized in Table 9 with detailed worksheets provided in Appendix D.

Table 9: Intersection Operations - 2026 Conditions

INTERSECTION & MOVEMENT		CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Warminster S/R & Highway 12	EB	stop	29	D	0.42	**>999**	**F**	**>4**
	WB	stop	36	E	0.42	**>999**	**F**	**>10**

Based on the projected 2026 traffic volumes and intersection control, the Warminster Sideroad approaches will experience considerable delay during the PM peak hour with projected volumes far exceeding the available movement capacities, resulting in a level of service F.

3.3 INTERSECTION IMPROVEMENTS

To remedy the levels of service F realized during the PM peak, the need for traffic signal control was once again reviewed.

3.3.1 Traffic Signal Warrants

A summary of the signal warrant analysis under the 2026 horizon is provided in Table 10, whereas the completed warrants are provided in Appendix E. As illustrated, under “free flow conditions”, which reflects the rural nature of the study area, the warrant for signal control is satisfied (warrants 1A/1B and 2A/2B are both met 80%).

Table 10: Traffic Signal Warrants – 2026 Conditions

INTERSECTION & TRAFFIC FLOW CONDITIONS		WARRANT				
		1A	1B	2A	2B	Warranted
Warminster S/R & Highway 12	Free Flow	100%	91%	100%	96%	yes
	Restricted Flow	100%	71%	100%	73%	no

3.3.2 Intersection Operations

The subject intersection was again reviewed with consideration for traffic signal control, the results of which are summarized in Table 11 with detailed operational worksheets provided in Appendix D. As with the 2021 existing conditions, a simple signal timing plan was assumed, with advance green for the northbound and southbound left turn movements during the PM peak hour (not necessary in the AM peak).

Table 11: Intersection Operations – 2026 Conditions + Traffic Signals

INTERSECTION & MOVEMENT			CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
				Delay	LOS	V/C	Delay	LOS	V/C
Warminster S/R & Highway 12	EB	LTR	signal	18	B	0.27	36	D	0.50
	WB	LTR	signal	18	B	0.32	36	D	0.43
	NB	L	signal	4	A	0.08	6	A	0.26
	NB	T	signal	5	A	0.29	19	B	0.88
	NB	R	signal	4	A	0.01	5	A	0.06
	SB	L	signal	4	A	0.02	13	B	0.21
	SB	LT	signal	7	A	0.64	11	B	0.66
	overall		signal	8	A	0.58	17	B	0.80

L left R right T thru LT left-thru TR thru-right LTR left-thru-right

As noted, level of service D or better will be provided (typically A or B), thus confirming the need for traffic signal control to appropriately accommodate the future traffic volumes.

4 MTO Intersection Review

As previously noted, the MTO completed a review of the subject intersection earlier in 2021 in response to concerns raised by the Township relating to the unsignalized intersection control and the pedestrian crossover operations. The report is structured as follows:

- Chapter 1: Existing Conditions;
- Chapter 2: Operational and Safety Data and Analysis;
- Chapter 3: Traffic Control Requirements at Highway 12/Warminster Sideroad; and
- Chapter 4: Opportunities/Recommendations to Improve Safety.

The corresponding report has been reviewed, primarily with respect to the appropriateness of the existing intersection control and pedestrian crossover, with comments as follows. A copy of the MTO report is provided in Appendix F for ease of reference.

4.1 OPERATIONAL ANALYSIS

The operational analysis as presented by MTO focused on observed compliance with the pedestrian crossover (ie. did vehicles stop when the crossover was activated), travel speeds and collision analysis at the intersection. Based on the information provided, there was no justification for improvements to the existing configuration and/or control.

The analysis did not however, review traffic operations at the intersection. As reported in the previous chapters, given the increased traffic volumes on Highway 12, increased delays will be realized by those vehicles on Warminster Sideroad, resulting in poor levels of service under both existing (2021) and future (2026) conditions.

4.2 TRAFFIC SIGNAL WARRANTS

As reported in Section 2.4.1, signal warrants are considered based on the following operating conditions:

- *Free Flow Conditions represent roads with operating or posted speeds equal to or greater than 70 km/h and are normally encountered in rural areas or on controlled access roads in urban areas.* ***As driving characteristics in small urban communities can be different from those in larger urban areas, free flow conditions are also used for isolated communities with a population of less than 10,000 and located outside the community influence of a large urban center, even if the operating speed is less than 70 km/h.***

- *Restricted Flow Conditions represent roads with operating or posted speeds of less than 70 km/h and are **normally encountered in urban areas** where side friction on the roadway (due to parking, numerous entrances, etc.) reduces the operating speed.*

The MTO warrant analysis was completed based on the November 2019 intersection traffic count and reflects “restricted flow conditions”, the latter of which is likely a reflection of the reduced speed limit through the subject area (posted 60 km/h). However, such conditions are normally encountered in urban areas - Warminster would be considered rural in nature. While “free flow conditions” are typically associated with higher operating speeds, they are appropriate in isolated communities, even if the operating speed is less than 70 km/h. This latter application recognizes that driving characteristics in small urban communities can be different than those in large urban communities. As reported by MTO, the 85th percentile speeds through the 60 km/h speed zone range from 75 to 81 km/h, whereas those beyond the 60 km/h zone range from 91 to 103 km/h. This is considered more representative of free flow conditions (ie. operating speeds greater than 70 km/h) .

The MTO signal warrant was repeated under “free-flow conditions” for purposes of comparison. While the volumes on Highway 12 exceed the warrant thresholds, such are not satisfied for Warminster Sideroad given the reduced volumes captured in the 2019 traffic counts.

However, in considering the need for traffic signals, it would be appropriate to consider traffic volumes reflective of current (ie. 2021) and future conditions, given the continued growth anticipated for the area. This reflects a more safety conscious, pro-active approach, ensuring that the appropriate traffic control is implemented as required. As detailed in the previous section, given the projected 2026 traffic volume projections, traffic signal control is necessary.

4.3 IPS & CROSSOVER WARRANTS

The analysis provided indicates that neither an Intersection Pedestrian Signal (IPS) nor a Pedestrian Crossover is warranted based on the pedestrian crossing volumes. However, in consideration of pedestrian desire lines and need for connectivity across Highway 12 to serve the school, MTO acknowledges that a crossover is appropriate, as recently installed.

Notwithstanding the additional measures, there are concerns regarding the operations of the crossover on Highway 12 and the potential for non-compliance. Township Council is seeking the implementation of traffic signal control.

5 Summary

The following are key findings of this study:

- Based on the 2019 intersection traffic volumes as reported by MTO, the intersection of Highway 12 and Warminster Sideroad operates under a level of service F resulting from increased delays to Warminster Sideroad traffic (which in turn result from the increased volumes on Highway 12).
- A similar operating level will result under existing (2021) and future (2026) conditions. Level of service F is typically deemed unacceptable and thus operational improvements are required.
- The most appropriate mechanism to ensure acceptable traffic operations at the intersection is through the provision of traffic signal control. Traffic signals would rest in the green phase for Highway 12 traffic, and revert to green for Warminster Sideroad only when called by queuing traffic. In this regard, impacts to Highway 12 traffic operations would be limited (less than 20 seconds as per the 2026 intersection operations review) .
- While the warrants for traffic signal control are not strictly satisfied under the 2021 conditions, they are satisfied under 2026 conditions. Furthermore as noted, they are required to ensure acceptable traffic operations will be provided.
- The pedestrian crossover was installed by MTO in 2017 in recognition of the need to provide a safe and controlled crossing to serve students attending Warminster Elementary School. Notwithstanding, it is understood there are concerns from local residents and Township Council as to the suitability of the crossover in ensuring safe pedestrian crossings (given higher travel speeds through the area and occurrences of non-compliance).
- While the pedestrian crossing volumes at the intersection do not warrant signal control (and nor are they likely to in the future), the provision of such will remedy concerns relating to safe pedestrian crossings in that motorists are familiar with traffic signal control as compared to pedestrian crossovers (the installation of pedestrian crossovers on provincial highways is somewhat limited).
- In consideration of the existing and future traffic operations and traffic signal warrants, and the requirement to provide a safe and controlled crossing of Highway 12 for school children, the implementation of traffic signals is recommended. Such are warranted largely in part due to the increased traffic volumes on Highway 12 (as evident through a comparison of the 2016 and 2019 traffic counts) and hence responsibility for the traffic signals should be that of MTO.

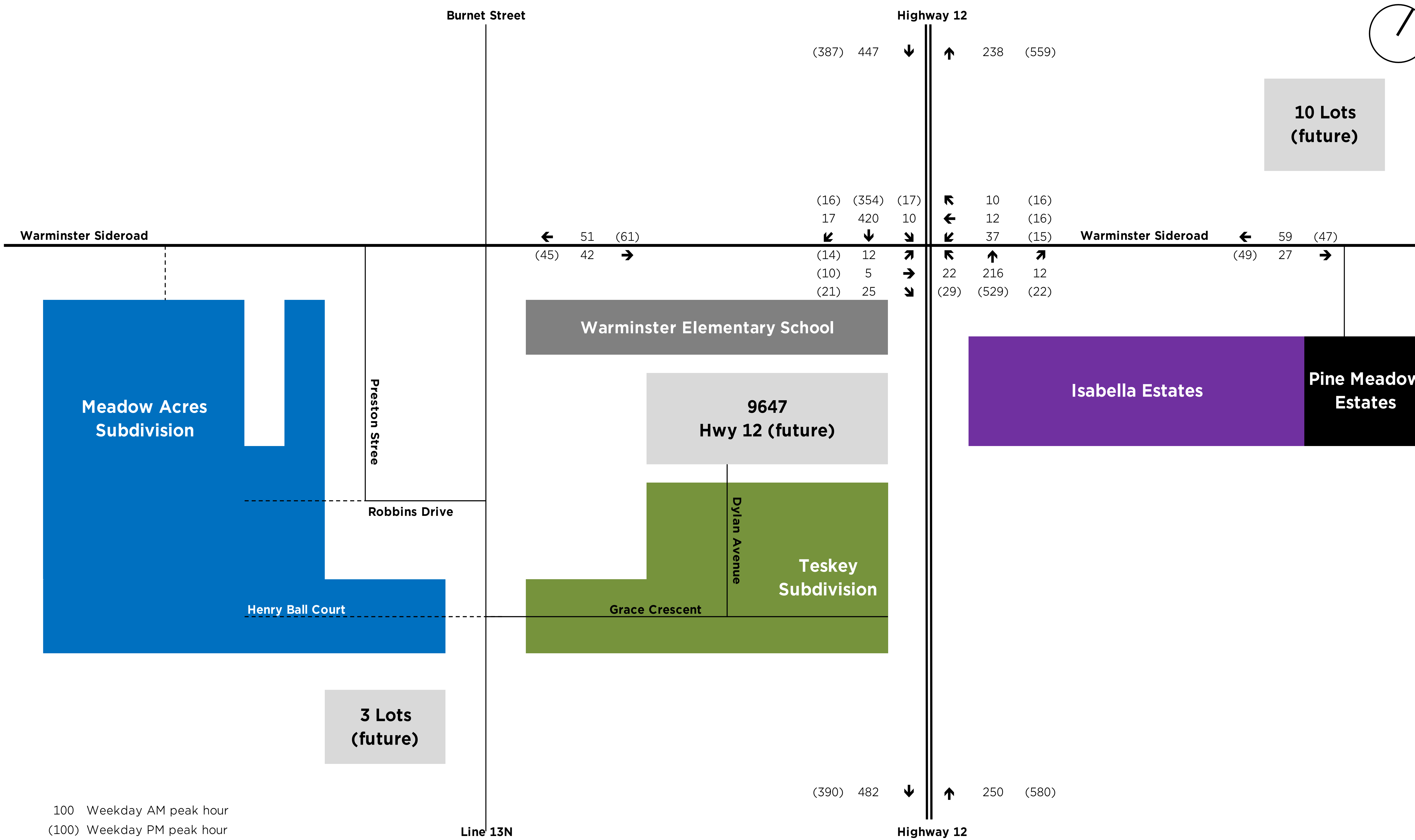
9647 HIGHWAY 12 SUBDIVISION

Figure 1: Intersection Location

9647 HIGHWAY 12 SUBDIVISION

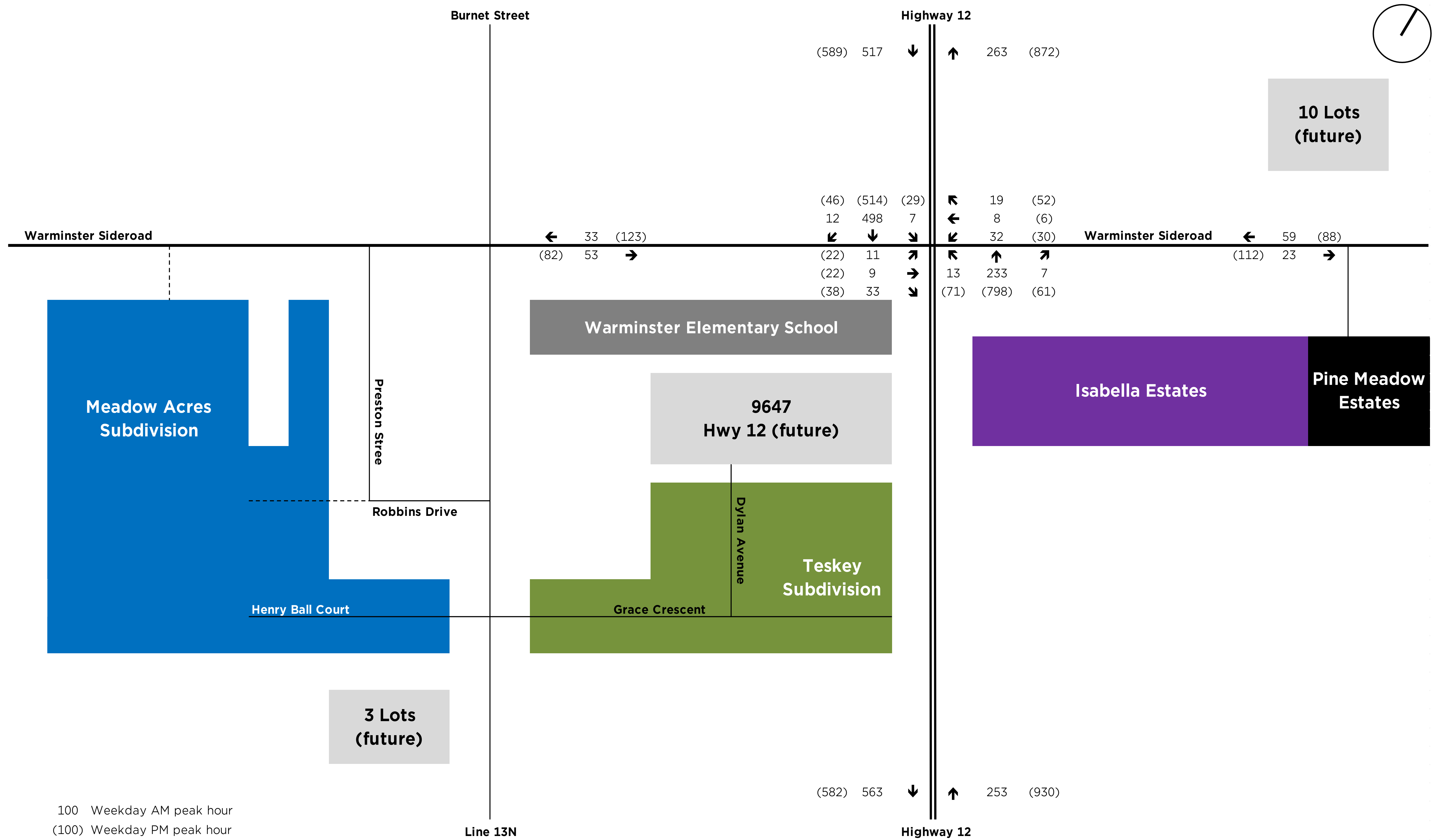
Figure 2: Intersection Configuration

Pedestrian Crossover of Highway 12 at Warminster Sideroad



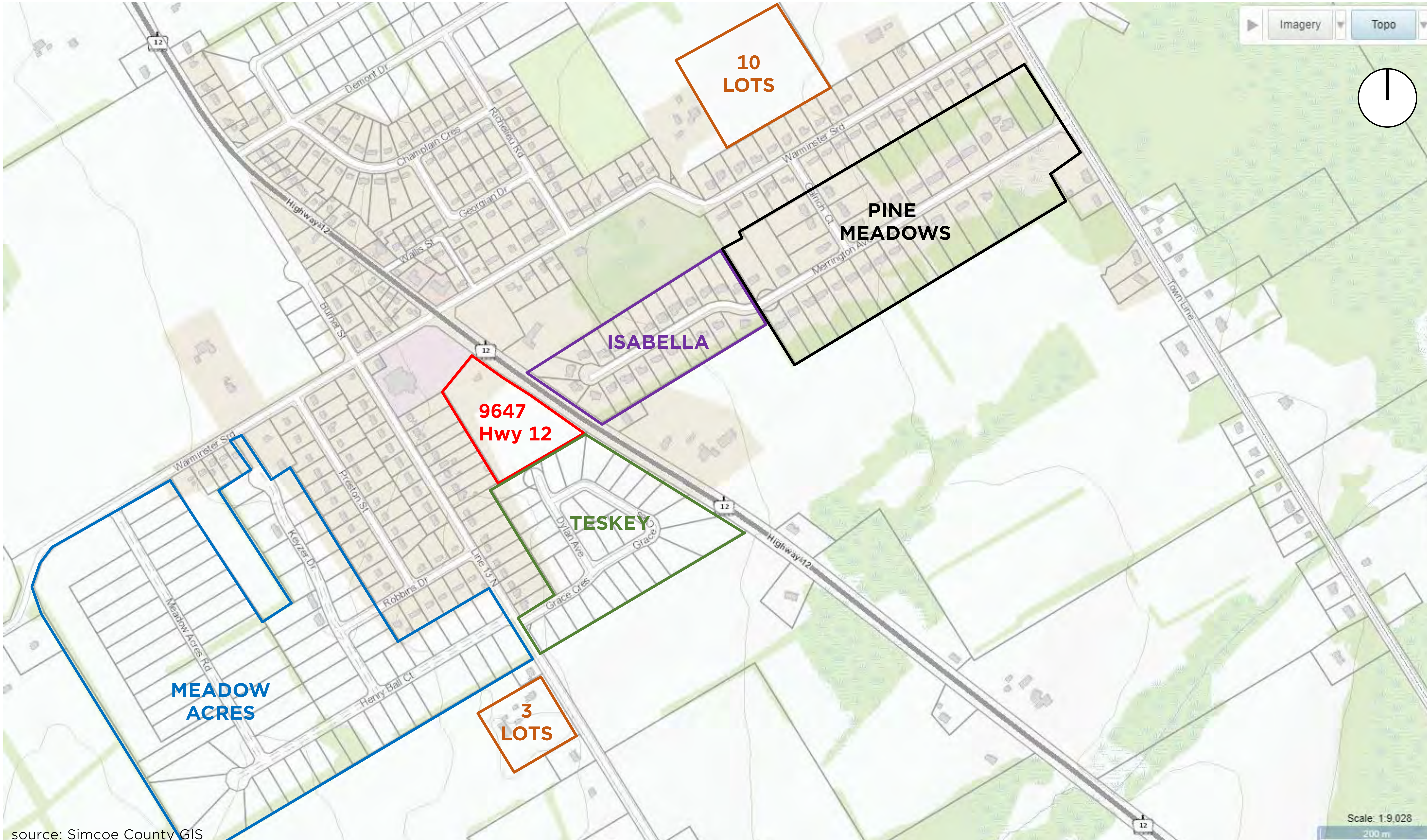
9647 HIGHWAY 12 SUBDIVISION

Figure 4: 2016 Traffic Volumes



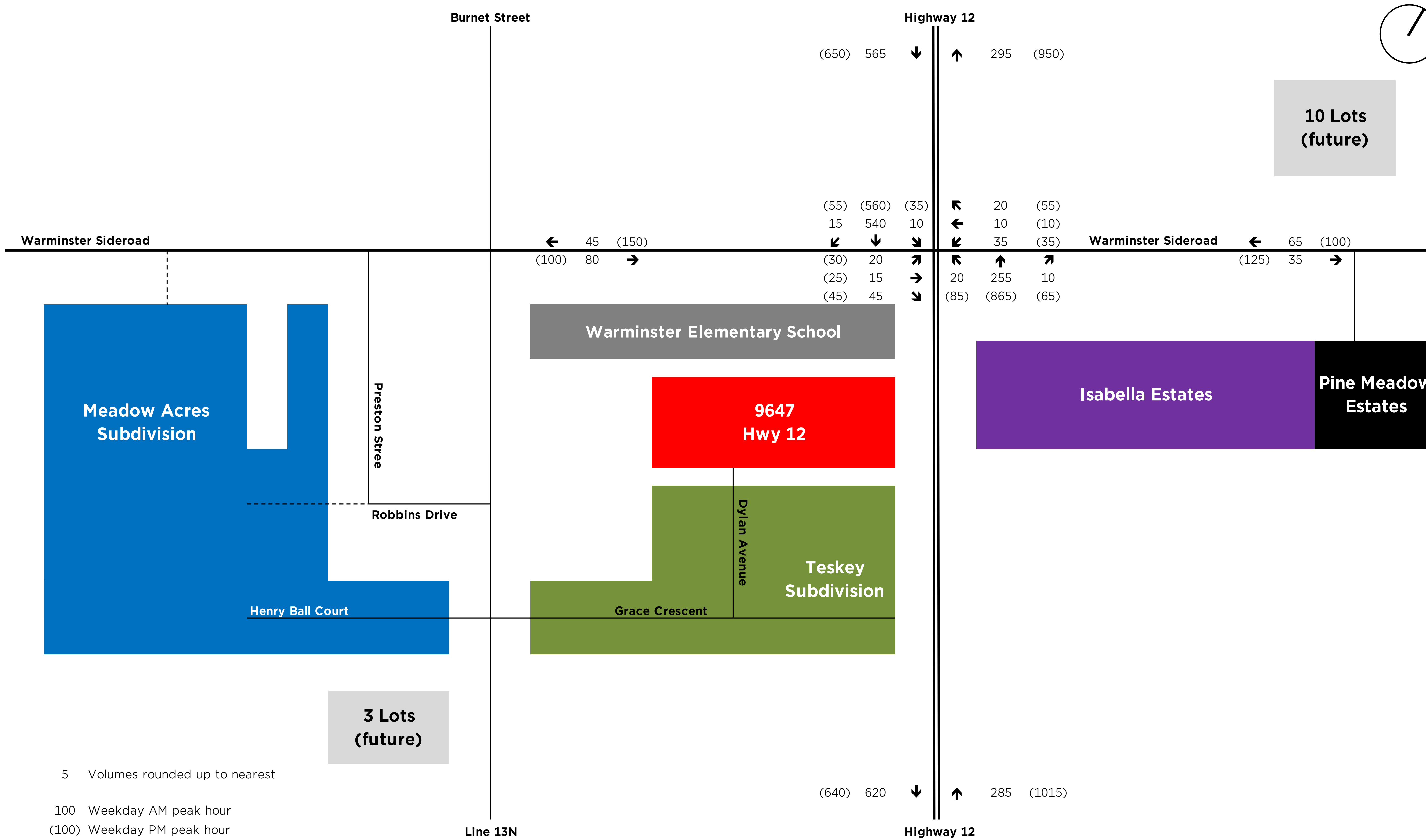
9647 HIGHWAY 12 SUBDIVISION

Figure 5: 2019 Traffic Volumes



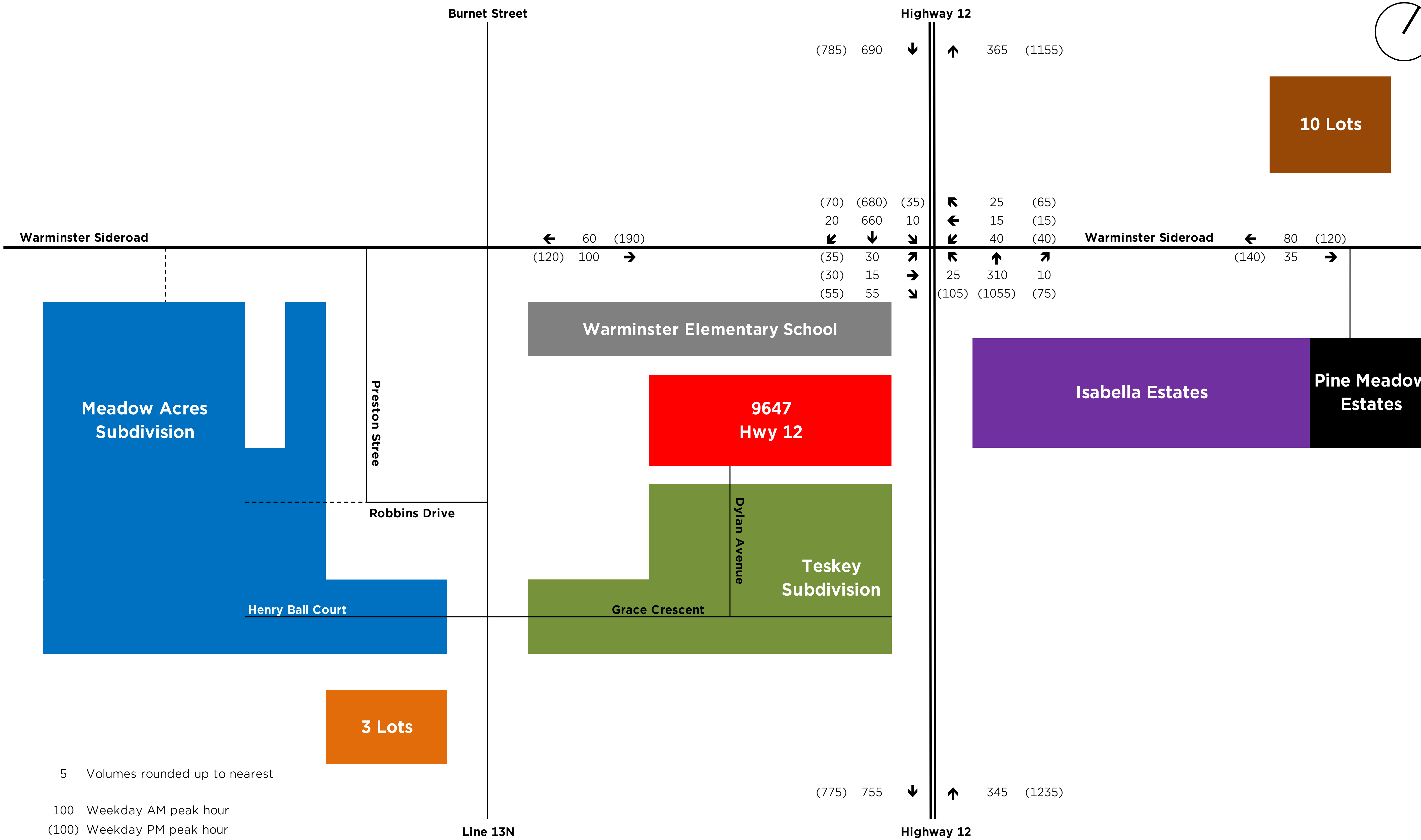
9647 HIGHWAY 12 SUBDIVISION

Figure 6: Background Developments



9647 HIGHWAY 12 SUBDIVISION

Figure 7: 2021 Traffic Volumes



9647 HIGHWAY 12 SUBDIVISION

Figure 8: 2026 Traffic Volumes

Appendix A: Traffic Counts

Ministry of Transportation
Ministère des Transports
2019

Intersection Layout Sheet

Version: 1.0 Feb 1, 2016

Contract # 9015-E-0009
Work Order # 120

Date: Nov 13 / Day: Wednesday Hrs: 7 – 9 + 11 – 14 + 15 – 18

Location: HWY 12 & WARMINISTER SDRD Ramps: /

Reg/Mun: CR Town/City: Coldwater Area:

File Name: 0194800000 Device: Gretch / Jamar Unit # 22 / Interval 1: AM / NN / PM

Observer: Vadim Potiyenko Weather: Clear / Clear Road Condition: Dry / Dry

LHRS & O/S: 19480 0.00

GPS: G-Star IV

Datum: WGS 84 Y / N

Lat: 44.639911

Long: -79.545029

Comments:

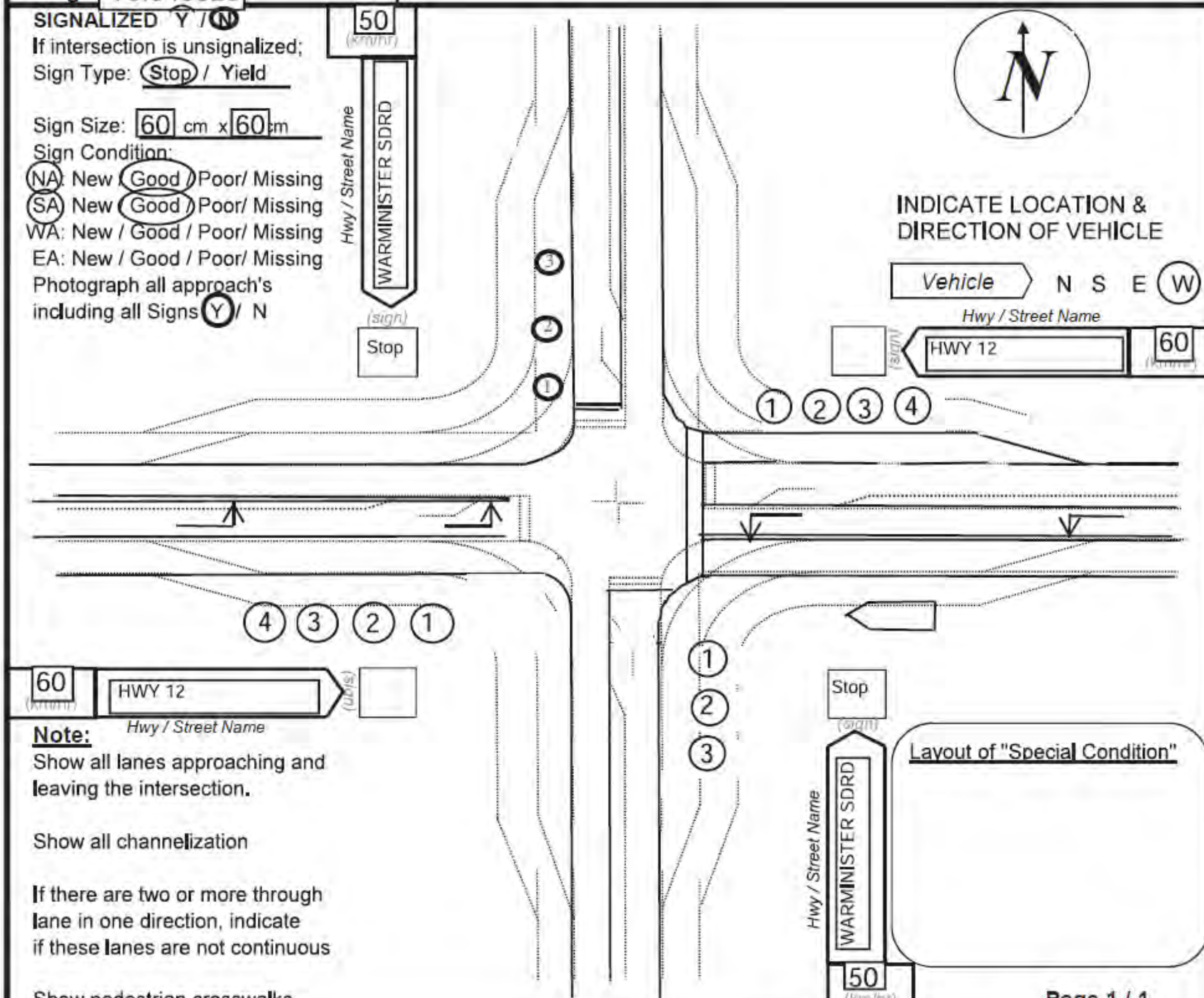
SIGNALIZED Y / N

If intersection is unsignalized;
Sign Type: Stop / Yield

Sign Size: 60 cm x 60 cm

Sign Condition:
NA: New / Good / Poor/ Missing
SA: New / Good / Poor/ Missing
WA: New / Good / Poor/ Missing
EA: New / Good / Poor/ Missing

Photograph all approach's including all Signs Y / N



Note:
Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continuous

Show pedestrian crosswalks

Layout of "Special Condition"

Page 1 / 1

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement Total Count and Peak Summary Report

Description: Hwy 12 @ Warminster Sdrd

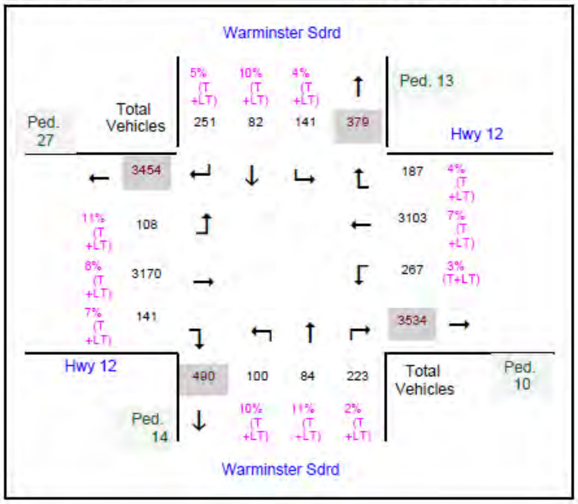
Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12

Start Date: 13-Nov-2019 (Wed) **I/C Side:** **LHRS:** 19480

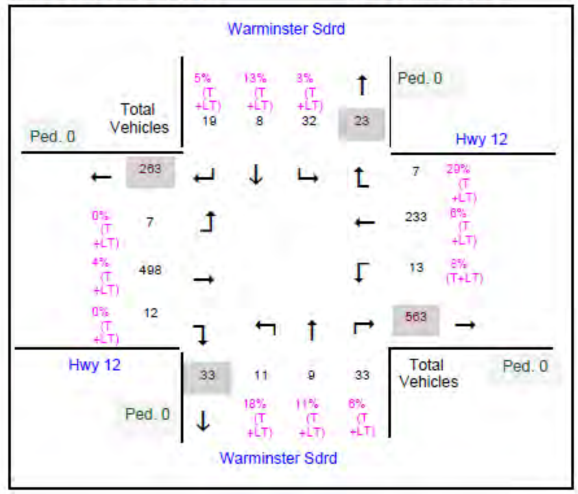
End Date: 13-Nov-2019 (Wed) **Int. Type:** Four Leg **Offset:** 0

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

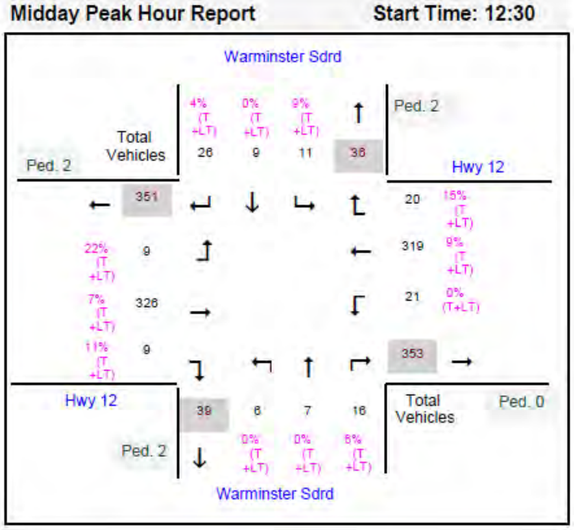
Total Count **Number of hours: 8**



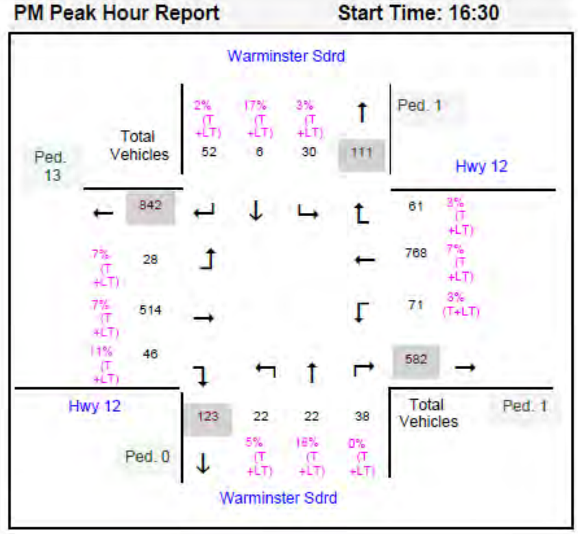
AM Peak Hour Report **Start Time: 07:15**



Midday Peak Hour Report **Start Time: 12:30**



PM Peak Hour Report **Start Time: 16:30**



Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement 15 Minute Report

Description: Hwy 12 @ Warminster Sdrd

Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12

Start Date: 13-Nov-2019 (Wed) **I/C Side:** **LHRS:** 19480

End Date: 13-Nov-2019 (Wed) **Int. Type:** Four Leg **Offset:** 0

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

	Major Road Approaches																										Minor Road Approaches																										
	East Hwy 12													West Hwy 12													North Warminster Sdrd													South Warminster Sdrd													
Start	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Heavy Trucks			Ped	Total
Time	←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		Veh.
Period 1																																									
07:00	7	68	2	0	1	0	0	2	0	1	0	87	0	0	2	0	0	3	0	4	4	0	1	0	0	0	0	0	0	0	1	2	5	0	0	0	0	0	0	0	185
07:15	4	51	1	0	3	0	1	1	0	0	1	94	4	0	2	0	0	6	0	0	11	0	6	0	0	0	1	0	0	0	1	4	9	0	0	0	2	0	0	0	202
07:30	0	52	0	0	1	0	0	2	0	0	1	166	3	0	4	0	0	1	0	0	3	3	3	0	0	0	0	0	0	0	3	1	13	0	0	0	0	0	1	0	257
07:45	6	41	2	0	6	0	0	1	1	0	3	109	3	0	5	0	0	1	0	0	6	3	4	0	0	0	0	0	0	0	2	3	2	0	0	0	0	1	0	0	199
08:00	2	74	2	0	1	0	0	0	1	0	2	108	2	0	2	0	0	0	0	0	11	1	5	0	0	0	0	1	1	0	3	0	7	0	0	0	0	0	1	0	224
08:15	2	57	2	0	1	0	0	2	0	0	3	103	4	0	0	0	1	2	0	1	5	0	9	1	0	0	0	0	0	0	3	0	6	0	0	0	0	0	0	0	201
08:30	12	59	0	0	6	0	0	3	0	1	0	110	3	0	2	0	0	2	0	0	3	2	1	0	0	0	0	0	0	3	1	3	7	0	0	0	1	0	0	3	215
08:45	9	52	1	0	5	0	0	1	0	0	1	105	2	0	4	0	0	4	0	2	4	5	4	0	1	0	0	2	0	3	2	1	6	0	0	0	0	0	0	3	209
Period 2																																									
11:00	10	74	3	0	2	0	0	3	0	0	0	94	1	1	6	0	0	1	0	2	4	2	4	0	0	0	0	0	0	0	1	2	4	0	0	0	0	0	0	0	212
11:15	2	45	2	1	3	0	0	2	0	0	1	67	1	0	3	1	0	3	0	0	2	1	5	0	0	1	0	0	0	0	5	1	3	0	0	0	2	0	0	0	151
11:30	2	48	5	0	4	1	0	3	0	1	0	66	1	0	4	0	0	2	0	0	3	3	3	0	0	1	0	0	0	0	0	1	9	0	0	1	0	0	0	0	157
11:45	4	61	2	0	6	0	0	4	0	2	0	54	2	0	3	0	0	1	0	1	2	4	4	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	2	148
12:00	5	65	2	1	3	0	0	0	0	0	1	77	6	0	3	0	0	1	0	1	3	5	3	0	0	0	0	0	0	0	4	2	8	1	0	0	0	0	0	0	190
12:15	8	61	4	0	7	0	0	0	0	0	1	72	2	1	5	0	0	2	0	0	1	1	9	0	0	0	0	0	1	0	2	0	5	0	0	0	1	0	0	0	183
12:30	8	69	7	0	5	0	0	0	0	0	1	87	2	0	3	1	0	4	0	1	5	1	9	0	0	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	206
12:45	1	71	2	0	8	1	0	2	1	0	1	57	3	0	2	0	0	1	0	1	2	3	10	0	0	0	0	0	0	2	3	2	3	0	0	0	0	0	0	2	173
13:00	4	75	6	0	3	0	0	0	0	0	1	78	2	1	7	0	0	0	0	0	2	3	3	1	0	0	0	0	0	0	1	1	2	0	0	1	0	0	0	0	191
13:15	8	76	2	0	9	1	0	1	0	0	4	81	1	1	2	0	0	4	0	0	1	2	3	0	0	0	0	0	0	0	1	4	8	0	0	0	0	0	0	0	209
13:30	4	58	4	0	5	0	0	2	0	0	4	78	0	0	1	0	1	5	0	0	2	1	3	0	0	0	0	0	0	0	1	1	4	0	1	0	0	0	0	0	175
13:45	5	54	2	2	3	0	0	1	0	2	0	81	3	0	6	0	0	2	0	0	5	4	5	0	0	0	0	0	0	2	2	0	4	0	0	0	0	0	0	4	179
Period 3																																									
15:00	6	83	6	0	7	0	0	3	0	1	6	87	6	0	3	0	0	2	0	0	2	0	10	1	0	0	0	0	0	0	4	3	6	0	0	0	0	0	0	0	235
15:15	10	103	7	0	3	0	0	2	0	0	5	81	4	1	3	0	0	2	3	0	0	6	15	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	251

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement 15 Minute Report

Description: Hwy 12 @ Warminster Sdrd

Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12

Start Date: 13-Nov-2019 (Wed) **I/C Side:** **LHRS:** 19480

End Date: 13-Nov-2019 (Wed) **Int. Type:** Four Leg **Offset:** 0

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

	Major Road Approaches																			
	East Hwy 12										West Hwy 12									
Start	Cars			Trucks			Long Trucks				Cars			Trucks			Long Trucks			
Time	←	↑	→	←	↑	→	←	↑	→	Ped	←	↑	→	←	↑	→	←	↑	→	Ped
15:30	4	88	11	1	7	0	0	3	0	0	4	76	5	0	5	0	1	3	0	0
15:45	7	108	6	0	4	0	0	0	0	0	5	80	6	1	5	0	0	0	0	0
16:00	9	111	12	0	2	0	0	0	0	0	4	77	3	0	1	0	0	4	0	1
16:15	11	142	5	0	8	0	0	1	0	0	3	108	2	0	3	0	1	2	0	0
16:30	12	170	6	2	19	1	0	5	0	0	4	112	10	0	10	1	0	4	0	1
16:45	23	191	24	0	14	0	0	3	0	0	9	146	15	2	9	3	0	1	1	8
17:00	12	153	12	0	9	0	0	1	0	1	6	124	5	0	4	0	0	4	0	3
17:15	22	202	17	0	1	1	0	0	0	0	7	98	11	0	2	0	0	0	0	1
17:30	17	139	8	0	4	0	0	1	0	1	7	90	4	0	2	0	0	0	0	0
17:45	23	192	14	0	1	0	0	0	0	0	11	130	15	0	6	0	0	1	0	0

	Minor Road Approaches																				
	North Warminster Sdrd										South Warminster Sdrd										
Start	Cars			Trucks			Long Trucks				Cars			Trucks			Heavy Trucks				Total
Time	←	↑	→	←	↑	→	←	↑	→	Ped	←	↑	→	←	↑	→	←	↑	→	Ped	Veh.
15:30	4	1	13	0	1	0	0	0	1	0	7	10	16	0	0	0	1	2	0	0	264
15:45	3	0	10	0	0	0	0	1	2	0	7	2	17	0	0	0	0	0	0	0	264
16:00	4	5	8	0	0	0	0	1	0	0	2	3	8	0	1	0	0	0	0	0	255
16:15	2	0	13	0	0	1	0	0	1	0	1	2	2	0	0	0	0	0	0	0	308
16:30	6	0	12	1	0	0	0	0	0	0	4	3	12	0	0	0	1	0	0	0	395
16:45	13	2	24	0	0	0	0	0	0	0	1	8	11	0	0	0	0	0	0	0	500
17:00	3	2	2	0	1	0	0	0	0	1	7	2	9	0	1	0	0	0	0	0	357
17:15	7	1	13	0	0	0	0	0	1	0	9	5	6	0	2	0	0	1	0	0	406
17:30	3	1	4	0	0	1	0	0	0	0	2	3	6	0	0	0	0	0	0	0	292
17:45	10	12	21	0	0	0	0	0	0	0	5	6	16	1	0	0	0	0	0	0	464

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Traffic Signal Warrant

Description: Hwy 12 @ Warminster Sdrd
Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12
Start Date: 13-Nov-2019 (Wed) **I/C Side:** **LHRS:** 19480
End Date: 13-Nov-2019 **Intersection Type:** Four Leg **Offset:** 0
Schedule Summary: Tuesday, Wednesday, Thursday AM 07:00-09:00, Midday 11:00-14:00, PM 15:00-18:00
Default as defined in 2016 Provincial Data Collection Contract

Intersection Configuration:

MAJOR ROADS

Approach	Name	Channel Right	Pattern
E	Hwy 12	☐	C
W	Hwy 12	☐	C

☐ 2 or more approach Lanes

MINOR ROADS

Approach	Name	Channel Right	Pattern
N	Warminster Sdrd	☐	UNCL
	Ramps		
S	Warminster Sdrd	☐	UNCL
	Ramps		

☐ 2 or more approach Lanes

Intersection Type: Four Leg
Traffic Control: Two Way Stop
Flow Condition: Restricted

Justification 1 - Minimum Vehicle Volume:

Calculated using raw data

1A: All approach lanes:
1B: Minor road approaches:

	1A		1B	
	Min. Req.	%	Min. Req.	%
	720	100	170	100
	576	80	136	80

	Major Road Approaches						Minor Road Approaches						1A		1B	
	East Approach			West Approach			North Approach			South Approach						
Time	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱	Total	%	Total	%
07:00	18	229	6	5	480	10	25	6	14	9	11	30	843	100	95	56
08:00	25	261	6	7	442	11	24	12	20	10	4	27	849	100	97	57
11:00	19	255	13	2	304	6	11	10	18	8	4	18	668	80	69	41
12:00	23	291	17	5	314	14	11	10	33	12	4	18	752	100	88	52
13:00	23	287	15	12	345	6	11	10	14	5	7	19	754	100	66	39
15:00	28	411	30	23	347	24	10	9	51	23	17	41	1014	100	151	80
16:00	57	666	48	23	477	35	26	8	59	9	17	33	1458	100	152	80
17:00	74	703	52	31	461	35	23	17	42	24	20	37	1519	100	163	80
TotalsTM	267	3103	187	108	3170	141	141	82	251	100	84	223	7857	780	881	485
Approach			3557			3419			474			407	Section %	98	Section %	61

Justification 1 Minimum Compliance: 61 %

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Traffic Signal Warrant

Description: Hwy 12 @ Warminster Sdrd

Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12

Start Date: **I/C Side:** **LHRS:** 19480

End Date: **Intersection Type:** Four Leg **Offset:** 0

Schedule Summary: Tuesday, Wednesday, Thursday AM 07:00-09:00, Midday 11:00-14:00, PM 15:00-18:00
Default as defined in 2016 Provincial Data Collection Contract

Justification 2 - Delay to Cross Traffic:

Calculated using raw data

2A: Major road approaches:

2B: Minor road approaches:

	2A		**2B**	
	Min. Req.	**%**	**Min. Req.**	**%**
	720	**100**	**75**	**100**
	576	**80**	**60**	**80**

	Major Road Approaches						Minor Road Approaches							2A		2B	
	East Approach			West Approach			North Approach			South Approach							
Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Ped*	Total	%	Total	%
07:00	18	229	6	5	480	10	25	6	14	9	11	30	0	748	100	50	67
08:00	25	261	6	7	442	11	24	12	20	10	4	27	0	752	100	50	67
11:00	19	255	13	2	304	6	11	10	18	8	4	18	0	599	80	35	47
12:00	23	291	17	5	314	14	11	10	33	12	4	18	0	664	80	36	48
13:00	23	287	15	12	345	6	11	10	14	5	7	19	0	688	80	28	37
15:00	28	411	30	23	347	24	10	9	51	23	17	41	0	863	100	51	68
16:00	57	666	48	23	477	35	26	8	59	9	17	33	0	1306	100	62	80
17:00	74	703	52	31	461	35	23	17	42	24	20	37	0	1356	100	73	80
Totals: TM	267	3103	187	108	3170	141	141	82	251	100	84	223	0	6976	740	385	494
Approach			3557			3419			474			407		Section %	92	Section %	62

* Pedestrians crossing major road

Justification 2 Minimum Compliance: 62 %

Justification 3 - Volume / Delay Combination:

Calculated using raw data

	Minimum Compliance (%)	
Justification 1 - Minimum Vehicle Volume:	61	%
Justification 2 - Delay to Cross Traffic:	62	%
Justification 3 Minimum Compliance:	61	%

Ontario
Ministry of Transportation

TVIS II - Traffic Volume Information System

Traffic Signal Warrant

Description: Hwy 12 @ Warminster Sdrd
Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12
Start Date: **I/C Side:** **LHRS:** 19480
End Date: **Intersection Type:** Four Leg **Offset:** 0
Schedule Summary: Tuesday, Wednesday, Thursday AM 07:00-09:00, Midday 11:00-14:00, PM 15:00-18:00
Default as defined in 2016 Provincial Data Collection Contract

Justification 5 - Collision Experience

Preceding Months	Number of Collisions **	%
Warrant Threshold *	5	100
1 - 12	0	0
13 - 24	0	0
25 - 36	0	0
Totals	0	0

Justification 5 Compliance: 0 %

* Per twelve-month period.

** Include only collisions that are susceptible to correction

Calculation Options - Use raw data

Factors for major road approaches

East Approach Factor 1.0
West Approach Factor 1.0

Factors for minor road approaches

North Approach Factor 1.0
South Approach Factor 1.0

Factor for pedestrian crossing major road 1.0

CONCLUSION: TRAFFIC SIGNALS ARE NOT WARRANTED

Ontario

INTERSECTION LAYOUT SHEET

Date: Apr. 29 Day: Fri Request # 068 Observer(s) Golant

Gretch Code (LHRS O/S): 1948000000 Ramp # n/a

Hwy # 12 Location WARMINSTER SDRD

Reg/Mun Simcoe Town/City Warminster

Comments

Segment 1 - AM or PM (Please Circle **ONE**) Weather sunny

DATASETS

For office use only:

Emt File

AM Peak

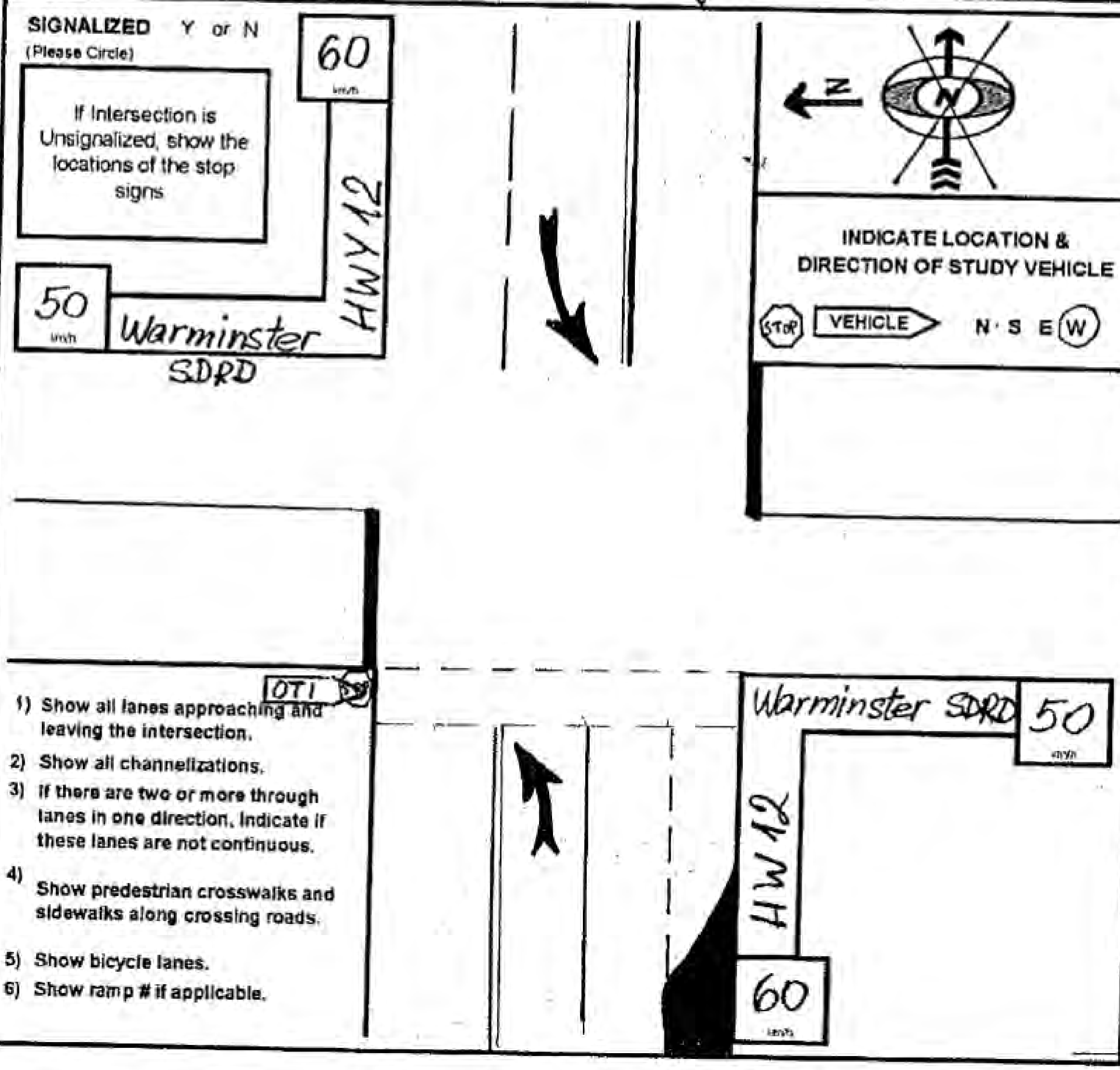
PM Peak

Processed by

SIGNALIZED Y or N

(Please Circle)

If Intersection is Unsignalized, show the locations of the stop signs



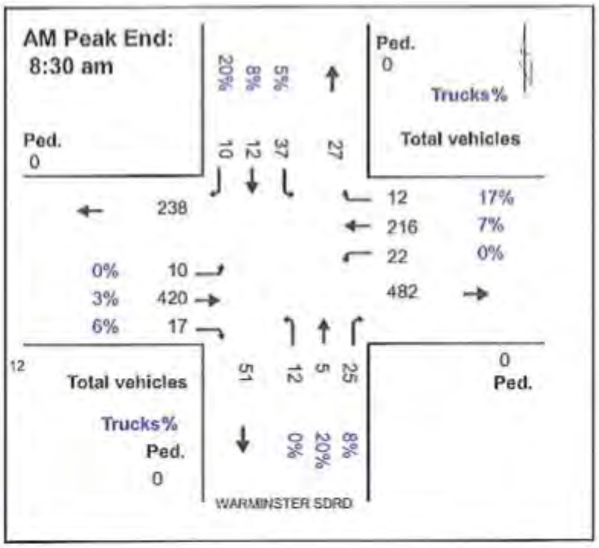
1) Show all lanes approaching and leaving the intersection.
2) Show all channelizations.
3) If there are two or more through lanes in one direction, indicate if these lanes are not continuous.
4) Show pedestrian crosswalks and sidewalks along crossing roads.
5) Show bicycle lanes.
6) Show ramp # if applicable.

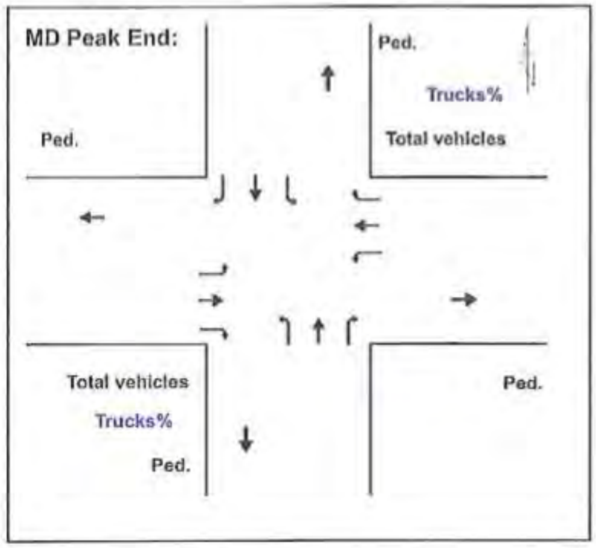
Ontario

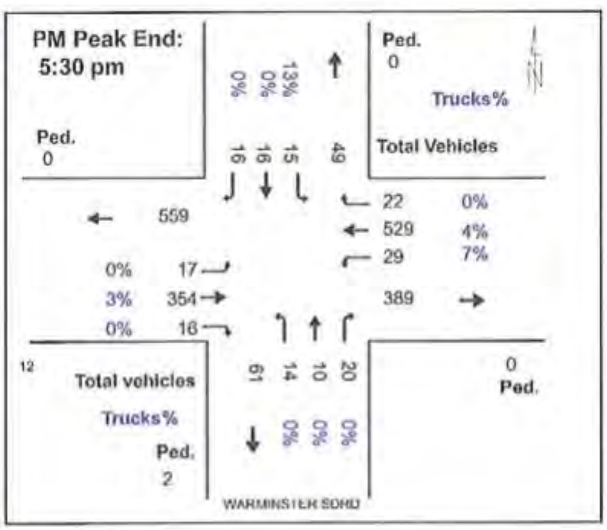
HWY 12 @ WARMINSTER SDRD

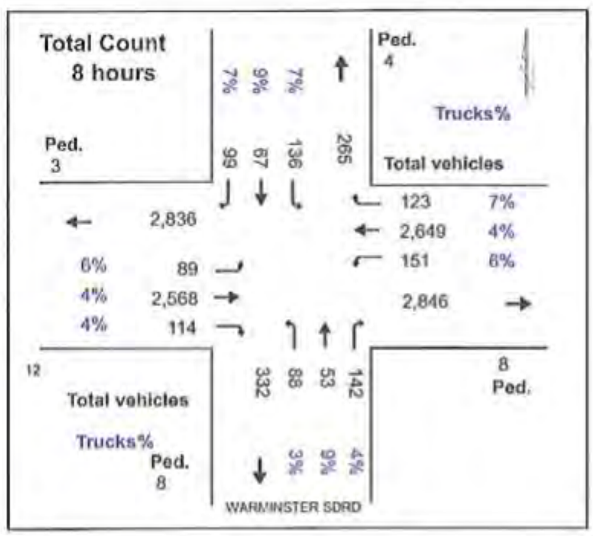
Central

Intersection ID:194800000 | Count Day: Friday | Count Date: 29-Apr-2016









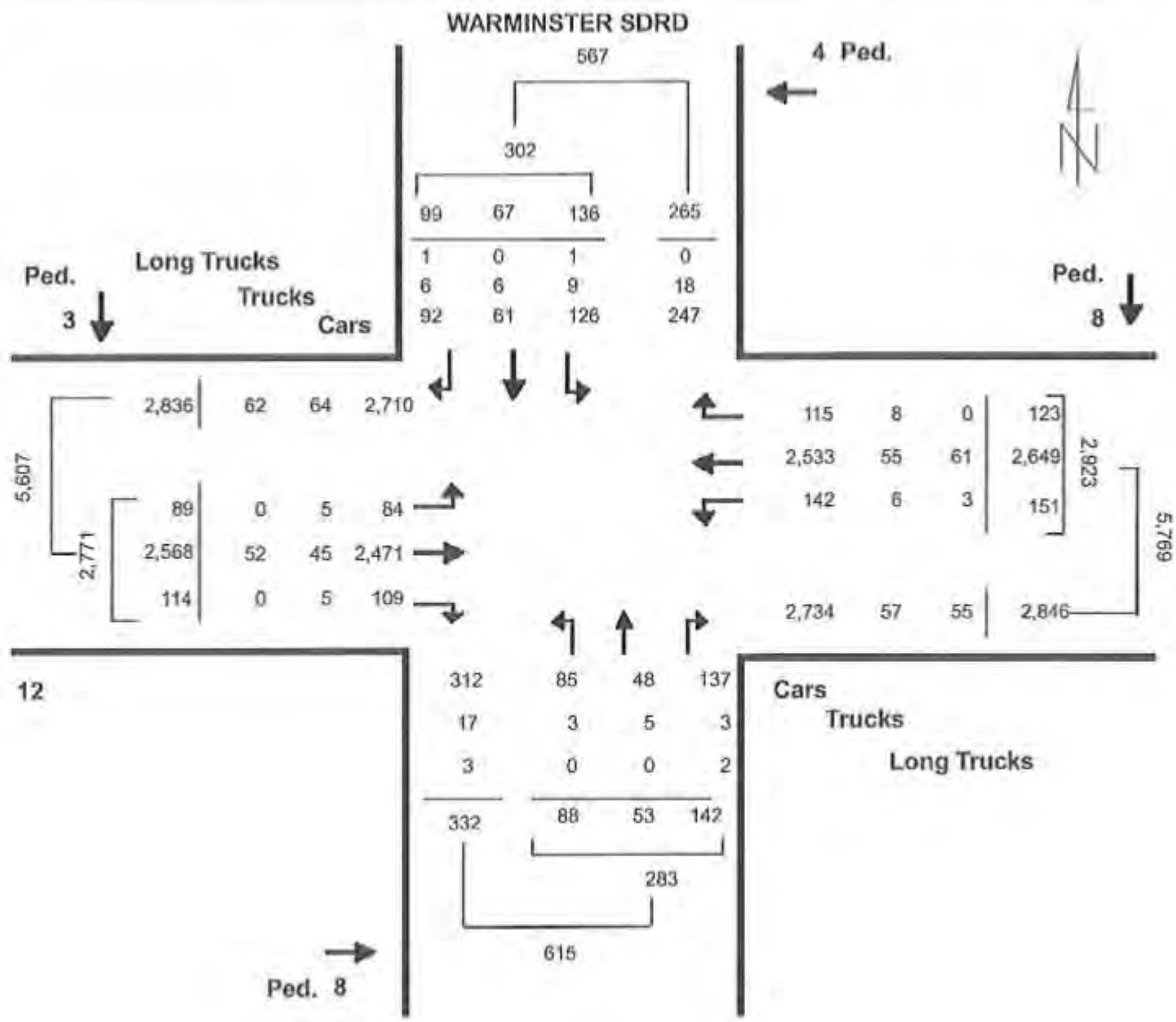
Traffic
Engineering
Software

COUNT TOTAL

HWY 12 @ WARMINSTER SDRD

Central

Intersection ID:194800000 **Date: 29-Apr-2016**



15 MIN REPORT

Intersection ID:194800000 **HWY 12 @ WARMINSTER SDRD** **Municipality: Central** **Date: 29-Apr-2016**

Time	NORTH APPROACH Cars			Trucks			Heavies			Ped	EAST APPROACH Cars			Trucks			Heavies			Ped	SOUTH APPROACH Cars			Trucks			Heavies			Ped	WEST APPROACH Cars			Trucks			Heavies			Ped	Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Period1																																									
7:15	5	1	3	0	0	0	0	0	0	0	0	41	4	0	1	0	0	2	0	0	0	0	4	0	1	0	0	0	0	0	3	58	0	0	2	0	0	0	0	0	125
7:30	6	3	5	1	1	0	0	0	0	0	5	47	2	0	2	0	1	1	0	0	2	1	7	1	0	0	0	0	0	0	1	77	0	2	3	0	0	1	0	0	169
7:45	6	5	0	0	0	1	0	0	0	0	6	47	2	0	1	0	0	3	0	0	1	1	7	0	1	0	0	0	0	0	3	129	4	0	1	0	0	2	0	0	220
8:00	8	2	4	0	1	0	0	0	0	0	3	53	4	0	1	1	0	1	0	0	3	0	7	0	0	0	0	0	0	0	2	92	6	0	1	0	0	1	0	0	190
8:15	12	3	3	0	0	1	0	0	0	0	5	37	4	0	2	0	0	1	0	0	6	3	5	0	0	1	0	0	0	0	4	90	2	0	2	0	0	1	0	0	182
8:30	9	1	1	2	0	0	0	0	0	0	8	63	0	0	4	1	0	3	0	0	2	0	4	0	0	1	0	0	0	0	1	97	4	0	3	1	0	1	0	0	206
8:45	2	2	0	1	0	0	0	0	0	0	1	44	2	0	2	0	0	1	0	0	1	1	4	0	0	0	0	0	0	0	2	89	4	1	0	0	0	3	0	0	160
9:00	3	4	3	1	1	0	0	0	0	0	6	40	2	1	5	1	0	2	0	0	3	2	5	0	0	0	0	0	0	0	0	73	3	0	1	1	0	1	0	0	158
Period2																																									
13:15	6	0	2	0	0	0	0	0	0	0	1	67	5	0	1	1	1	7	0	0	1	0	5	0	0	0	0	0	1	0	4	67	3	0	2	0	0	1	0	0	175
13:30	5	1	2	0	0	0	0	0	0	0	4	80	3	0	2	0	0	1	0	0	3	1	6	0	0	0	0	0	0	0	1	59	4	0	0	0	0	3	0	0	175
13:45	3	0	6	0	0	0	0	0	0	0	8	54	1	0	2	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	3	76	4	0	3	0	0	3	0	0	169
14:00	3	2	2	0	0	0	0	0	0	0	5	67	2	0	1	0	0	1	0	0	5	1	6	0	0	0	0	0	0	0	1	56	1	0	1	0	0	3	0	0	157
14:15	2	1	2	0	0	0	0	0	0	0	2	77	3	0	1	0	0	0	0	0	3	1	1	0	0	1	0	0	0	0	4	59	1	0	3	0	0	3	0	0	164
14:30	3	2	3	1	0	0	0	0	0	0	5	69	1	0	0	0	0	3	0	0	4	0	2	0	0	0	0	0	1	0	0	68	3	0	2	0	0	3	0	0	170
14:45	2	1	2	0	0	0	0	0	0	0	2	75	4	1	2	1	0	3	0	0	1	0	0	0	0	0	0	0	0	0	2	74	1	0	0	0	0	1	0	0	172
15:00	1	1	6	1	1	1	0	0	0	0	4	89	3	0	5	1	0	2	0	0	2	0	1	0	0	0	0	0	0	0	4	69	6	0	1	1	0	6	0	0	205
15:15	2	2	4	0	0	0	0	0	0	0	5	87	0	0	2	0	0	2	0	1	0	2	3	0	0	0	0	0	0	1	2	73	6	0	1	0	0	2	0	0	195
15:30	6	1	5	1	0	0	0	0	0	0	5	97	3	0	1	0	0	1	0	0	4	4	1	0	0	0	0	0	0	1	1	72	8	0	1	1	0	2	0	1	216
15:45	1	2	4	0	0	0	0	0	0	2	4	98	6	1	0	0	0	1	0	2	10	4	9	0	1	0	0	0	0	0	2	79	7	1	1	0	0	1	0	2	238
16:00	5	0	1	0	2	2	0	0	0	1	2	66	2	0	0	1	0	3	0	5	1	4	5	0	0	0	0	0	0	1	1	68	5	0	0	1	0	1	0	0	177
16:15	4	1	0	0	0	0	0	0	0	0	8	102	5	1	0	0	0	2	0	0	3	1	2	1	0	0	0	0	0	0	4	90	0	1	3	0	0	2	0	0	230
16:30	1	0	4	0	0	0	0	0	0	0	6	112	7	0	0	0	0	2	0	0	0	2	7	0	1	0	0	0	0	2	5	76	2	0	4	0	0	1	0	0	232
16:45	7	5	5	1	0	0	0	0	0	0	6	130	6	1	5	0	0	1	0	0	2	4	8	0	0	0	0	0	0	2	4	77	2	0	2	0	0	1	0	0	269
17:00	4	5	2	0	0	0	1	0	0	0	6	124	6	0	4	0	0	4	0	0	5	2	3	0	0	0	0	0	0	0	8	82	5	0	1	0	0	1	0	0	263
17:15	2	3	4	0	0	0	0	0	0	0	4	132	7	0	3	0	0	3	0	0	4	3	3	0	0	0	0	0	0	0	2	89	6	0	3	0	0	2	0	0	270
17:30	0	3	5	0	0	0	0	0	0	0	10	120	3	1	2	0	1	1	0	0	3	1	6	0	0	0	0	0	0	0	3	94	3	0	1	0	0	1	0	0	258
17:45	6	2	3	0	0	0	0	0	0	0	8	106	5	0	1	0	0	1	0	0	4	2	6	0	0	0	0	0	0	0	2	82	3	0	0	0	0	1	0	0	232
18:00	4	0	2	0	0	0	0	0	0	0	3	94	3	0	3	0	0	1	0	0	5	3	2	0	0	0	0	0	0	0	1	91	4	0	2	0	0	0	0	0	218
18:15	1	2	4	0	0	0	0	0	0	0	2	94	5	0	1	0	0	2	0	0	0	1	6	0	1	0	0	0	0	0	1	73	5	0	0	0	0	1	0	0	199
18:30	0	3	0	0	0	1	0	0	1	0	3	67	4	0	0	1	0	1	0	0	5	2	6	0	0	0	0	0	0	0	2	60	4	0	0	0	0	2	0	0	162
18:45	3	2	1	0	0	0	0	0	0	0	2	83	6	0	1	0	0	3	0	0	1	0	3	0	0	0	0	0	0	1	5	67	0	0	0	0	0	1	0	0	179
19:00	4	1	4	0	0	0	0	0	0	1	3	71	5	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	6	65	3	0	1	0	0	0	0	0	167

Ministry of Transportation - Traffic Signal Warrants

Municipality: Central
Intersection: HWY 12 @ WARMINSTER SDRD
Major Road: HWY 12
Direction: East-West
Minor Road: WARMINSTER SDRD

Warrant 1 - Minimum Vehicular Volume

A - All Approaches

	Min. Req.	Min. Req.	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00	Total
Volume	720	576	704	706	676	711	809	990	978	705	6279
Warrant %	100	80	80	80	80	80	100	100	100	80	700

Controlling Sectional % 88%

B - Minor Street Both Approaches

	Min. Req.	Min. Req.	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00	Total
Volume	170	136	88	87	65	47	86	81	76	55	585
Warrant %	100	80	52	51	38	28	51	48	45	32	345

Controlling Sectional % 43%

WARRANT 1 HAS BEEN SATISFIED 43%

Warrant 2 - Delay To Cross Traffic

A - Major Street Both Approaches

	Min. Req.	Min. Req.	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00	Total
Volume	720	576	616	619	611	664	723	909	902	650	5694
Warrant %	100	80	80	80	80	80	100	100	100	80	700

Controlling Sectional % 88%

B - Traffic Crossing Major Street

	Min. Req.	Min. Req.	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00	Total
Volume	75	60	46	53	30	26	56	40	37	24	312
Warrant %	100	80	61	71	40	35	75	53	49	32	416

Controlling Sectional % 52%

WARRANT 2 HAS BEEN SATISFIED 52%

Warrant 3 - Accident Experience

A Reportable accident within a 12 month period averaged over 36 consecutive months susceptible to correction by a traffic signal was 0

Based on the minimum warrant value of 5 this section has been satisfied 0%

B Adequate trial of less restrictive remedies requirement was satisfied 100%

C Either Warrant #1 or #2 being satisfied by at least 80% was satisfied 0%

WARRANT 3 HAS BEEN SATISFIED 0%

Warrant 4 - Combination Warrant

Warrant 1 satisfied 80% or more 0%

Warrant 2 satisfied 80% or more 0%

Warrant 3 satisfied 80% or more 0%

WARRANT 4 HAS BEEN SATISFIED 0%

CONCLUSION: TRAFFIC SIGNALS ARE NOT WARRANTED

Appendix B:
2021 Operations

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	15	40	35	10	20	20	255	10	10	540	15
Future Volume (Veh/h)	20	15	40	35	10	20	20	255	10	10	540	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	16	42	37	11	21	21	268	11	11	568	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	934	919	576	950	916	268	584			279		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	934	919	576	950	916	268	584			279		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	94	92	82	96	97	98			99		
cM capacity (veh/h)	226	263	517	206	264	771	991			1284		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	79	69	21	268	11	11	584
Volume Left	21	37	21	0	0	11	0
Volume Right	42	21	0	0	11	0	16
cSH	336	277	991	1700	1700	1284	1700
Volume to Capacity	0.23	0.25	0.02	0.16	0.01	0.01	0.34
Queue Length 95th (m)	6.8	7.3	0.5	0.0	0.0	0.2	0.0
Control Delay (s)	19.0	22.2	8.7	0.0	0.0	7.8	0.0
Lane LOS	C	C	A			A	
Approach Delay (s)	19.0	22.2	0.6			0.1	
Approach LOS	C	C					

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	25	45	35	10	55	80	865	65	35	560	55
Future Volume (Veh/h)	30	25	45	35	10	55	80	865	65	35	560	55
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	26	47	37	11	58	84	911	68	37	589	58
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1834	1839	618	1802	1800	911	647			979		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1834	1839	618	1802	1800	911	647			979		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	16	60	90	0	84	83	91			95		
cM capacity (veh/h)	38	65	489	35	69	332	939			705		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	105	106	84	911	68	37	647
Volume Left	32	37	84	0	0	37	0
Volume Right	47	58	0	0	68	0	58
cSH	79	76	939	1700	1700	705	1700
Volume to Capacity	1.34	1.40	0.09	0.54	0.04	0.05	0.38
Queue Length 95th (m)	61.9	64.5	2.2	0.0	0.0	1.3	0.0
Control Delay (s)	309.5	339.0	9.2	0.0	0.0	10.4	0.0
Lane LOS	F	F	A			B	
Approach Delay (s)	309.5	339.0	0.7			0.6	
Approach LOS	F	F					

Intersection Summary			
Average Delay	35.5		
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	15	40	35	10	20	20	255	10	10	540	15
Future Volume (vph)	20	15	40	35	10	20	20	255	10	10	540	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.93			0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1725			1759		1789	1883	1601	1789	1876	
Flt Permitted		0.89			0.79		0.41	1.00	1.00	0.59	1.00	
Satd. Flow (perm)		1550			1426		772	1883	1601	1119	1876	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	16	42	37	11	21	21	268	11	11	568	16
RTOR Reduction (vph)	0	37	0	0	19	0	0	0	5	0	2	0
Lane Group Flow (vph)	0	42	0	0	50	0	21	268	6	11	582	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		4.2			4.2		22.9	22.9	22.9	22.9	22.9	
Effective Green, g (s)		4.2			4.2		22.9	22.9	22.9	22.9	22.9	
Actuated g/C Ratio		0.11			0.11		0.59	0.59	0.59	0.59	0.59	
Clearance Time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		166			153		452	1102	937	655	1098	
v/s Ratio Prot								0.14			c0.31	
v/s Ratio Perm		0.03			c0.04		0.03		0.00	0.01		
v/c Ratio		0.25			0.33		0.05	0.24	0.01	0.02	0.53	
Uniform Delay, d1		16.0			16.1		3.4	3.9	3.4	3.4	4.9	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.8			1.3		0.0	0.1	0.0	0.0	0.5	
Delay (s)		16.8			17.4		3.5	4.0	3.4	3.4	5.4	
Level of Service		B			B		A	A	A	A	A	
Approach Delay (s)		16.8			17.4			4.0			5.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	25	45	35	10	55	80	865	65	35	560	55
Future Volume (vph)	30	25	45	35	10	55	80	865	65	35	560	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		2.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.94			0.93		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1743			1714		1789	1883	1601	1789	1858	
Flt Permitted		0.86			0.84		0.28	1.00	1.00	0.25	1.00	
Satd. Flow (perm)		1520			1469		535	1883	1601	464	1858	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	26	47	37	11	58	84	911	68	37	589	58
RTOR Reduction (vph)	0	41	0	0	51	0	0	0	19	0	4	0
Lane Group Flow (vph)	0	64	0	0	55	0	84	911	49	37	643	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		6.1			6.1		33.0	33.0	33.0	27.2	27.2	
Effective Green, g (s)		6.1			6.1		33.0	33.0	33.0	27.2	27.2	
Actuated g/C Ratio		0.12			0.12		0.65	0.65	0.65	0.53	0.53	
Clearance Time (s)		6.0			6.0		2.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		181			175		438	1216	1033	246	988	
v/s Ratio Prot							0.01	c0.48			0.35	
v/s Ratio Perm		c0.04			0.04		0.11		0.03	0.08		
v/c Ratio		0.35			0.31		0.19	0.75	0.05	0.15	0.65	
Uniform Delay, d1		20.7			20.6		4.3	6.2	3.3	6.1	8.6	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.2			1.0		0.2	2.6	0.0	0.3	1.5	
Delay (s)		21.9			21.6		4.5	8.8	3.3	6.4	10.1	
Level of Service		C			C		A	A	A	A	B	
Approach Delay (s)		21.9			21.6			8.1			9.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	51.1	Sum of lost time (s)	14.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Appendix C:
2021 Traffic Signal Warrants

TATHAM ENGINEERING

8-HOUR TRAFFIC SIGNAL WARRANT

Project & No.: Warminster S/R & Highway 12 321892

GENERAL INFORMATION

Analyst	Michael Cullip	**Jurisdiction/Area**	Twp of Oro-Medonte **Date** May 31,2021
Agency or Company	Tatham Engineering Limited	**East-West Street**	Warminster S/R
Analysis Period	2021 Existing	**North-South Street**	Highway 12
Flow Conditions	Free flow (rural)	**Major Street**	North-South
T Intersection	No	**Approach Lanes per Directio**	1
		Hours of Traffic Volume Data	AM & PM peaks only

Additional Comments

TRAFFIC & PEDESTRIAN VOLUMES

Hour of Data	AM Peak						PM Peak	AM + PM
Hour Ending								4
MAJOR STREET								
Northbounc right	10						65	**19**
thru	255						865	**280**
left	20						80	**25**
Southbounc right	15						55	**18**
thru	540						560	**275**
left	10						35	**11**
MINOR STREET								
Eastbound right	40						45	**21**
thru	15						25	**10**
left	20						30	**13**
Westbounc right	20						55	**19**
thru	10						10	**5**
left	35						35	**18**
PEDESTRIANS								
crossing MAJOR street								**0**
crossing MINOR street								**0**
APPROACH VOLUMES								
major	850						1660	628
minor	140						200	85
TOTAL	990						1860	713
CROSSING VOLUMES								
TOTAL	70						90	40
note 1	55						65	
note 2	15						25	
note 3	0						0	
3a	no						no	
3b	no						no	
note 4	0						0	

ACCIDENT HISTORY

Reportable accidents over the past 36 months susceptible to correction by a traffic signal.	months 1 to 12	-
	months 13 to 24	-
	months 25 to 36	-

NOTES

Traffic crossing MAJOR street defined as:

- note 1 Left turns from both minor street approaches
- note 2 The heaviest through volume from the minor street
- note 3 50% of the heavier left turn movement from the major street when both of the following are met:
  - 3a the left turn volume > 120
  - 3b the left turn volume + opposing volume > 720
- note 4 Pedestrians crossing the major street

Free Flow Conditions

- roads with operating speeds greater than or equal to 70 km/h
- normally encountered in rural areas
- may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

Restricted Flow Conditions

- roads with operating speeds less than 70 km/h
- normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

TATHAM ENGINEERING

8-HOUR TRAFFIC SIGNAL WARRANT

JUSTIFICATION 1 - MINIMUM VEHICLE VOLUME

JUSTIFICATION	GUIDANCE	AM Peak	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	PM Peak	No. of hours with compliance		Average Compliance
1A	TOTAL TRAFFIC ENTERING INTERSECTION	**990**	**713**	**713**	**713**	**713**	**713**	**713**	**1860**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 480 (1 lane approach on main OR VOL x 100 / 600 (2 or more lane approach	100%	100%	100%	100%	100%	100%	100%	100%	8	8	100%
1B	TRAFFIC ON MINOR STREET (vph) (2 way Total)	**140**	**85**	**85**	**85**	**85**	**85**	**85**	**200**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 120 (full intersection) OR VOL x 100 / 180 (tee intersection)	100%	71%	71%	71%	71%	71%	71%	100%	2	2	78%

FREE FLOW	**BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS**	**NO**
SIGNAL JUSTIFICATION 1:	**LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS**	**NO**

JUSTIFICATION 2 - DELAY TO CROSS TRAFFIC

JUSTIFICATION	GUIDANCE	AM Peak	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	PM Peak	No. of hours with compliance		Average Compliance
2A	MAIN ROAD TRAFFIC VOLUME (2 way Total)	**850**	**628**	**628**	**628**	**628**	**628**	**628**	**1660**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 480 (1 lane approach on main OR VOL x 100 / 600 (2 or more lane approach	100%	100%	100%	100%	100%	100%	100%	100%	8	8	100%
2B	CROSSING TRAFFIC (vph) (2 way Total)	**70**	**40**	**40**	**40**	**40**	**40**	**40**	**90**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 50	100%	80%	80%	80%	80%	80%	80%	100%	2	8	85%

FREE FLOW	**BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS**	**NO**
SIGNAL JUSTIFICATION 2:	**LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS**	**YES**

JUSTIFICATION 3 - COLLISION EXPERIENCE

	Preceding Months	Number of Collisions	Percent Fulfillment
A. Number of reportable collisions susceptible to prevention by a traffic signal.	1 - 12	-	-
	13 - 24	-	-
	25 - 36	-	-
	annual average	-	-
B. Adequate trial of less restrictive remedies has failed to reduce collision frequency.	☐ YES	☐ NO	n/a
C. Either Justification 1 or Justification 2 satisfied to 80% or more.	☐ YES	☐ NO	n/a
SIGNAL JUSTIFICATION 3:	**ALL OF 3A, 3B & 3C FULFILLED TO 100%?**		**NO**

JUSTIFICATION 4 - COMBINATION JUSTIFICATION

JUSTIFICATION SATISFIED 80% OR MORE				Two Justifications Satisfied 80% or more
Justification 1	-	Minimum Vehicle Volume	NO	**NO**
Justification 2	-	Delay to Cross Traffic	YES	
Justification 3	-	Collision Experience	-	

JUSTIFICATION SUMMARY

ARE TRAFFFIC SIGNALS JUSTIFIED FOR THE INTERSECTION IN QUESTION?	**NO**

TATHAM ENGINEERING

8-HOUR TRAFFIC SIGNAL WARRANT

Project & No.: Warminster S/R & Highway 12 321892

GENERAL INFORMATION

Analyst	Michael Cullip	**Jurisdiction/Area**	Twp of Oro-Medonte **Date** May 31,2021
Agency or Company	Tatham Engineering Limited	**East-West Street**	Warminster S/R
Analysis Period	2021 Existing	**North-South Street**	Highway 12
Flow Conditions	Restricted flow (urban)	**Major Street**	North-South
T Intersection	No	**Approach Lanes per Directio**	1
		Hours of Traffic Volume Data	AM & PM peaks only
Additional Comments			

TRAFFIC & PEDESTRIAN VOLUMES

Hour of Data	AM Peak						PM Peak	AM + PM
Hour Ending								4
MAJOR STREET								
Northbounc right	10						65	**19**
thru	255						865	**280**
left	20						80	**25**
Southbounc right	15						55	**18**
thru	540						560	**275**
left	10						35	**11**
MINOR STREET								
Eastbound right	40						45	**21**
thru	15						25	**10**
left	20						30	**13**
Westbounc right	20						55	**19**
thru	10						10	**5**
left	35						35	**18**
PEDESTRIANS								
crossing MAJOR street								**0**
crossing MINOR street								**0**
APPROACH VOLUMES								
major	850						1660	628
minor	140						200	85
TOTAL	990						1860	713
CROSSING VOLUMES								
TOTAL	70						90	40
note 1	55						65	
note 2	15						25	
note 3	0						0	
3a	no						no	
3b	no						no	
note 4	0						0	

ACCIDENT HISTORY

Reportable accidents over the past 36 months susceptible to correction by a traffic signal.	months 1 to 12	-
	months 13 to 24	-
	months 25 to 36	-

NOTES

Traffic crossing MAJOR street defined as:

note 1 Left turns from both minor street approaches

note 2 The heaviest through volume from the minor street

note 3 50% of the heavier left turn movement from the major street when both of the following are met:

3a the left turn volume > 120

3b the left turn volume + opposing volume > 720

note 4 Pedestrians crossing the major street

Free Flow Conditions

- roads with operating speeds greater than or equal to 70 km/h
- normally encountered in rural areas
- may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

Restricted Flow Conditions

- roads with operating speeds less than 70 km/h
- normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

TATHAM ENGINEERING

8-HOUR TRAFFIC SIGNAL WARRANT

JUSTIFICATION 1 - MINIMUM VEHICLE VOLUME

JUSTIFICATION	GUIDANCE	AM Peak	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	PM Peak	No. of hours with compliance		Average Compliance
1A	TOTAL TRAFFIC ENTERING INTERSECTION	**990**	**713**	**713**	**713**	**713**	**713**	**713**	**1860**	100%	80%+	-
1A	COMPLIANCE % VOL x 100 / 720 (1 lane approach on main OR VOL x 100 / 900 (2 or more lane approach	100%	99%	99%	99%	99%	99%	99%	100%	2	8	99%
1B	TRAFFIC ON MINOR STREET (vph) (2 way Total)	**140**	**85**	**85**	**85**	**85**	**85**	**85**	**200**	100%	80%+	-
1B	COMPLIANCE % VOL x 100 / 170 (full intersection) OR VOL x 100 / 255 (tee intersection)	82%	50%	50%	50%	50%	50%	50%	100%	1	2	60%
RESTRICTED FLOW		**BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS**										**NO**
SIGNAL JUSTIFICATION 1:		**LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS**										**NO**

JUSTIFICATION 2 - DELAY TO CROSS TRAFFIC

JUSTIFICATION	GUIDANCE	AM Peak	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	PM Peak	No. of hours with compliance		Average Compliance
2A	MAIN ROAD TRAFFIC VOLUME (2 way Total)	**850**	**628**	**628**	**628**	**628**	**628**	**628**	**1660**	100%	80%+	-
2A	COMPLIANCE % VOL x 100 / 720 (1 lane approach on main OR VOL x 100 / 900 (2 or more lane approach	100%	87%	87%	87%	87%	87%	87%	100%	2	8	90%
2B	CROSSING TRAFFIC (vph) (2 way Total)	**70**	**40**	**40**	**40**	**40**	**40**	**40**	**90**	100%	80%+	-
2B	COMPLIANCE % VOL x 100 / 75	93%	53%	53%	53%	53%	53%	53%	100%	1	2	64%
RESTRICTED FLOW		**BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS**										**NO**
SIGNAL JUSTIFICATION 2:		**LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS**										**NO**

JUSTIFICATION 3 - COLLISION EXPERIENCE

	Preceding Months	Number of Collisions	Percent Fulfillment
A. Number of reportable collisions susceptible to prevention by a traffic signal.	1 - 12	-	-
	13 - 24	-	-
	25 - 36	-	-
	annual average	-	-
B. Adequate trial of less restrictive remedies has failed to reduce collision frequency.	☐ YES	☐ NO	n/a
C. Either Justification 1 or Justification 2 satisfied to 80% or more.	☐ YES	☐ NO	n/a
SIGNAL JUSTIFICATION 3:	**ALL OF 3A, 3B & 3C FULFILLED TO 100%?**		**NO**

JUSTIFICATION 4 - COMBINATION JUSTIFICATION

JUSTIFICATION SATISFIED 80% OR MORE				Two Justifications Satisfied 80% or more
Justification 1	-	Minimum Vehicle Volume	NO	**NO**
Justification 2	-	Delay to Cross Traffic	NO	
Justification 3	-	Collision Experience	-	

JUSTIFICATION SUMMARY

ARE TRAFFFIC SIGNALS JUSTIFIED FOR THE INTERSECTION IN QUESTION?	**NO**

Appendix D:
2026 Operations

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	15	55	40	15	25	25	310	10	10	660	20
Future Volume (Veh/h)	30	15	55	40	15	25	25	310	10	10	660	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	16	58	42	16	26	26	326	11	11	695	21
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1140	1116	706	1161	1116	326	716			337		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1140	1116	706	1161	1116	326	716			337		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	92	87	69	92	96	97			99		
cM capacity (veh/h)	157	200	436	136	200	715	885			1222		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	106	84	26	326	11	11	716
Volume Left	32	42	26	0	0	11	0
Volume Right	58	26	0	0	11	0	21
cSH	254	198	885	1700	1700	1222	1700
Volume to Capacity	0.42	0.42	0.03	0.19	0.01	0.01	0.42
Queue Length 95th (m)	14.8	14.8	0.7	0.0	0.0	0.2	0.0
Control Delay (s)	29.0	36.0	9.2	0.0	0.0	8.0	0.0
Lane LOS	D	E	A			A	
Approach Delay (s)	29.0	36.0	0.7			0.1	
Approach LOS	D	E					

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	30	55	40	15	65	105	1055	75	35	680	70
Future Volume (Veh/h)	35	30	55	40	15	65	105	1055	75	35	680	70
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	37	32	58	42	16	68	111	1111	79	37	716	74
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2236	2239	753	2197	2197	1111	790			1190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2236	2239	753	2197	2197	1111	790			1190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	7	86	0	56	73	87			94		
cM capacity (veh/h)	13	34	410	4	36	254	830			587		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	127	126	111	1111	79	37	790
Volume Left	37	42	111	0	0	37	0
Volume Right	58	68	0	0	79	0	74
cSH	32	12	830	1700	1700	587	1700
Volume to Capacity	4.01	10.29	0.13	0.65	0.05	0.06	0.46
Queue Length 95th (m)	Err	Err	3.5	0.0	0.0	1.5	0.0
Control Delay (s)	Err	Err	10.0	0.0	0.0	11.5	0.0
Lane LOS	F	F	B			B	
Approach Delay (s)	Err	Err	0.9			0.5	
Approach LOS	F	F					

Intersection Summary			
Average Delay	1063.1		
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	15	55	40	15	25	25	310	10	10	660	20
Future Volume (vph)	30	15	55	40	15	25	25	310	10	10	660	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.93			0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1718			1761		1789	1883	1601	1789	1875	
Flt Permitted		0.87			0.79		0.31	1.00	1.00	0.56	1.00	
Satd. Flow (perm)		1514			1421		574	1883	1601	1061	1875	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	16	58	42	16	26	26	326	11	11	695	21
RTOR Reduction (vph)	0	50	0	0	22	0	0	0	4	0	2	0
Lane Group Flow (vph)	0	56	0	0	62	0	26	326	7	11	714	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		6.0			6.0		26.3	26.3	26.3	26.3	26.3	
Effective Green, g (s)		6.0			6.0		26.3	26.3	26.3	26.3	26.3	
Actuated g/C Ratio		0.14			0.14		0.59	0.59	0.59	0.59	0.59	
Clearance Time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		205			192		340	1117	950	629	1113	
v/s Ratio Prot								0.17			c0.38	
v/s Ratio Perm		0.04			c0.04		0.05		0.00	0.01		
v/c Ratio		0.27			0.32		0.08	0.29	0.01	0.02	0.64	
Uniform Delay, d1		17.2			17.3		3.8	4.4	3.7	3.7	5.9	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.7			1.0		0.1	0.1	0.0	0.0	1.3	
Delay (s)		17.9			18.3		3.9	4.6	3.7	3.7	7.2	
Level of Service		B			B		A	A	A	A	A	
Approach Delay (s)		17.9			18.3			4.5			7.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	30	55	40	15	65	105	1055	75	35	680	70
Future Volume (vph)	35	30	55	40	15	65	105	1055	75	35	680	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		2.0	6.0	6.0	2.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.94			0.93		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1742			1718		1789	1883	1601	1789	1857	
Flt Permitted		0.86			0.83		0.24	1.00	1.00	0.09	1.00	
Satd. Flow (perm)		1512			1455		450	1883	1601	161	1857	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	32	58	42	16	68	111	1111	79	37	716	74
RTOR Reduction (vph)	0	36	0	0	50	0	0	0	20	0	4	0
Lane Group Flow (vph)	0	91	0	0	76	0	111	1111	59	37	786	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		10.1			10.1		61.1	55.5	55.5	57.0	53.4	
Effective Green, g (s)		10.1			10.1		61.1	55.5	55.5	57.0	53.4	
Actuated g/C Ratio		0.12			0.12		0.73	0.67	0.67	0.69	0.64	
Clearance Time (s)		6.0			6.0		2.0	6.0	6.0	2.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		183			176		422	1256	1067	180	1191	
v/s Ratio Prot							c0.02	c0.59		0.01	0.42	
v/s Ratio Perm		c0.06			0.05		0.18		0.04	0.13		
v/c Ratio		0.50			0.43		0.26	0.88	0.06	0.21	0.66	
Uniform Delay, d1		34.2			33.9		5.8	11.2	4.8	12.9	9.3	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.1			1.7		0.3	7.7	0.0	0.6	1.4	
Delay (s)		36.3			35.6		6.1	19.0	4.8	13.4	10.6	
Level of Service		D			D		A	B	A	B	B	
Approach Delay (s)		36.3			35.6			17.0			10.8	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix E:
2026 Traffic Signal Warrants

TATHAM ENGINEERING

8-HOUR TRAFFIC SIGNAL WARRANT

Project & No.: Warminster S/R & Highway 12 321892

GENERAL INFORMATION

Analyst	Michael Cullip	**Jurisdiction/Area**	Twp of Oro-Medonte **Date** May 31,2021
Agency or Company	Tatham Engineering Limited	**East-West Street**	Warminster S/R
Analysis Period	2026 Total	**North-South Street**	Highway 12
Flow Conditions	Free flow (rural)	**Major Street**	North-South
T Intersection	No	**Approach Lanes per Directio**	1
		Hours of Traffic Volume Data	AM & PM peaks only

Additional Comments

TRAFFIC & PEDESTRIAN VOLUMES

		Hour of Data	**AM Peak**						**PM Peak**	**AM + PM**
		Hour Ending								**4**
MAJOR STREET										
Northbounc	right		10						75	**21**
	thru		310						1055	**341**
	left		25						105	**33**
Southbounc	right		20						70	**23**
	thru		660						680	**335**
	left		10						35	**11**
MINOR STREET										
Eastbound	right		55						55	**28**
	thru		15						30	**11**
	left		30						35	**16**
Westbounc	right		25						65	**23**
	thru		15						15	**8**
	left		40						40	**20**
PEDESTRIANS										
crossing MAJOR street										**0**
crossing MINOR street										**0**
APPROACH VOLUMES										
	major		1035						2020	764
	minor		180						240	105
	TOTAL		1215						2260	869
CROSSING VOLUMES										
	TOTAL		85						105	48
	note 1		70						75	
	note 2		15						30	
	note 3		0						0	
	3a		no						no	
	3b		no						yes	
	note 4		0						0	

ACCIDENT HISTORY

Reportable accidents over the past 36 months susceptible to correction by a traffic signal.	months 1 to 12	-
	months 13 to 24	-
	months 25 to 36	-

NOTES

Traffic crossing MAJOR street defined as:

- note 1 Left turns from both minor street approaches
- note 2 The heaviest through volume from the minor street
- note 3 50% of the heavier left turn movement from the major street when both of the following are met:
  - 3a the left turn volume > 120
  - 3b the left turn volume + opposing volume > 720
- note 4 Pedestrians crossing the major street

Free Flow Conditions

- roads with operating speeds greater than or equal to 70 km/h
- normally encountered in rural areas
- may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

Restricted Flow Conditions

- roads with operating speeds less than 70 km/h
- normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

8-HOUR TRAFFIC SIGNAL WARRANT

JUSTIFICATION 1 - MINIMUM VEHICLE VOLUME

JUSTIFICATION	GUIDANCE	HOUR ENDING								No. of hours with compliance		Average Compliance
		AM Peak	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	PM Peak			
1A	TOTAL TRAFFIC ENTERING INTERSECTION	**1215**	**869**	**869**	**869**	**869**	**869**	**869**	**2260**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 480 (1 lane approach on main OR VOL x 100 / 600 (2 or more lane approach	100%	100%	100%	100%	100%	100%	100%	100%	8	8	100%
1B	TRAFFIC ON MINOR STREET (vph) (2 way Total)	**180**	**105**	**105**	**105**	**105**	**105**	**105**	**240**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 120 (full intersection) OR VOL x 100 / 180 (tee intersection)	100%	88%	88%	88%	88%	88%	88%	100%	2	8	91%
FREE FLOW		**BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS**										**NO**
SIGNAL JUSTIFICATION 1:		**LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS**										**YES**

JUSTIFICATION 2 - DELAY TO CROSS TRAFFIC

JUSTIFICATION	GUIDANCE	HOUR ENDING								No. of hours with compliance		Average Compliance
		AM Peak	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	PM Peak			
2A	MAIN ROAD TRAFFIC VOLUME (2 way Total)	**1035**	**764**	**764**	**764**	**764**	**764**	**764**	**2020**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 480 (1 lane approach on main OR VOL x 100 / 600 (2 or more lane approach	100%	100%	100%	100%	100%	100%	100%	100%	8	8	100%
2B	CROSSING TRAFFIC (vph) (2 way Total)	**85**	**48**	**48**	**48**	**48**	**48**	**48**	**105**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 50	100%	95%	95%	95%	95%	95%	95%	100%	2	8	96%
FREE FLOW		**BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS**										**NO**
SIGNAL JUSTIFICATION 2:		**LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS**										**YES**

JUSTIFICATION 3 - COLLISION EXPERIENCE

	Preceding Months	Number of Collisions	Percent Fulfillment
A. Number of reportable collisions susceptible to prevention by a traffic signal.	1 - 12	-	-
	13 - 24	-	-
	25 - 36	-	-
	annual average	-	-
B. Adequate trial of less restrictive remedies has failed to reduce collision frequency.	☐ YES	☐ NO	n/a
C. Either Justification 1 or Justification 2 satisfied to 80% or more.	☐ YES	☐ NO	n/a
SIGNAL JUSTIFICATION 3:	**ALL OF 3A, 3B & 3C FULFILLED TO 100%?**		**NO**

JUSTIFICATION 4 - COMBINATION JUSTIFICATION

JUSTIFICATION SATISFIED 80% OR MORE				Two Justifications Satisfied 80% or more
Justification 1	-	Minimum Vehicle Volume	YES	**YES**
Justification 2	-	Delay to Cross Traffic	YES	
Justification 3	-	Collision Experience	-	

JUSTIFICATION SUMMARY

ARE TRAFFFIC SIGNALS JUSTIFIED FOR THE INTERSECTION IN QUESTION?	**YES**

8-HOUR TRAFFIC SIGNAL WARRANT

Project & No.: Warminster S/R & Highway 12 321892

GENERAL INFORMATION

Analyst	Michael Cullip	**Jurisdiction/Area**	Twp of Oro-Medonte **Date** May 31,2021
Agency or Company	Tatham Engineering Limited	**East-West Street**	Warminster S/R
Analysis Period	2026 Total	**North-South Street**	Highway 12
Flow Conditions	Restricted flow (urban)	**Major Street**	North-South
T Intersection	No	**Approach Lanes per Directio**	1
		Hours of Traffic Volume Data	AM & PM peaks only
Additional Comments			

TRAFFIC & PEDESTRIAN VOLUMES

Hour of Data	**AM Peak**						**PM Peak**	**AM + PM**
Hour Ending								**4**
MAJOR STREET								
Northbounc right	10						75	**21**
thru	310						1055	**341**
left	25						105	**33**
Southbounc right	20						70	**23**
thru	660						680	**335**
left	10						35	**11**
MINOR STREET								
Eastbound right	55						55	**28**
thru	15						30	**11**
left	30						35	**16**
Westbounc right	25						65	**23**
thru	15						15	**8**
left	40						40	**20**
PEDESTRIANS								
crossing MAJOR street								**0**
crossing MINOR street								**0**
APPROACH VOLUMES								
major	1035						2020	764
minor	180						240	105
TOTAL	1215						2260	869
CROSSING VOLUMES								
TOTAL	85						105	48
note 1	70						75	
note 2	15						30	
note 3	0						0	
3a	no						no	
3b	no						yes	
note 4	0						0	

ACCIDENT HISTORY

Reportable accidents over the past 36 months susceptible to correction by a traffic signal.	months 1 to 12	-
	months 13 to 24	-
	months 25 to 36	-

NOTES

Traffic crossing MAJOR street defined as:

note 1 Left turns from both minor street approaches

note 2 The heaviest through volume from the minor street

note 3 50% of the heavier left turn movement from the major street when both of the following are met:

3a the left turn volume > 120

3b the left turn volume + opposing volume > 720

note 4 Pedestrians crossing the major street

Free Flow Conditions

- roads with operating speeds greater than or equal to 70 km/h
- normally encountered in rural areas
- may also be used at intersections within the built-up area of a community with < 10 000 people and outside the commuting influence of a large urban centre, even if the speed is less than 70 km/h

Restricted Flow Conditions

- roads with operating speeds less than 70 km/h
- normally encountered in urban areas where the traffic volumes approach or exceed practical working capacity of road

TATHAM ENGINEERING

8-HOUR TRAFFIC SIGNAL WARRANT

JUSTIFICATION 1 - MINIMUM VEHICLE VOLUME

JUSTIFICATION	GUIDANCE	HOUR ENDING AM Peak	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	PM Peak	No. of hours with compliance		Average Compliance
1A	TOTAL TRAFFIC ENTERING INTERSECTION	**1215**	**869**	**869**	**869**	**869**	**869**	**869**	**2260**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 720 (1 lane approach on main OR VOL x 100 / 900 (2 or more lane approach	100%	100%	100%	100%	100%	100%	100%	100%	8	8	100%
1B	TRAFFIC ON MINOR STREET (vph) (2 way Total)	**180**	**105**	**105**	**105**	**105**	**105**	**105**	**240**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 170 (full intersection) OR VOL x 100 / 255 (tee intersection)	100%	62%	62%	62%	62%	62%	62%	100%	2	2	71%

RESTRICTED FLOW	**BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS**	**NO**
SIGNAL JUSTIFICATION 1:	**LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS**	**NO**

JUSTIFICATION 2 - DELAY TO CROSS TRAFFIC

JUSTIFICATION	GUIDANCE	HOUR ENDING AM Peak	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	PM Peak	No. of hours with compliance		Average Compliance
2A	MAIN ROAD TRAFFIC VOLUME (2 way Total)	**1035**	**764**	**764**	**764**	**764**	**764**	**764**	**2020**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 720 (1 lane approach on main OR VOL x 100 / 900 (2 or more lane approach	100%	100%	100%	100%	100%	100%	100%	100%	8	8	100%
2B	CROSSING TRAFFIC (vph) (2 way Total)	**85**	**48**	**48**	**48**	**48**	**48**	**48**	**105**	100%	80%+	-
	COMPLIANCE % VOL x 100 / 75	100%	63%	63%	63%	63%	63%	63%	100%	2	2	73%

RESTRICTED FLOW	**BOTH 2A AND 2B FULFILLED 100% EACH OF 8 HOURS**	**NO**
SIGNAL JUSTIFICATION 2:	**LESSER OF 2A OR 2B FULFILLED 80% EACH OF 8 HOURS**	**NO**

JUSTIFICATION 3 - COLLISION EXPERIENCE

	Preceding Months	Number of Collisions	Percent Fulfillment
A. Number of reportable collisions susceptible to prevention by a traffic signal.	1 - 12	-	-
	13 - 24	-	-
	25 - 36	-	-
	annual average	-	-
B. Adequate trial of less restrictive remedies has failed to reduce collision frequency.	☐ YES	☐ NO	n/a
C. Either Justification 1 or Justification 2 satisfied to 80% or more.	☐ YES	☐ NO	n/a
SIGNAL JUSTIFICATION 3:	**ALL OF 3A, 3B & 3C FULFILLED TO 100%?**		**NO**

JUSTIFICATION 4 - COMBINATION JUSTIFICATION

JUSTIFICATION SATISFIED 80% OR MORE				Two Justifications Satisfied 80% or more
Justification 1	-	Minimum Vehicle Volume	NO	**NO**
Justification 2	-	Delay to Cross Traffic	NO	
Justification 3	-	Collision Experience	-	

JUSTIFICATION SUMMARY

ARE TRAFFFIC SIGNALS JUSTIFIED FOR THE INTERSECTION IN QUESTION?	**NO**

Appendix F: MTO Report

Ontario

Operational and Safety Review

Highway 12 at Warminster Sideroad Intersection

MTO Design and Engineering Branch, Central Region Traffic

January 2021

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Appendices

Executive Summary

An operational and safety review of the Highway 12 and Warminster Sideroad intersection has been conducted in response to concerns associated with the unsignalized intersection and pedestrian crossover (PXO).

The review consisted of collecting and assessing traffic data related to the existing conditions, the PXO operation, vehicle operating speeds and speed limits, and traffic control requirements for the intersection. Based on the findings, a number of opportunities/recommendations for safety and operational improvements were identified and are summarized in the attached table.

Highway 12 and Warminster Sideroad is a stop-controlled 4-legged intersection in Warminster. In 2017, a pedestrian crossover (PXO) was installed to replace the school crossing at the east side of the intersection. Warminster is built-up with several businesses including the Warminster Elementary school. The school is located in the south-west quadrant of the intersection, as detailed in figure below.

Highway 12 & Warminster Sideroad Intersection

Highway 12 through Warminster has an annual average daily traffic volume of 10,500 of which 4% is commercial vehicles. The regulatory speed limit approaching the intersection is 60 km/h on Highway 12 and 50 km/h on Warminster Sideroad.

A review of the existing signage along Highway 12 was conducted and some signing improvements identified. The ministry will undertake these changes in the spring once the ground has thawed.

A critical component of the study was collecting data related to the PXO operation. The ministry installed a portable camera between October 5th, 2020 and November 30th, 2020 which allowed regular monitoring of the Warminster Sideroad intersection and PXO.

Observations using the camera indicate the vast majority of motorists are stopping and yielding to pedestrians when the PXO is active. The observed compliance rate while the CCTV camera was deployed was 96%. A percentage of non-conformance with traffic control devices should be expected, whether due to aggressive or distracted driving, and even driver misunderstanding of the rules of the road

Speed studies were conducted along Highway 12 through Warminster to determine if there was excessive speeding. The speed study results indicate motorists are reducing their speeds through the community. Travelling westbound, the average speed is 82 km/h approaching Warminster and drops to 67.5 km/h at the intersection; while travelling eastbound, the average speed is 94 km/h approaching Warminster and drops to 69 km/h at the intersection.

Although motorists are not in compliance with the 60 km/h speed limit, we would typically expect to see motorists driving a reasonable level above the speed limit in the absence of continuous or automated enforcement. In Warminster, motorists are reducing their speeds which suggests they are scanning their driving environment, are aware of the speed limit, and can further reduce their speed if necessary.

A couple of opportunities were identified to improve speed compliance, beyond enforcement by the Ontario Provincial Police.

Designating Highway 12 through Warminster as a Community Safety Zone can increase driver awareness and assist in speed compliance. Traffic related offences committed within the zone would be subject to increased fines. The implementation of a community safety zone on a provincial highway requires the municipality to initiate the request so this is an opportunity that the municipality can pursue. An amendment to Ontario Regulation 510/99 Community Safety Zones under the Highway Traffic Act (HTA) is required before the zone can be implemented.

Radar speed signs or Speed Display Devices (SDD) can be a tool to reduce vehicle speeds in Warminster. The operating speeds of motorists are displayed visually which provides an active reminder to comply with the posted speed limit. The ministry does not use/deploy radar speed signs but allows municipalities to install under encroachment permit. Hence this is a municipal initiative. If the Township wishes to pursue SDD, the ministry recommends the signs be installed temporarily near the beginning of the school year and after holiday breaks, no longer than two weeks at a time to maintain their effectiveness on driver behavior.

The suitability of the posted speed limit through Warminster was assessed in accordance with the Transportation Association of Canada (TAC) methodology for speed zoning Based on this analysis, the ministry is recommending lowering the speed limit from 60 km/h to 50 km/h for a 550 metre stretch of Highway 12 including the school area, PXO and Warminster intersection. The ministry is responsible for the regulatory HTA changes associated with the speed limit change. Consultation with key stakeholders is required prior to initiating any speed limit change.

The collision history for Highway 12 and Warminster Sideroad intersection was reviewed for the 5-year period of 2015-2019. The ministry identified 4 collisions at the intersection in this timeframe including three that would be classified as preventable with traffic signals. The low number and low severity of collisions does not support the need for traffic signals at the intersection.

Finally, the Hwy 12 and Warminster Sideroad intersection was reviewed in terms of technical justification or warrants for a set of full traffic signals at the intersection, pedestrian signals, and pedestrian crossover. This was done in accordance with the approaches set out in the Ontario Traffic Manuals (OTMs) to ensure consistency with other similar situations across the province. Based upon the OTM requirements, neither a full set of traffic signals nor an IPS is warranted. The intersection is warranted for a PXO based on the connectivity aspect of the PXO warrant.

As previously discussed with the Township, although an IPS is not warranted, the ministry is open to the opportunity for the municipality to upgrade the PXO to an IPS. If Oro-Medonte wishes to pursue this option, they would be responsible for the design and construction including all costs associated with the upgrade.

Summary of Opportunities to Improve Safety

Type of Improvement	Recommendation/Opportunity
Signing	Modify/replace various signs including: • Install School Area signs in both directions on Highway 12. School crossing signs should be removed. • Install missing Warminster Road guide signs (advance and turn off) on Highway 12 eastbound. • Replace Warminster Road guide signs on Highway 12 westbound due to age and poor reflectivity • Relocate Highway 12 eastbound regulatory speed limit sign (60 km/h). Currently it is partially blocking the Pedestrian Crossing Ahead sign. • Ministry responsibility
Upgrade PXO	• Upgrade the PXO to an Intersection Pedestrian Signal (IPS). • Considered a municipal initiative
Modify speed limit through town	• Reduce speed limit to 50 km/h for approximately 550 metres incorporating PXO, school area and Warminster Sideroad intersection. • Keep 60 km/h speed limit for remainder of speed zone through Warminster (west of intersection). • Ministry responsibility
Improve Speed limit compliance	There are opportunities to improve speed limit compliance beyond OPP enforcement. Both would be municipal initiatives: • Initiate a community safety zone. Traffic related offences committed within the zone are subject to increased fines. • Implement Speed Display Devices (SDD) on temporary basis at strategic times.
Enforcement	Engage OPP as a partner in highway safety: • Provide enforcement of PXO and speed limit compliance, as resources and priorities permit. • Support further safety initiatives (community safety zone, speed limit reduction, education, etc).
Education	Information on use of PXOs is available in various ways: • Electronic message signs (PVMSs) on the highway can raise awareness of the PXO and alert drivers of the need to stop • Ministry website, driver training materials are readily available • PXO Brochure has been developed with rules of the road and tips for pedestrians, drivers and cyclists.

1.0 Existing Conditions

1.1 Overview of Site

Highway 12 and Warminster Sideroad is a stop-controlled 4-legged intersection within the community of Warminster. Warminster is built-up with several businesses including the Warminster Elementary school. The school is located in the south-west quadrant of the intersection, as detailed in Figure 1.

Highway 12 at Warminster Sideroad has an annual average daily traffic volume of 10,500 of which 4% is commercial vehicles. The traffic pattern on Highway 12 is classified as commuter, with typical rush hour traffic patterns during morning (7:00 a.m. – 9:00 a.m.) and afternoon (3:00 p.m. – 5:00 p.m.) peaks. A summary of the peak hour directional volumes on Highway 12, as determined from the 2019 turning movement count is provided in Table 1.

The horizontal and vertical alignment of Highway 12 through the community of Warminster is relatively straight and flat with good visibility of the intersection.

The intersection has dedicated left turn lanes in both directions on Highway 12 as well as a westbound right turn taper. The regulatory speed limit approaching the intersection is 60 km/h on Highway 12 and 50 km/h on Warminster Sideroad. Partial illumination is present, located at the north-west and south-east quadrants at the intersection.

There are no sidewalks along Highway 12 or Warminster Sideroad. There is an asphalt boulevard located on both sides of the roadway. This boulevard is typically placed to improve maintenance and functionality of the curb and gutter but also provides pedestrians and cyclists an area of refuge.

Warminster does not currently have a community safety zone along Highway 12. Community safety zones are sections of roadway where public safety is of special concern. Its purpose is to inform drivers they are entering a zone that the community has designated as an area where the safety of its children/citizens is paramount. Traffic related offences committed within the zone are subject to increased fines.

Table 1: Highway 12 Peak Hour Directional Volumes (2019)

Highway 12	AM Peak Hour	PM Peak Hour
Eastbound	563	582
Westbound	263	842

Table 2: Traffic Characteristics

Highway 12 Traffic Data	
Travel Pattern	Commuter
Average Annual Daily Traffic Volume	10500
Historical Traffic Volume Growth Rate	3%
Commercial Vehicle (% of daily traffic)	4%
Posted Speed Limit (Hwy 12)	60 km/h
Posted Speed Limit (Warminster Rd)	50 km/h

Figure 1: Highway 12 & Warminster Sideroad Intersection

In late 2017, a Level 2 Type B pedestrian crossover (PXO) was installed to replace the school crossing at the east side of the intersection. Level 2 pedestrian crossovers are distinctly defined by the prescribed use of a different set of regulatory signs, warning signs, pavement markings, and rapid rectangular flashing beacons.

The PXO is shown in Figure 2, looking westbound on Hwy 12. Features of the PXO include:

- Actuated Double-sided Rapid Rectangular Flashing Beacon with Tell Tale and Pedestrian Pushbutton
- Side-mounted pedestrian crossover signs
- Over-head mounted pedestrian crossover sign, for each direction of travel
- Ladder Crosswalk Markings
- Shark teeth (yield to pedestrian's line markings) at 6.0 m from crosswalk
- Pedestrian Crossover Ahead signs, upstream of the crosswalk in both directions
- No Passing Here to Crossing signs, upstream of the crosswalk

Figure 2: Existing Level 2 Type B PXO: Hwy 12 & Warminster, facing westbound

1.2 Signing Inventory and Review

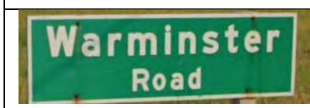
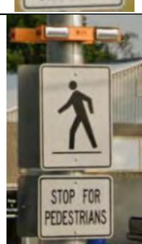
Signs on Highway 12 near the intersection were tabulated and reviewed for conformance with Ontario Traffic Manual (OTM) requirements including OTM Book 5 Regulatory Signs, Book 6 Warning Signs, Book 8 Guide and Information Signs, and Book 15 Pedestrian Crossing treatments. Signs were also reviewed for condition including nighttime reflectivity. Sign inventory is summarized in Table 3.

Many of the signs were installed as part of the PXO construction in 2017 and found to be in good condition and in conformance with provincial standards. However, the following signing deficiencies were identified:

- School Area signs are applicable in both directions on Highway 12 in place of the School Crossing Ahead signs. School Crossing Ahead signs are normally only implemented at supervised school crossings (ie with crossing guard) which no longer exists at this location.
- Warminster Road guide signs (advance and turn off) are missing on Highway 12 eastbound
- Warminster Road guide signs on Highway 12 westbound are old with poor night-time reflectivity.
- The Highway 12 eastbound regulatory speed limit sign (60 km/h) is partially blocking the Pedestrian Crossing Ahead sign.

Table 3: Existing Sign Inventory

	Sign Type	**Direction**	**Placement**	**Sign Condition**
	60 km/h ahead	Westbound/Eastbound	WB: Hwy 12, 560m east of Warminster Rd EB: Hwy 12, 1km west of Warminster Rd Ground-mounted on right shoulder	Good condition, good reflectivity
	60 Km/h Begins	Westbound/Eastbound	Hwy 12, 300m east of Warminster Rd Hwy 12, 750m west of Warminster Rd Ground mounted on right shoulder	Good condition, good reflectivity
	Intersection Sign (Wa-11A)	Westbound	Ground-mounted on right shoulder	Good condition, good reflectivity

	Intersection Sign (Wa-11A)	Eastbound	Ground-mounted on right shoulder	Good condition, good reflectivity
	School Crossing Ahead	Westbound/Eastbound	Ground-mounted on right shoulder	Good condition, good reflectivity
	Advance Guide Sign	Westbound	Ground-mounted on right shoulder	Poor condition, poor reflectivity
	Guide Sign	Westbound	Ground-mounted on right shoulder	Poor condition, poor reflectivity
	Pedestrian Crossing Ahead	Westbound/Eastbound	Ground-mounted on right shoulder	Good condition, good reflectivity
	No Passing Here to Crossing	Westbound/Eastbound	Ground-mounted on right shoulder	Good condition, good reflectivity
	Pedestrian Crossover with Stop for pedestrian tab	Westbound/Eastbound	Pole-mounted to PXO Crossing	Good condition, good reflectivity
	Overhead Pedestrian sign	Westbound/Eastbound	Mounted overhead at PXO Crossing	Good condition, good reflectivity
	Regulatory speed limit signs	Westbound/Eastbound	Ground-mounted on right shoulder (EB: 100m, 275m west of Warminster Sdrd)	Good condition, good reflectivity

1.3 Pavement Markings

All pavement markings are in accordance with current standards. All edge, directional dividing, continuity, and intersection stop lines are appropriate type, placement, and colour. At the pedestrian crossover, the ladder markings and shark teeth (yield to pedestrian line) are in accordance to OTM Book 15.

1.4 Portable Variable Message Signs (PVMS)

On October 1st, 2020, two PVMS were deployed on Highway 12, as shown in Figure 3. The PVMS were deployed with targeted messages to advise motorists of the PXO and the need for vehicles to stop for pedestrians.

The purpose of the PVMS is to educate and bring awareness to motorists of the increase of pedestrians. The two PVMS are a temporary measure as they cannot be left on the roadside over the winter. As a result, the PVMS were removed in December.

Figure 3: Deployed PVMS on Highway 12, 315m west of Warminster Road, facing eastbound (left)
250m east of Warminster Road, facing westbound (right)

PVMS Message Displayed On-Field

PEDESTRIAN CROSSING AHEAD	MUST STOP WHEN FLASHING

2.0 Operational and Safety Data and Analysis

Traffic operational and safety data for the intersection was collected and analysed. This included daily monitoring of the PXO for compliance by motorists in terms of stopping for pedestrians, review of existing speed of traffic and speed zoning analysis of Highway 12 through Warminster, and collision analysis.

2.1 Pedestrian Crossover Observations

The ministry installed a portable CCTV camera from October 5th, 2020 to November 30th, 2020 to observe the Highway 12 and Warminster Sideroad intersection operations. There was daily monitoring of the pedestrian crossover (PXO) for motorist compliance and pedestrian volumes during morning and afternoon peak pedestrian times.

Observations indicate the vast majority of motorists are stopping and yielding to pedestrians when the PXO is active. There were isolated cases when a platoon or group of vehicles was in the dilemma zone when the PXO was activated. The dilemma zone is an area where motorists may have trouble reacting and stopping in time. Although the lead vehicle may not have been able to stop, the platooning effect sometimes encouraged other vehicles that had the opportunity to stop and yield to the flashing PXO to proceed onward. It should be noted that the same situation with the dilemma zone exists with traffic signals when motorists are faced with the changing of the green light and need to decide whether to stop or proceed through the intersection.

Results of the monitoring have been tabulated for the period from October 5th to November 2nd. Out of 180 times the PXO pushbutton was pressed, 8 instances of non-compliance were observed, resulting in an observed compliance rate of 96%. Between October 13 to October 30, the ministry did not observe any non-compliance with the PXO. Although this is positive, some percentage of non-conformance with traffic control devices should be expected, whether due to aggressive or distracted driving, and even driver misunderstanding of the rules of the road.

Comparison data on compliance rates for signals is not available. Although driver understanding of traffic / pedestrian signals may be higher, there is still the opportunity for drivers to run the red/amber light to avoid delays with stopping for the pedestrians. The requirement for Red Light Camera programs highlights that some motorists will ignore rules of the road despite safety risks and fines/demerit points.

There were some cases of pedestrians not waiting for vehicles to stop and yield and proceeding to cross Highway 12 without pressing the pushbutton to signal the flashers. Traffic volumes during these cases were observed to be low and traffic gaps were available to cross Highway 12. Pedestrians are encouraged to use the features of the PXO including the pushbutton and wait for all vehicles to come to a complete stop.

The driver compliance information is summarized in Tables 4 and 5, while the complete daily PXO monitoring and observation data is included in Appendix A.

Table 4: Driver Compliance Rate (October 5th, 2020 to November 2nd, 2020)

Number of crossings (Push Button Pressed)	180
# Non compliance by drivers	8
Compliance Rate	**96%**

Table 5:Number of Pedestrians and Non-compliance by AM/PM period

Time Period	# Peds	# Non-compliance by Drivers
AM (8:15-9:15)	197	5
PM (15:00 – 16:00)	215	3
Pedestrian Total	412	

2.2 Speed Study and Speed Zoning through Warminster

2.2 (i) Speed Study

Highway 12 passing through Warminster has a regulatory speed limit of 60 km/h. The 60 km/h speed zone is just over 1 km long and extends from approximately 300m east of Warminster Sideroad intersection to 760 m west of the intersection. The posted speed limit beyond the community is 80 km/h.

On October 08, 2020 a radar speed study was conducted at the following 4 locations in order to determine the speed of motorists approaching and through Warminster.

- Station 1: Highway 12 400m east of Warminster Sideroad (80 km/h speed zone)
- Station 2: Highway 12 130m east of Warminster Sideroad (60 km/h speed zone)
- Station 3: Highway 12 200m west of Warminster Sideroad (60 km/h speed zone)
- Station 4: Highway 12 820m west of Warminster Sideroad (80 km/h speed zone)

The speeds were collected from free flow vehicles, so speeds are not restricted by other vehicles that may otherwise influence a driver’s selection of speed. Results of the speed study indicate motorists are cognizant of being in a built-up area and are reducing their speeds through the community.

There are a couple of key indicators when reviewing the speed data results. The 85th percentile speed is the speed that 85% of motorists are driving at or below. It is often referred to as the operating speed of the highway and is the speed that the majority of motorists feel comfortable driving at, regardless of the posted speed limit. Highway geometric design as well as roadside environment (rural / urban features) play a significant role in influencing the 85th percentile speed. Typically, the 85th percentile speed is 10-20 km/h higher than the posted regulatory speed. Travelling westbound, the 85th percentile speed is 91 km/h at the east limit of Warminster in the 80 km/h speed zone, then drops to 75 km/h in the 60km/h zone, and then increases back to 91 km/h once re-entering the 80km/h zone west of the town.

Travelling eastbound, the 85th percentile speed is 103 km at the west limit of Warminster, then drops to 77 km/h in the 60km/h zone. The significant drop in the 85th percentile speed through the community is due to motorists recognizing the built-up development and features in Warminster. Pedestrians when present would further reinforce the need to slow down.

Travelling westbound, the average speed is 82 km/h approaching Warminster and drops to 67.5 km/h at the intersection; while travelling eastbound, the average speed is 94 km/h approaching Warminster and drops to 69 km/h at the intersection. The average speeds at the intersection reflect the speeds in close proximity to the PXO.

Overall, the speed results are positive. We would typically expect to see motorists driving a reasonable level above the speed limit in the absence of continuous or automated enforcement. In Warminster, motorists are reducing their speeds which suggests they are scanning their driving environment, are aware of the speed limit, and can further reduce their speed if necessary.

Figure 4 shows the 85th percentile and average speeds on Highway 12 near Warminster Sideroad. The full speed study results are available in Appendix B.

2.2 (ii) Speed Zoning

The ministry assessed what the posted speed limit should be through Warminster using the Transportation Association of Canada (TAC) methodology for speed zoning. This approach evaluates the posted speed limit based on the classification, function and physical characteristics of a roadway. Although the 85th percentile speed is often used as an indicator for establishing a reasonable speed limit, the TAC methodology considers a number of additional risk factors in addition to the operating speeds.

These additional risk factors that include:

- Horizontal/Vertical geometry
- Lane width
- Roadside hazards
- Pedestrian exposure
- Cyclist exposure
- Pavement surface
- Number of intersections
- Number of driveways
- Interchanges
- On-street parking

The higher level of risk evaluated for a roadway, the lower the recommended posted speed limit is assessed. Based on the TAC approach, the total risk score evaluated for Highway 12 through Warminster is 57 which corresponds to a recommended speed limit of 60 km/hr. The TAC results are available in Appendix C.

There are several other considerations the TAC guidelines do not explicitly account for when quantifying risk factors. Some of the important factors not explicitly considered in TAC are highways through towns, school zones, and roadways in suburban area.

Given the presence of the school adjacent to the highway, and ongoing development and growth in Warminster, there may be merit based on the TAC approach in lowering the speed limit to 50 km/h, particularly for the segment including the school area, PXO and Warminster intersection.

It is best practices to implement speed zones at a minimum of 500 metres in length for lower speeds. This is done to avoid frequent speed limit changes and to have consistency from the motorist's perspective.

2.3 Collision Analysis

Collision data for the Highway 12 and Warminster Sideroad intersection was reviewed for the most recent 5-year period of 2015-2019. The ministry identified 4 collisions at the intersection in this timeframe. Three collisions were identified that would be classified as preventable with traffic signals. These collisions occurred in August 2015, March 2016 and October 2016. There was also one property damage collision at the intersection in December 2019. This collision involved a vehicle from Warminster Sideroad attempting to make a left turn at the intersection but sliding due to icy conditions and hitting a vehicle stopped on the opposite Warminster sideroad approach to Highway 12. This is not classified as preventable with signals.

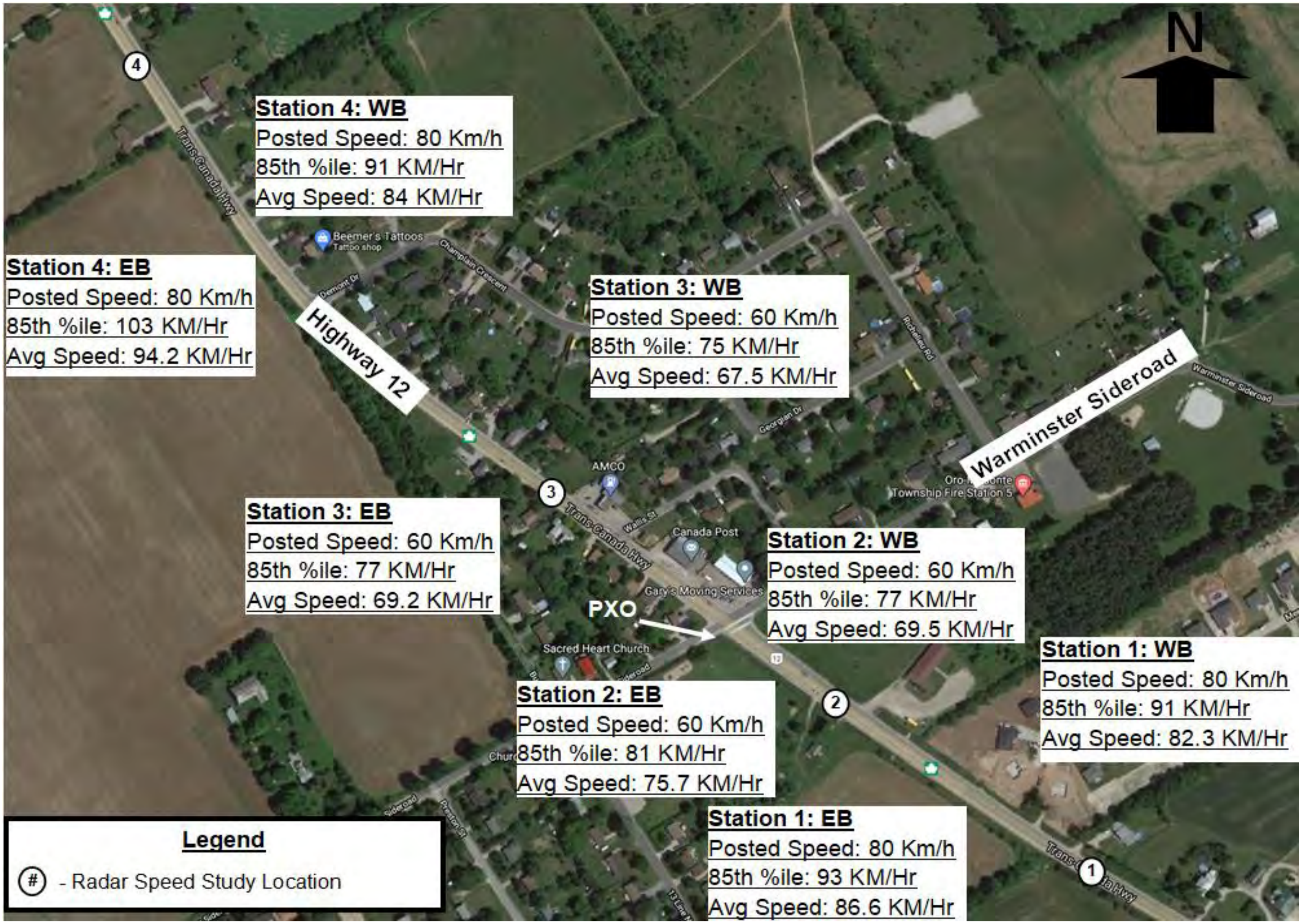


Figure 4: Highway 12 & Warminster Sideroad - Speed Study Locations

3.0 Traffic Control Requirements at Highway 12/ Warminster Sideroad

To ensure consistency with other similar situations across the province, a review was carried out following the approaches set out in OTM Books. The intersection was reviewed in terms of technical justification or warrants for a set of full traffic signals at the intersection, pedestrian signals, and pedestrian crossover.

3.1 (i) Traffic Signal Warrant Analysis based on Volume and Delay Criteria

This part of the traffic signal warrant analysis includes the following 3 warranting criteria, which are the most basic of the warrants reviewed by MTO for determining whether traffic signals are justified at an intersection:

- Warrant 1: Minimum Vehicle Volume
- Warrant 2: Delay to Cross Traffic
- Warrant 3: Volume/Delay Combination

The most recent intersection turning movement count (TMC) was conducted in November 2019. The results of the count were used to determine if traffic signals are warranted at this intersection.

In order for a traffic signal to be warranted at the intersection, the minimum vehicle volume (Warrant 1) or the delay to cross the intersection (Warrant 2) must meet standard volume thresholds for an 8-hour period as indicated in OTM Book 12, Traffic Signals.

The warrant results are expressed as a percentage and must be at 100% for either Warrant 1 or Warrant 2 for signals to be warranted. Alternatively, there is a combination of Warrant 1 and 2 where if both warrants meet or exceed 80% then the signal is also warranted. Based on the 2019 turning movement count, the warrant results are Warrant 1: 61% and Warrant 2: 62%, which indicates that traffic signals are not currently warranted.

The ministry recognises from the previous traffic count conducted in April 2016 that vehicle volumes are increasing. However, the intersection remains below ministry threshold volumes for a traffic signal. The results of both 2019 and 2016 turning movement counts are summarized in Table 6 below, and the intersection counts with warrant analysis are available in Appendix D.

Table 6: Highway 12 & Warminster Sideroad Signal Warrant Summary

Turning Movement Count (Year)	**Warrant 1** (Minimum Vehicle Volume)	**Warrant 2** (Delay to Cross Traffic)
April 2016	43%	52%
Nov 2019	61%	62%

3.1 (ii) Collision Experience Warrant

In addition to the volume, delay and combination warrants, a traffic signal may be justified at an intersection based on an over-representation of collisions correctible by traffic signals. For signals to be justified under this criteria, there must be 15 correctible collisions over a 36-month (3 year) study period. Collisions susceptible to reduction are those involving vehicles and/or pedestrians which, under signalized conditions, would move on separate phases. They generally include collisions between highway traffic and traffic either turning left out of the side street or crossing the highway.

Collision data at the Highway 12 and Warminster Sideroad intersection was collected for analysis over a 5-year period between 2015 to 2019. Data was obtained from the ministry's e-collision system based on the GPS coordinates of the intersection.

Three collisions were identified during this time period that would be classified as preventable with traffic signals. These collisions occurred in August 2015, March 2016 and October 2016. All 3 collisions involved vehicles on Warminster Sideroad failing to yield the right of way and impacting a vehicle on Highway 12. Two of the collisions were property damage, while one involved a minor injury to one of the vehicle occupants.

Based on the collision history over the past 5 years, traffic signals are not justified using the safety criteria identified within OTM Book 12. Furthermore, there is no indication of increasing frequency of collisions over time due to higher risk manoeuvres because of smaller gaps, or high-speed collisions with major injuries.

3.2 Intersection Pedestrian Signal (Pedestrian Volume and Delay Warrant)

An intersection pedestrian signal (IPS) are traffic control devices that are dedicated primarily to providing traffic gaps for pedestrian right-of-way. They appear to motorists on the highway as regular traffic signals with signal heads which turn red, amber and green. Motorists have a better understanding of the traffic control device resulting in higher compliance rates. One potential impact may be pedestrians pushing the pushbutton and proceeding before the light changes because of natural gaps in the traffic, resulting in motorists stopping on the highway for no reason.

The ministry reviewed the pedestrian volumes to determine if an intersection pedestrian signal (IPS) is warranted at this location. A pedestrian signal is a type of signal, but it is only activated when pedestrians push the pushbutton to cross the highway. With an IPS, the intersection of Highway 12/Warminster Sideroad is not signalized, and the adjacent stop-controlled legs approaching the intersection remain stop controlled.

In order to warrant a pedestrian signal at this location, the total 8-hour pedestrian volumes crossing Highway 12 must meet specified thresholds as identified in OTM Book 12. Furthermore, traffic volumes on the main road must be so heavy that pedestrians experience excessive delays.

The pedestrian volumes captured in the 2019 traffic volume count were used to determine if a pedestrian signal is warranted. It is noted that pedestrian volumes can differ from the time of the 2019 count. However, the ministry has been monitoring the intersection via remote camera and can confirm that pedestrian volumes are still appropriate, the observation findings of the intersection can be found in section 2. Based on monitoring in the fall, the typical daily pedestrian volumes during peak hours ranged from 10 to 23.

From the 2019 TMC, the 8-hour total pedestrians using the pedestrian crossover was 27. The majority of pedestrians using the crosswalk are children going to Warminster Elementary School. There are no crossing guards assisting children crossing Highway 12 at the PXO, School crossing guards are the responsibility of the municipality and the local school board.

A factor of 2 is applied to adjust for unassisted children resulting in an adjusted volume of 54 pedestrians. The total two-way 8-hour vehicular volume on Highway 12 is 6988. Applying Figure 5 OTM Book 12 - Pedestrian Justification Based on Pedestrian Volumes an intersection pedestrian signal (IPS) is not justified.

Ministry staff have been monitoring the pedestrian crossover and determined that pedestrians are able to cross Highway 12 in a reasonable amount of time and with minimal delay when using the PXO. Based on pedestrian volumes and daily cross walk observations regarding delays, an IPS is not justified at this location.

Table 7: 2019 Pedestrian and Volume Count Data for IPS Analysis

2019 Pedestrian and Volume Count Data	
8-Hour Vehicular Volume	6988
8-Hour Pedestrian Count	27
8-Hour Pedestrian Adjusted for children	54

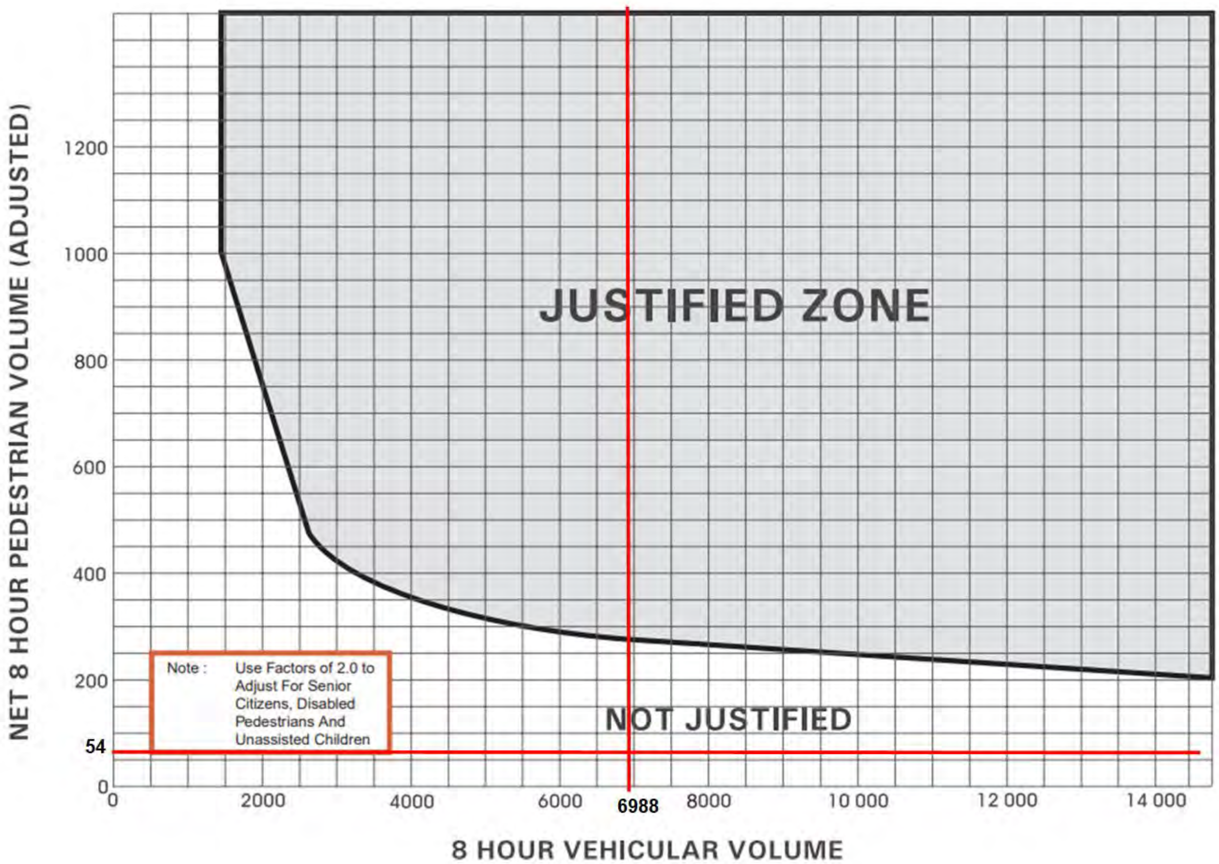


Figure 5: OTM Book 12 Justification 6 – Pedestrian Volumes (IPS Warrant)

3.3 Pedestrian Crossover (PXO) Warrant Analysis

Reviewing Figure 5: OTM Book 12 Justification 6, Warminster would require 250+ pedestrians crossing the highway in an 8-hour period in order to justify a pedestrian signal. These types of pedestrian volumes are not readily achieved by small rural communities which is one of the reasons why MTO introduced new PXO types in OTM Book 15. PXOs can allow for controlled pedestrian crossings in smaller communities when other types of control are not warranted.

Pedestrian crossovers are intended for traffic volumes under 35,000 AADT, low speed roadways (60 km/h or less posted speeds), and roadways with four lanes or less of two-way traffic or 3-lanes of one-way traffic.

For a site to qualify for a PXO, the warranting criteria are either pedestrian volumes or pedestrian system connectivity. For smaller communities with a population less than 10,000, pedestrian volume requirements are less stringent. In order to warrant a PXO based on pedestrian volumes, 100 pedestrians crossing the highway in a 4-hour period is required. By applying OTM Book 15 Figure 6 – 4-hour pedestrian volume criterion for communities of populations less than 10,000, a PXO is not warranted in Warminster based on number of pedestrians.

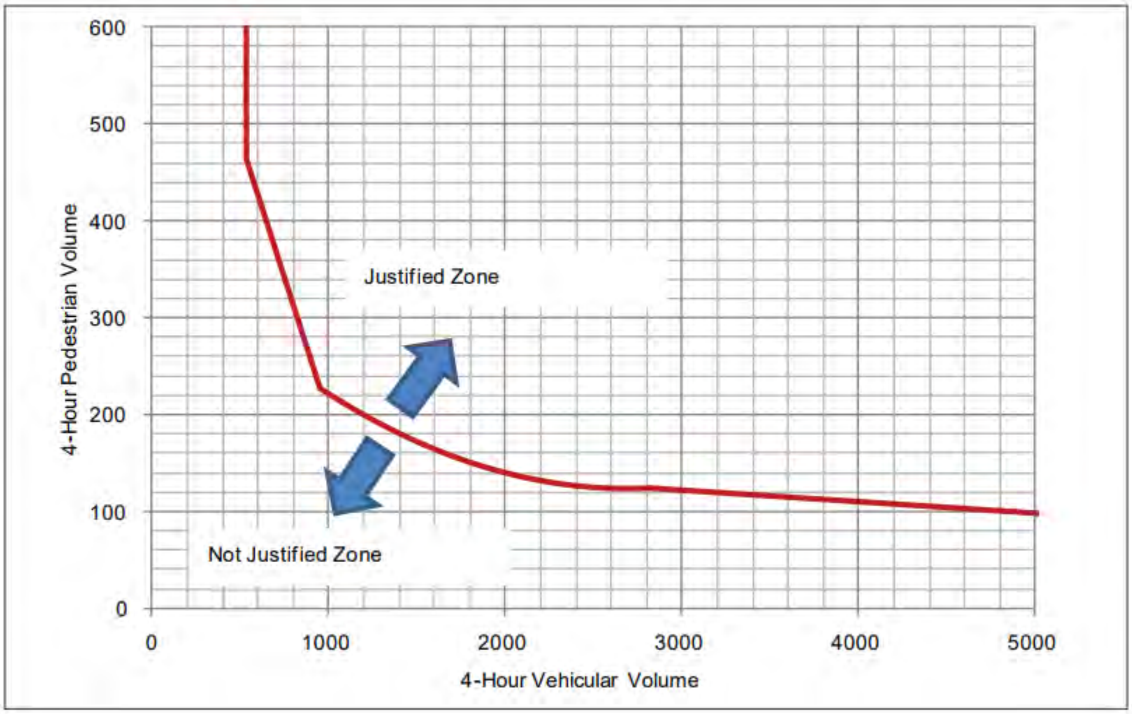


Figure 6: 4-Hour Pedestrian Volume Criterion for Communities of Populations Less than 10,000 (PXO Warrant)

Pedestrian system connectivity can also provide the justification for a PXO based on factors that provide connectivity. These factors include connecting crosswalks and sidewalks, or locations of pedestrian generators and attractors.

Warminster Elementary School is located on the south side of Warminster Sideroad and generates pedestrian traffic from the surrounding residential areas. Based on the connectivity aspect of the PXO warrant, Highway 12 and Warminster Sideroad intersection is warranted for a pedestrian crossover (PXO). Based on OTM Book 15, the Level 2 Type B is the appropriate PXO type given the number of lanes and 60 km/h speed limit on Highway 12.

4.0 Opportunities / Recommendations to Improve Safety

The ministry has reviewed the existing intersection and pedestrian crossover for safety and operational concerns and identified a number of opportunities and/or recommendations to improve overall safety at the intersection and through the community. These opportunities and recommendations are discussed below and summarized in Table 8:

- **Sign Improvements**

Based on the sign review, the following improvements are recommended based upon the sign condition and to improve conformance to OTM best practices. The ministry is responsible for these signing improvements:

- Replace Warminster Road guide signs on Highway 12 westbound, due to age and poor reflectivity
- Install School Area signs in both directions on Highway 12 in place of the School Crossing Ahead signs. School Crossing Ahead signs are normally only implemented at supervised school crossings. Although there is no longer a school crossing guard at this crossing, the warning signs remain in place. If School Area signs are installed the school crossing signs should be removed.
- Install missing Warminster Road guide signs (advance and turn off) on Highway 12 eastbound. This will provide better information to motorists on the presence of the intersection.
- Relocate Highway 12 eastbound regulatory speed limit sign (60 km/h). Currently it is partially blocking the Pedestrian Crossing Ahead sign.

- **Upgrade the existing PXO to Intersection Pedestrian Signal (IPS):**

Based upon the standard set out in the OTM manuals along with the pedestrian and traffic volumes, neither a full set of traffic signals nor an IPS is warranted. The ministry understands the concerns of the community and is open to the opportunity for the municipality to upgrade the PXO to an IPS to improve pedestrian safety through the community. If Oro-Medonte wishes to pursue this option, they would be responsible for the design and construction including all costs associated with the upgrade.

- **Reduce Speed Limit in vicinity of Warminster Elementary School**

The current speed limit through Warminster is 60 km/h, and based on TAC speed zoning methodology, this is considered an appropriate speed limit. However, the TAC methodology does not explicitly consider certain factors including highways through towns and school zones.

The location of Warminster Elementary School fronting Highway 12, with the requirement for many students to cross the highway to gain walking access to the school provides some justification to lower the speed limit in the vicinity of the school.

The current 60 km/h speed zone extends from 300 metres east of the Warminster Sideroad intersection to 760 metres west of the intersection. It is desirable to have a 500-metre minimum speed zone. As a preliminary recommendation, a new 50 km/h speed zone could extend from 300 metres east of the intersection to approximately 250 metres west of the intersection. There may be some opportunity to slightly extend this zone further to the east towards the Warminster boundary sign.

The ministry recommends that a 60 km/h zone remain when entering Warminster eastbound. This will allow a more gradual transition in speeds, and is more in keeping with driver expectations. This would result in a 60 km/h zone from 760 metres west of the intersection to 250 metres west of the intersection.

The preliminary recommendation for the proposed speed zoning is shown in Figure 7.

Any change to the speed limit through Warminster requires an amendment to Ontario Regulation 619 – Speed Limits under the Highway Traffic Act. The Ministry is responsible for processing the speed limit change. Speed limit changes also require consultation with the municipality, OPP and MPP before proceeding. The consultation and regulatory amendment process take approximately 6 months to complete.

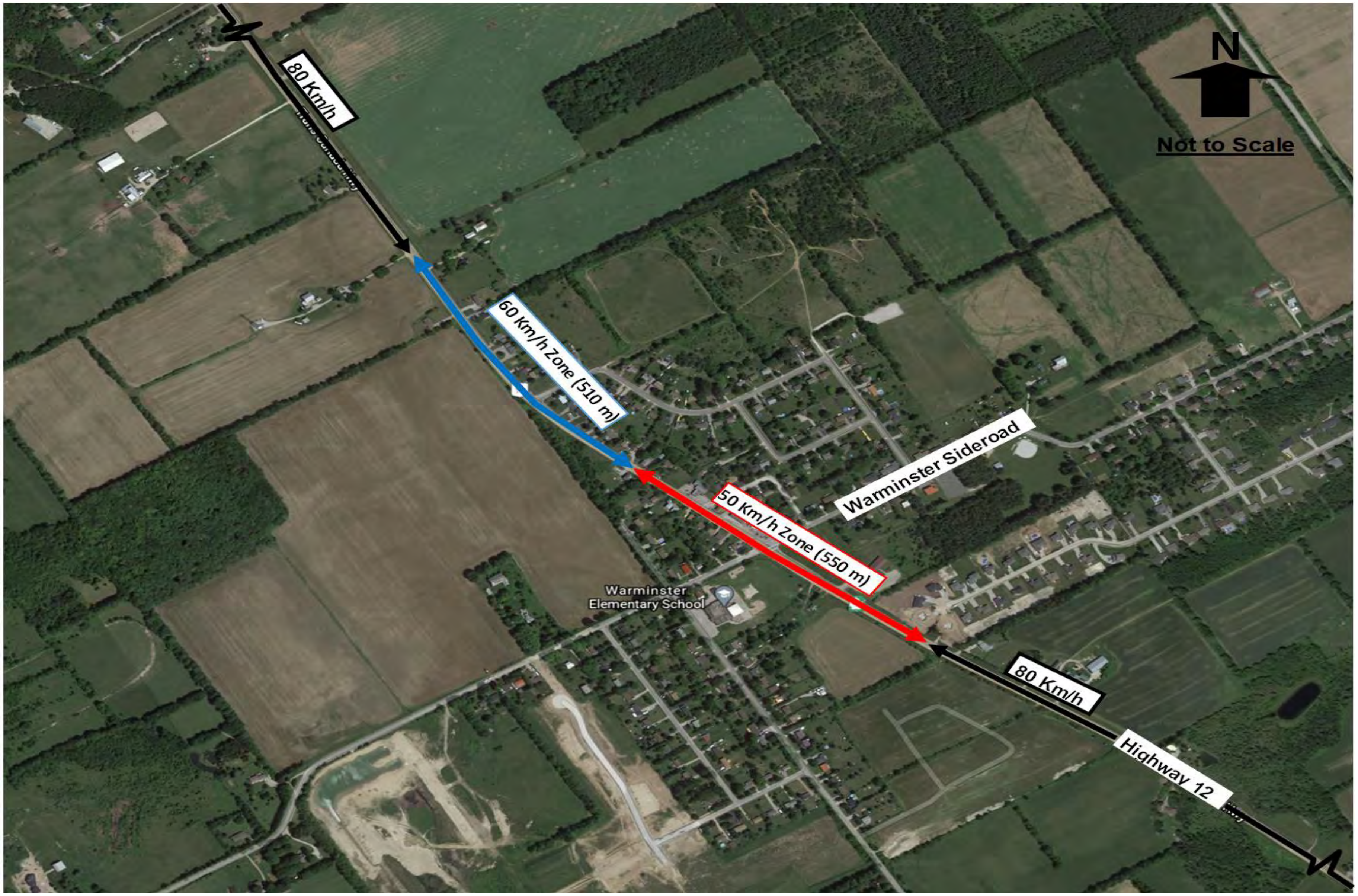


Figure 7: Highway 12 & Warminster Sideroad - Proposed Speed Zones

➢ Improve Speed Compliance

Although motorists are lowering their speeds, there are opportunities, beyond police enforcement, to encourage further compliance:

- Community Safety Zone (CSZ)

The implementation of a community safety zone on a provincial highway requires the municipality to initiate the request so this is an opportunity that the municipality can pursue. An amendment to Ontario Regulation 510/99 Community Safety Zones under the Highway Traffic Act (HTA) is required before the zone can be implemented. In addition, community safety zone signs must be posted. The Community Safety Zone document is available for reference in Appendix E.

It should be noted that automated speed enforcement (ASE) is not an option on provincial highways as part of community safety zones. Section 205 of the HTA limits the program to roadways under municipal responsibility.

- Radar Speed Signs/Speed Display Devices

Installing radar speed signs or Speed Display Devices (SDD) can be a tool to reduce vehicle speeds in the Warminster community. The operating speeds of motorists are displayed visually which provides an active reminder to comply with the posted speed limit. The ministry follows TAC's guidelines for SDD. Based on TAC's recommendations, the ministry supports the temporary use of SDD on provincial highways but does not support their long-term use.

The ministry does not use/deploy radar speed signs but allows municipalities to install under encroachment permit. The permanent installation of radar speed signs is not recommended, due to the signs losing their effectiveness over time. SDD are most effective immediately after installation and the effect on driver behaviour then drops off. Portable units are recommended so they can be removed and redeployed at intervals to maintain their effectiveness and that drivers do not become accustomed to the device.

If the Township wishes to pursue radar speed signs, the ministry recommends the signs be installed temporarily near the beginning of the school year and after holiday breaks, no longer than two weeks at a time to maintain their effectiveness on driver behavior. Coordination with OPP enforcement is beneficial as part of an overall safety campaign through the community.

➢ Enforcement

Given the role of driver behaviour in the effective and safe functioning of the PXO, OPP presence for enforcement compliance with PXO operation is important to its overall success. Enforcement also encourages compliance with the reduced speed limit which enhances overall pedestrian and community safety.

MTO has engaged the OPP regarding increased enforcement in Warminster and the OPP should be included as an active partner with any future initiatives to improve safety on Highway 12 through Warminster.

- **Education**

Ongoing public education on the use of PXOs and legal requirements for drivers to stop is another important component of community and pedestrian safety. MTO can utilize portable variable message signs at this site with targeted messaging for drivers as necessary.

There is also information available on the ministry's website regarding driving laws for pedestrian crossovers. Ultimately each driver is responsible for understanding the rules of road and complying with those rules and penalties for drivers who endanger pedestrians are severe.

The ministry developed a brochure specific to PXO rules of the road to support public education from both a motorist and pedestrian perspective. This was distributed during a public education session held jointly with the MTO/OPP at the Warminster Elementary School when the PXO was implemented. It is available electronically as reference, and can be shared with the municipality and other stakeholders, although information on HTA penalties in the brochure is outdated.

Table 8: Summary of Opportunities to Improve Safety

Type of Improvement	Recommendation/Opportunity	Lead Role	Level of Difficulty to implement and/ or comments
Signing	Modify/replace various signs including: • Install School Area signs in both directions on Highway 12. School crossing signs should be removed. • Install missing Warminster Road guide signs (advance and turn off) on Highway 12 eastbound. • Replace Warminster Road guide signs on Highway 12 westbound due to age and poor reflectivity • Relocate Highway 12 eastbound regulatory speed limit sign (60 km/h). Currently it is partially blocking the Pedestrian Crossing Ahead sign.	MTO	Easy. Could proceed in spring after ground has thawed.
Upgrade PXO	• Upgrade the PXO to an Intersection Pedestrian Signal (IPS). • Considered a municipal initiative	Oro-Medonte	More Challenging Requires procurement and oversight of design consultant and construction contractor plus financial commitment.
Modify speed limit through town	• Reduce speed limit to 50 km/h for approximately 550 metres incorporating PXO, school area and Warminster Sideroad intersection. • Keep 60 km/h speed limit for remainder of speed zone through Warminster (west of intersection).	MTO	Moderate. Requires stakeholder consultation and HTA regulatory amendment.
Improve Speed limit compliance	There are opportunities to improve speed limit compliance beyond OPP enforcement. Both would be municipal initiatives: • Initiate a community safety zone. Traffic related offences committed within the zone are subject to increased fines.	Oro-Medonte	Moderate. Community Safety Zone requires regulatory amendment as well as signs to be posted.

	• Implement Speed Display Devices (SDD) on temporary basis at strategic times.		SDD could be a quick win if the Township currently has the signs and is familiar with their use and deployment.
Enforcement	Engage OPP as a partner in highway safety: • Provide enforcement of PXO and speed limit compliance, as resources and priorities permit. • Support further safety initiatives (community safety zone, speed limit reduction, education, etc).	OPP	Moderate. Requires OPP resources which may not always be available
Education	Information on use of PXOs is available in various ways: • Electronic message signs (PVMSs) on the highway can raise awareness of the PXO and alert drivers of the need to stop • Ministry website, driver training materials are readily available • PXO Brochure has been developed with rules of the road and tips for pedestrians, drivers and cyclists.	MTO	Easy. Information is readily available but requires road users to be responsible to educate themselves on the rules of the road and to follow those rules.

Appendices

Appendix A: PXO monitoring data

Appendix B: Speed Studies (4 Stations)

Appendix C: TAC Speed limit Analysis

Appendix D: Turning Movement Counts (2019, 2016)

Appendix E: Community Safety Zone Documents

Appendix A: PXO Monitoring Data

05-Oct-20	
8:15 - 9:10	
Time	# of Ped
8:56	6
8:58	2
8:59	2
9:00	1
9:03	3
9:07	1
Total	**15**
Frequency	5
15:00 - 16:00	
15:19	1
15:21	1
15:24	2
15:26	2
15:31	2
15:32	9
15:34	3
15:41	3
Total	**23**
Frequency	8

06-Oct-20		
8:15 - 9:10		
Time	# of Ped	Comment
8:51	1	
8:53	1	
8:57	2	
8:59	6	
9:00	3	
9:02	3	
9:04	1	
9:06	1	4 vehicles noncomp
Total	**18**	
Frequency	8	

07-Oct-20		
8:15 - 9:10		
Time	# of Ped	Comment
9:06	1	rain
9:39	1	
total	**2**	
Frequency	2	
15:00 - 16:00		
15:31	6	
15:34	3	
total	**9**	
Frequency	2	

08-Oct-20		
8:15 - 9:10		
Time	Number of Ped	Comment
8:54	3	platoon
8:59	4	White van does
9:01	4	
9:04	1	
9:06	2	3 vehicles do not
Total	**14**	
Frequency	5	
15:00 - 16:00		
15:21	1	
15:28	1	
15:32	6	one veh d
15:38	3	
15:49	2	
Total	**13**	
Frequency	5	

09-Oct-20		
Time	# of Ped	Comment
8:54	3	
Total	**3**	
Frequency	1	
15:00 - 16:00		
15:25	1	Left turning veh blocking sightline
15:31	1	
15:33	4	
15:34	3	car does not stop but slows down
15:35	5	3 car passby when PXO active
15:41	1	Note - Running across
15:43	1	1 veh non compl
15:46	3	
Total	**19**	
Frequency	8	

13-Oct-20		
Time	# of Ped	Comment
8:50	2	
8:55	2	
8:57	3	
8:58	1	
8:59	5	
9:00	2	
9:02	1	
Total	**16**	
Frequency	7	
15:00 - 16:00		
Camera Feed Down		
Frequency	0	

14-Oct-20		
Time	# of Ped	Comment
8:56	3	
8:57	2	
8:58	4	
8:59	1	
9:00	2	
9:01	1	
9:02	2	
9:03	4	
9:04	3	
9:05	1	
9:06	1	
9:08	1	
Total	**25**	
Frequency	12	
15:00 - 16:00		
Camera Feed Issues		
15:43	1	
Total	**1**	
Frequency	1	

15-Oct-20		
Time	# of Ped	Comment
8:58	1	
8:59	2	
9:08	1	
Total	**4**	
Frequency	3	
15:00 - 16:00		
15:23	1	
15:32	4	
15:35	3	
15:40	1	
15:52	1	
15:56	1	
Total	**11**	
Frequency	6	

16-Oct-20		
Time	# of Ped	Comment
8:52	2	
Total	**2**	
Frequency	1	
15:00 - 16:00		
Camera Feed Down		
Frequency	0	

19-Oct-20		
Time	# of Ped	Comment
8:52	1	
8:58	4	
Total	**5**	
Frequency	2	
15:00 - 16:00		
15:24	2	
15:26	1	
15:29	3	
15:31	7	
15:32	2	
15:33	4	
15:35	2	
15:38	1	
Total	**22**	
Frequency	8	

20-Oct-20		
Time	# of Ped	Comment
8:57	3	
9:01	2	
Total	**5**	
Frequency	2	
15:00 - 16:00		
15:22	1	
15:26	1	
15:29	1	
15:31	4	
15:32	1	
15:36	4	
15:38	1	
15:45	3	
Total	**16**	
Frequency	8	

21-Oct-20		
Time	# of Ped	Comment
8:54	1	
8:59	2	
9:01	2	
9:05	4	
9:06	1	
Total	**10**	
Frequency	5	
15:00 - 16:00		
15:24	1	
15:31	5	
15:32	1	
15:34	3	
15:35	1	
Total	**11**	
Frequency	5	

22-Oct-20		
Time	# of Ped	Comment
8:55	2	
9:00	2	
9:03	1	
9:05	1	
9:07	1	
Total	**7**	
Frequency	5	
15:00 - 16:00		
15:25	1	
15:28	2	
15:29	2	
15:31	5	
15:32	2	
15:33	1	
15:34	5	
15:36	2	
15:38	1	
15:39	2	
Total	**23**	
Frequency	10	

23-Oct-20		
Time	# of Ped	Comment
	PA DAY	
Frequency	0	
Frequency	0	

26-Oct-20			27-Oct-20			28-Oct-20			29-Oct-20			30-Oct-20			02-Nov-20		
Time	# of Ped	Comment	Time	# of Ped	Comment	Time	# of Ped	Comment	Time	# of Ped	Comment	Time	# of Ped	Comment	Time	# of Ped	Comment
9:01	3		9:00	2		8:53	1		8:53	1		8:52	5	3 bike	8:51	2	
9:03	3					8:55	2		8:55	1		8:58	2		8:53	1	Proceeded while crossing
9:04	2					8:57	2		9:06	1		9:00	1		8:55	2	
9:05	2					9:01	6					9:03	2		8:57	1	
9:06	1					9:03	2					9:06	1		9:00	3	1bike
						9:04	5								9:01	3	
						9:05	2								9:02	2	
						9:07	2								9:06	2	
															9:10	1	
Total	**11**		**Total**	**2**		**Total**	**22**		**Total**	**3**		**Total**	**11**		**Total**	**17**	
Frequency	5		Frequency	1		Frequency	8		Frequency	3		Frequency	5		Frequency	9	
15:00 - 16:00			15:00 - 16:00			15:00 - 16:00			15:00 - 16:00			15:00 - 16:00			15:00 - 16:00		
15:27	1		15:30	2		15:22	1		15:31	3		15:29	1		15:29	1	
15:29	2		15:32	3		15:24	1		15:32	2		15:32	2		15:31	7	
15:32	5		15:38	1		15:29	1		15:33	3	1bike	15:33	5	1bike	15:34	2	
15:33	4					15:45	3		15:35	1	bike	15:35	4	1bike	15:38	2	
15:44	1								15:37	2		15:44	1	1bike	15:44	2	
15:59	1														15:51	2	
															16:01	1	
Total	**14**		**Total**	**6**		**Total**	**6**		**Total**	**11**		**Total**	**13**		**Total**	**17**	
Frequency	6		Frequency	3		Frequency	4		Frequency	5		Frequency	5		Frequency	7	

Appendix B: Speed Studies (4 Stations)

Vehicle Speed Report Generator

Date Processed 10/09/2020

Lhrs/os	19470/8.84	**Date**	2020-10-08
Highway	12	**Time Period**	0315pm-0425pm
Direction	EB	**Stream**	
Location	HWY 12 0.13km east of Warminster Sdrd	**File Name**	
Request Number	359-915 (b)		
Posted Speed	60 km/h		
Total Traffic Passing Test Point	143		

H.R.S	98
L.R.S.	60
85 %ile	81
% Comp	2.1
Pace	68 - 84
% in Pace	80.4
Mean Speed	75.7
Std. Dev.	6.7

KM/Hr	Cars & Light Vehicles	Total Cars	Heavy Vehicles	Total Trucks	Tot Veh	Cum Total	CUM %
>124		0		0	0		
124		0		0	0		
122		0		0	0		
120		0		0	0		
118		0		0	0		
116		0		0	0		
114		0		0	0		
112		0		0	0		
110		0		0	0		
108		0		0	0		
106		0		0	0		
104		0		0	0		
102		0		0	0		
100		0		0	0		
98	*	1		0	1	143	100.0
96		0		0	0		
94	*	1		0	1	142	99.3
92	**	2		0	2	141	98.6
90	*	1		0	1	139	97.2
88	**	2		0	2	138	96.5
86	***	3		0	3	136	95.1
84	******	6		0	6	133	93.0
82	*********	9		0	9	127	88.8
80	*************	13		0	13	118	82.5
78	******************	18	**	2	20	105	73.4
76	*********************	21	**	2	23	85	59.4
74	****************	16	*	1	17	62	43.4
72	**************	14		0	14	45	31.5
70	***********	11		0	11	31	21.7
68	*******	7	*	1	8	20	14.0
66	***	3		0	3	12	8.4
64	**	2	*	1	3	9	6.3
62	*	1	**	2	3	6	4.2
60	**	2	*	1	3	3	2.1
58		0		0	0		
56		0		0	0		
54		0		0	0		
52		0		0	0		
50		0		0	0		
48		0		0	0		
46		0		0	0		
44		0		0	0		
42		0		0	0		
40		0		0	0		
38		0		0	0		
36		0		0	0		
34		0		0	0		
32		0		0	0		
30		0		0	0		
28		0		0	0		
26		0		0	0		
24		0		0	0		
22		0		0	0		
20		0		0	0		
18		0		0	0		
16		0		0	0		
<16		0		0	0		
Totals		**133**		**10**	**143**		

Vehicle Speed Report Generator

Date Processed 10/09/2020

Lhrs/os	19470/8.84	**Date**	2020-10-08
Highway	12	**Time Period**	0315pm-0425pm
Direction	WB	**Stream**	
Location	HWY 12 0.13km east of Warminster Sdrd	**File Name**	
Request Number	359-915 (b)		
Posted Speed	60 km/h		
Total Traffic Passing Test Point	143		

H.R.S	96
L.R.S.	54
85 %ile	77
% Comp	8.4
Pace	60 - 76
% in Pace	76.9
Mean Speed	69.5
Std. Dev.	7.4

KM/Hr	Cars & Light Vehicles	Total Cars	Heavy Vehicles	Total Trucks	Tot Veh	Cum Total	CUM %
>124		0		0	0		
124		0		0	0		
122		0		0	0		
120		0		0	0		
118		0		0	0		
116		0		0	0		
114		0		0	0		
112		0		0	0		
110		0		0	0		
108		0		0	0		
106		0		0	0		
104		0		0	0		
102		0		0	0		
100		0		0	0		
98		0		0	0		
96	*	1		0	1	143	100.0
94		0		0	0		
92	*	1		0	1	142	99.3
90	**	2		0	2	141	98.6
88	*	1		0	1	139	97.2
86	*	1		0	1	138	96.5
84	*	1		0	1	137	95.8
82	****	4		0	4	136	95.1
80	*****	5		0	5	132	92.3
78	*******	7		0	7	127	88.8
76	******	6		0	6	120	83.9
74	*******	7	*	1	8	114	79.7
72	***********	11		0	11	106	74.1
70	**********	10	**	2	12	95	66.4
68	*******************	19	***	3	22	83	58.0
66	****************	16	**	2	18	61	42.7
64	******************	18	***	3	21	43	30.1
62	*********	9	*	1	10	22	15.4
60	*******	7	*	1	8	12	8.4
58	**	2		0	2	4	2.8
56	*	1		0	1	2	1.4
54	*	1		0	1	1	0.7
52		0		0	0		
50		0		0	0		
48		0		0	0		
46		0		0	0		
44		0		0	0		
42		0		0	0		
40		0		0	0		
38		0		0	0		
36		0		0	0		
34		0		0	0		
32		0		0	0		
30		0		0	0		
28		0		0	0		
26		0		0	0		
24		0		0	0		
22		0		0	0		
20		0		0	0		
18		0		0	0		
16		0		0	0		
<16		0		0	0		
Totals		**130**		**13**	**143**		

Vehicle Speed Report Generator

Date Processed 10/09/2020

Lhrs/os	19470/8.57	**Date**	2020-10-08
Highway	12	**Time Period**	0150pm-0305pm
Direction	EB	**Stream**	
Location	HWY 12 0.40km east of Warminster Sdrd	**File Name**	
Request Number	359-915 (b)		
Posted Speed	80 km/h		
Total Traffic Passing Test Point	139		

		KM/Hr	Cars & Light Vehicles	Total Cars	Heavy Vehicles	Total Trucks	Tot Veh	Cum Total	CUM %
H.R.S		>124		0		0	0		
	108	124		0		0	0		
		122		0		0	0		
L.R.S.		120		0		0	0		
	70	118		0		0	0		
		116		0		0	0		
85		114		0		0	0		
%ile	93	112		0		0	0		
		110		0		0	0		
%		108	*	1		0	1	139	100.0
Comp	23.0	106	*	1		0	1	138	99.3
		104	**	2		0	2	137	98.6
Pace		102	*	1		0	1	135	97.1
	80 - 96	100	***	3		0	3	134	96.4
		98	***	3		0	3	131	94.2
% in		96	*******	7		0	7	128	92.1
Pace	74.1	94	********	8		0	8	121	87.1
		92	*********	9		0	9	113	81.3
Mean		90	*************	13		0	13	104	74.8
Speed	86.6	88	*************	13		0	13	91	65.5
		86	*****************	17	*	1	18	78	56.1
Std.		84	****************	16	*	1	17	60	43.2
Dev.	7.3	82	***********	11		0	11	43	30.9
		80	************	12	**	2	14	32	23.0
		78	*******	7		0	7	18	12.9
		76	****	4	*	1	5	11	7.9
		74	*	1	*	1	2	6	4.3
		72	*	1	**	2	3	4	2.9
		70		0	*	1	1	1	0.7
		68		0		0	0		
		66		0		0	0		
		64		0		0	0		
		62		0		0	0		
		60		0		0	0		
		58		0		0	0		
		56		0		0	0		
		54		0		0	0		
		52		0		0	0		
		50		0		0	0		
		48		0		0	0		
		46		0		0	0		
		44		0		0	0		
		42		0		0	0		
		40		0		0	0		
		38		0		0	0		
		36		0		0	0		
		34		0		0	0		
		32		0		0	0		
		30		0		0	0		
		28		0		0	0		
		26		0		0	0		
		24		0		0	0		
		22		0		0	0		
		20		0		0	0		
		18		0		0	0		
		16		0		0	0		
		<16		0		0	0		
		Totals		**130**		**9**	**139**		

Vehicle Speed Report Generator

Date Processed 10/09/2020

Lhrs/os	19470/8.57	**Date**	2020-10-08
Highway	12	**Time Period**	0150pm-0305pm
Direction	WB	**Stream**	
Location	HWY 12 0.40km east of Warminster Sdrd	**File Name**	
Request Number	359-915 (b)		
Posted Speed	80 km/h		
Total Traffic Passing Test Point	148		

H.R.S	108
L.R.S.	58
85 %ile	91
% Comp	43.2
Pace	76 - 92
% in Pace	64.2
Mean Speed	82.3
Std. Dev.	10.0

KM/Hr	Cars & Light Vehicles	Total Cars	Heavy Vehicles	Total Trucks	Tot Veh	Cum Total	CUM %
>124		0		0	0		
124		0		0	0		
122		0		0	0		
120		0		0	0		
118		0		0	0		
116		0		0	0		
114		0		0	0		
112		0		0	0		
110		0		0	0		
108	*	1		0	1	148	100.0
106	**	2		0	2	147	99.3
104	*	1		0	1	145	98.0
102	**	2		0	2	144	97.3
100	***	3		0	3	142	95.9
98	**	2		0	2	139	93.9
96	****	4		0	4	137	92.6
94	***	3		0	3	133	89.9
92	*****	5		0	5	130	87.8
90	*********	9		0	9	125	84.5
88	**********	10		0	10	116	78.4
86	**************	14	*	1	15	106	71.6
84	**************	14	*	1	15	91	61.5
82	************	12		0	12	76	51.4
80	************	12	**	2	14	64	43.2
78	***********	11	*	1	12	50	33.8
76	********	8		0	8	38	25.7
74	*****	5	*	1	6	30	20.3
72	***	3		0	3	24	16.2
70	***	3		0	3	21	14.2
68	*****	5	*	1	6	18	12.2
66	***	3	*	1	4	12	8.1
64	*	1	*	1	2	8	5.4
62	**	2	**	2	4	6	4.1
60	*	1		0	1	2	1.4
58	*	1		0	1	1	0.7
56		0		0	0		
54		0		0	0		
52		0		0	0		
50		0		0	0		
48		0		0	0		
46		0		0	0		
44		0		0	0		
42		0		0	0		
40		0		0	0		
38		0		0	0		
36		0		0	0		
34		0		0	0		
32		0		0	0		
30		0		0	0		
28		0		0	0		
26		0		0	0		
24		0		0	0		
22		0		0	0		
20		0		0	0		
18		0		0	0		
16		0		0	0		
<16		0		0	0		
Totals		**137**		**11**	**148**		

Vehicle Speed Report Generator

Date Processed 10/09/2020

Lhrs/os	19480/0.20	**Date**	2020-10-08
Highway	12	**Time Period**	1237pm-0148pm
Direction	EB	**Stream**	
Location	HWY 12 0.20km west of Warminster Sdrd	**File Name**	
Request Number	359-915 (b)		
Posted Speed	60 km/h		
Total Traffic Passing Test Point	142		

		KM/Hr	Cars & Light Vehicles	Total Cars	Heavy Vehicles	Total Trucks	Tot Veh	Cum Total	CUM %
H.R.S		>124		0		0	0		
	96	124		0		0	0		
		122		0		0	0		
L.R.S.		120		0		0	0		
	52	118		0		0	0		
		116		0		0	0		
85		114		0		0	0		
%ile	77	112		0		0	0		
		110		0		0	0		
%		108		0		0	0		
Comp	16.9	106		0		0	0		
		104		0		0	0		
Pace		102		0		0	0		
	60 - 76	100		0		0	0		
		98		0		0	0		
% in		96	*	1		0	1	142	100.0
Pace	69.7	94	*	1		0	1	141	99.3
		92	*	1		0	1	140	98.6
Mean		90	**	2		0	2	139	97.9
Speed	69.2	88	*	1		0	1	137	96.5
		86	*	1		0	1	136	95.8
Std.		84	**	2		0	2	135	95.1
Dev.	8.5	82	***	3		0	3	133	93.7
		80	****	4	*	1	5	130	91.5
		78	*******	7		0	7	125	88.0
		76	******	6	*	1	7	118	83.1
		74	**********	10		0	10	111	78.2
		72	************	12		0	12	101	71.1
		70	***********	11	***	3	14	89	62.7
		68	***********	11		0	11	75	52.8
		66	**************	14	**	2	16	64	45.1
		64	**********	10	*	1	11	48	33.8
		62	************	12	*	1	13	37	26.1
		60	************	12		0	12	24	16.9
		58	********	8		0	8	12	8.5
		56	*	1		0	1	4	2.8
		54	**	2		0	2	3	2.1
		52	*	1		0	1	1	0.7
		50		0		0	0		
		48		0		0	0		
		46		0		0	0		
		44		0		0	0		
		42		0		0	0		
		40		0		0	0		
		38		0		0	0		
		36		0		0	0		
		34		0		0	0		
		32		0		0	0		
		30		0		0	0		
		28		0		0	0		
		26		0		0	0		
		24		0		0	0		
		22		0		0	0		
		20		0		0	0		
		18		0		0	0		
		16		0		0	0		
		<16		0		0	0		
		Totals		**133**		**9**	**142**		

Vehicle Speed Report Generator

Date Processed 10/09/2020

Lhrs/os	19480/0.20	**Date**	2020-10-08
Highway	12	**Time Period**	1237pm-0148pm
Direction	WB	**Stream**	
Location	HWY 12 0.20km west of Warminster Sdrd	**File Name**	
Request Number	359-915 (b)		
Posted Speed	60 km/h		
Total Traffic Passing Test Point	144		

H.R.S	90
L.R.S.	50
85 %ile	75
% Comp	22.2
Pace	58 - 74
% in Pace	72.9
Mean Speed	67.5
Std. Dev.	8.1

KM/Hr	Cars & Light Vehicles	Total Cars	Heavy Vehicles	Total Trucks	Tot Veh	Cum Total	CUM %
>124		0		0	0		
124		0		0	0		
122		0		0	0		
120		0		0	0		
118		0		0	0		
116		0		0	0		
114		0		0	0		
112		0		0	0		
110		0		0	0		
108		0		0	0		
106		0		0	0		
104		0		0	0		
102		0		0	0		
100		0		0	0		
98		0		0	0		
96		0		0	0		
94		0		0	0		
92		0		0	0		
90	**	2		0	2	144	100.0
88	*	1		0	1	142	98.6
86	***	3		0	3	141	97.9
84	**	2		0	2	138	95.8
82	***	3		0	3	136	94.4
80	****	4		0	4	133	92.4
78	*****	5		0	5	129	89.6
76	****	4	*	1	5	124	86.1
74	******	6		0	6	119	82.6
72	*********	9	*	1	10	113	78.5
70	***********	11	*	1	12	103	71.5
68	*************	13	**	2	15	91	63.2
66	************	12	***	3	15	76	52.8
64	**************	14		0	14	61	42.4
62	*************	13	**	2	15	47	32.6
60	**************	14	*	1	15	32	22.2
58	*********	9		0	9	17	11.8
56	****	4		0	4	8	5.6
54	*	1		0	1	4	2.8
52	**	2		0	2	3	2.1
50	*	1		0	1	1	0.7
48		0		0	0		
46		0		0	0		
44		0		0	0		
42		0		0	0		
40		0		0	0		
38		0		0	0		
36		0		0	0		
34		0		0	0		
32		0		0	0		
30		0		0	0		
28		0		0	0		
26		0		0	0		
24		0		0	0		
22		0		0	0		
20		0		0	0		
18		0		0	0		
16		0		0	0		
<16		0		0	0		
Totals		**133**		**11**	**144**		

Vehicle Speed Report Generator

Date Processed 10/09/2020

Lhrs/os	19480/0.82	**Date**	2020-10-09
Highway	12	**Time Period**	1105am-1223pm
Direction	EB	**Stream**	
Location	HWY 12 0.82km west of Warminster Sdrd	**File Name**	
Request Number	359-915 (b)		
Posted Speed	80 km/h		
Total Traffic Passing Test Point	143		

		KM/Hr	Cars & Light Vehicles	Total Cars	Heavy Vehicles	Total Trucks	Tot Veh	Cum Total	CUM %
H.R.S		>124		0		0	0		
	120	124		0		0	0		
		122		0		0	0		
L.R.S.		120	*	1		0	1	143	100.0
	74	118	*	1		0	1	142	99.3
		116	**	2		0	2	141	98.6
85		114	*	1		0	1	139	97.2
%ile	103	112	**	2		0	2	138	96.5
		110	****	4		0	4	136	95.1
%		108	**	2		0	2	132	92.3
Comp	9.8	106	****	4		0	4	130	90.9
		104	*******	7		0	7	126	88.1
Pace		102	*******	7		0	7	119	83.2
	86 - 102	100	***********	11		0	11	112	78.3
		98	*************	13	*	1	14	101	70.6
% in		96	***********	11	*	1	12	87	60.8
Pace	61.5	94	*********	9		0	9	75	52.4
		92	*********	9	*	1	10	66	46.2
Mean		90	************	12		0	12	56	39.2
Speed	94.2	88	***********	11	*	1	12	44	30.8
		86	******	6	**	2	8	32	22.4
Std.		84	****	4	**	2	6	24	16.8
Dev.	9.5	82	***	3	*	1	4	18	12.6
		80	******	6	*	1	7	14	9.8
		78	**	2		0	2	7	4.9
		76	****	4		0	4	5	3.5
		74	*	1		0	1	1	0.7
		72		0		0	0		
		70		0		0	0		
		68		0		0	0		
		66		0		0	0		
		64		0		0	0		
		62		0		0	0		
		60		0		0	0		
		58		0		0	0		
		56		0		0	0		
		54		0		0	0		
		52		0		0	0		
		50		0		0	0		
		48		0		0	0		
		46		0		0	0		
		44		0		0	0		
		42		0		0	0		
		40		0		0	0		
		38		0		0	0		
		36		0		0	0		
		34		0		0	0		
		32		0		0	0		
		30		0		0	0		
		28		0		0	0		
		26		0		0	0		
		24		0		0	0		
		22		0		0	0		
		20		0		0	0		
		18		0		0	0		
		16		0		0	0		
		<16		0		0	0		
		Totals		**133**		**10**	**143**		

Vehicle Speed Report Generator

Date Processed 10/09/2020

Lhrs/os	19480/0.82	**Date**	2020-10-09
Highway	12	**Time Period**	1105am-1223pm
Direction	WB	**Stream**	
Location	HWY 12 0.82km west of Warminster Sdrd	**File Name**	
Request Number	359-915 (b)		
Posted Speed	80 km/h		
Total Traffic Passing Test Point	148		

		KM/Hr	Cars & Light Vehicles	Total Cars	Heavy Vehicles	Total Trucks	Tot Veh	Cum Total	CUM %
H.R.S		>124		0		0	0		
	102	124		0		0	0		
		122		0		0	0		
L.R.S.		120		0		0	0		
	62	118		0		0	0		
		116		0		0	0		
85		114		0		0	0		
%ile	91	112		0		0	0		
		110		0		0	0		
%		108		0		0	0		
Comp	31.8	106		0		0	0		
		104		0		0	0		
Pace		102	*	1		0	1	148	100.0
	78 - 94	100	**	2		0	2	147	99.3
		98	***	3		0	3	145	98.0
% in		96	****	4		0	4	142	95.9
Pace	69.6	94	*******	7		0	7	138	93.2
		92	*********	9		0	9	131	88.5
Mean		90	************	12		0	12	122	82.4
Speed	84.0	88	****************	16	*	1	17	110	74.3
		86	*****************	17	*	1	18	93	62.8
Std.		84	************	12	**	2	14	75	50.7
Dev.	7.8	82	*************	13	*	1	14	61	41.2
		80	*********	9	**	2	11	47	31.8
		78	*******	7	*	1	8	36	24.3
		76	******	6	**	2	8	28	18.9
		74	*******	7		0	7	20	13.5
		72	****	4	*	1	5	13	8.8
		70	**	2		0	2	8	5.4
		68	**	2		0	2	6	4.1
		66	*	1		0	1	4	2.7
		64	**	2		0	2	3	2.0
		62	*	1		0	1	1	0.7
		60		0		0	0		
		58		0		0	0		
		56		0		0	0		
		54		0		0	0		
		52		0		0	0		
		50		0		0	0		
		48		0		0	0		
		46		0		0	0		
		44		0		0	0		
		42		0		0	0		
		40		0		0	0		
		38		0		0	0		
		36		0		0	0		
		34		0		0	0		
		32		0		0	0		
		30		0		0	0		
		28		0		0	0		
		26		0		0	0		
		24		0		0	0		
		22		0		0	0		
		20		0		0	0		
		18		0		0	0		
		16		0		0	0		
		<16		0		0	0		
		Totals		**137**		**11**	**148**		

Appendix C: TAC Speed limit Analysis

Automated Speed Limit Guidelines

FORM A - Automated Speed Limit Guidelines Spreadsheet

Version: 10-Apr-09

Name of Corridor:	Highway 12 (Warminster)		
Segment Evaluated:	200m east of Warminster Sideroad	to	300m west of Warminster Sideroad
Geographic Region:	Central Region		
Road Agency:	Ministry of Transportation		

Road Classification:	Arterial	Length of Corridor:	500	m
Urban / Rural:	Urban	Design Speed: (Required for Freeway, Expressway, Highway)		km/h
Divided / Undivided:	Undivided	Current Posted Speed: (For information only)	60	km/h
Major / Minor:	Major	Prevailing Speed: (85th Percentile - for information only)	77	km/h
# Through Lanes Per Direction:	1 lane	Policy: (Maximum Posted Speed)		

		RISK	Score
A1	GEOMETRY (Horizontal)	Lower	2
A2	GEOMETRY (Vertical)	Lower	2
A3	AVERAGE LANE WIDTH	Higher	6
B	ROADSIDE HAZARDS	Higher	3
C1	PEDESTRIAN EXPOSURE	Higher	9
C2	CYCLIST EXPOSURE	Medium	6
D	PAVEMENT SURFACE	Lower	1
E1	NUMBER OF INTERSECTIONS WITH PUBLIC ROADS	*Number of Occurrences*	13
	STOP controlled intersection		
	Signalized intersection	1	
	Roundabout or traffic circle		
	Crosswalk	0	
	Active, at-grade railroad crossing		
	Sidestreet STOP-controlled or lane	3	
E2	NUMBER OF INTERSECTIONS WITH PRIVATE ACCESS DRIVEWAYS	*Number of Occurrences*	15
	Left turn movements permitted	23	
	Right-in / Right-out only	0	
E3	NUMBER OF INTERCHANGES	*Number of Occurrences*	0
	Number of interchanges along corridor	0	
F	ON-STREET PARKING	N/A	0

Total Risk Score: 57

Recommended Posted Speed Limit (km/h):

As determined by road characteristics: 60

As determined by policy:

The recommended posted speed limit may be checked against the prevailing speeds of the roadway and the road's safety performance.

Comments:

Appendix D: Turning Movement Counts (2019, 2016)

Ministry of Transportation
Ministère des Transports

Intersection Layout Sheet

Version: 1.0 Feb 1, 2016

2019

Contract # 9015-E-0009
Work Order # 120

Date: Nov 13 / Day: Wednesday Hrs: 7 – 9 + 11 – 14 + 15 – 18

Location: HWY 12 & WARMINISTER SDRD Ramps: /

Reg/Mun: CR Town/City: Coldwater Area:

File Name: 0194800000 Device: Gretch / Jamar Unit # 22 / Interval 1: AM / NN / PM

Observer: Vadim Potiyenko Weather: Clear / Clear Road Condition: Dry / Dry

LHRS & O/S: 19480 0.00

GPS: G-Star IV

Datum: WGS 84 Y / N

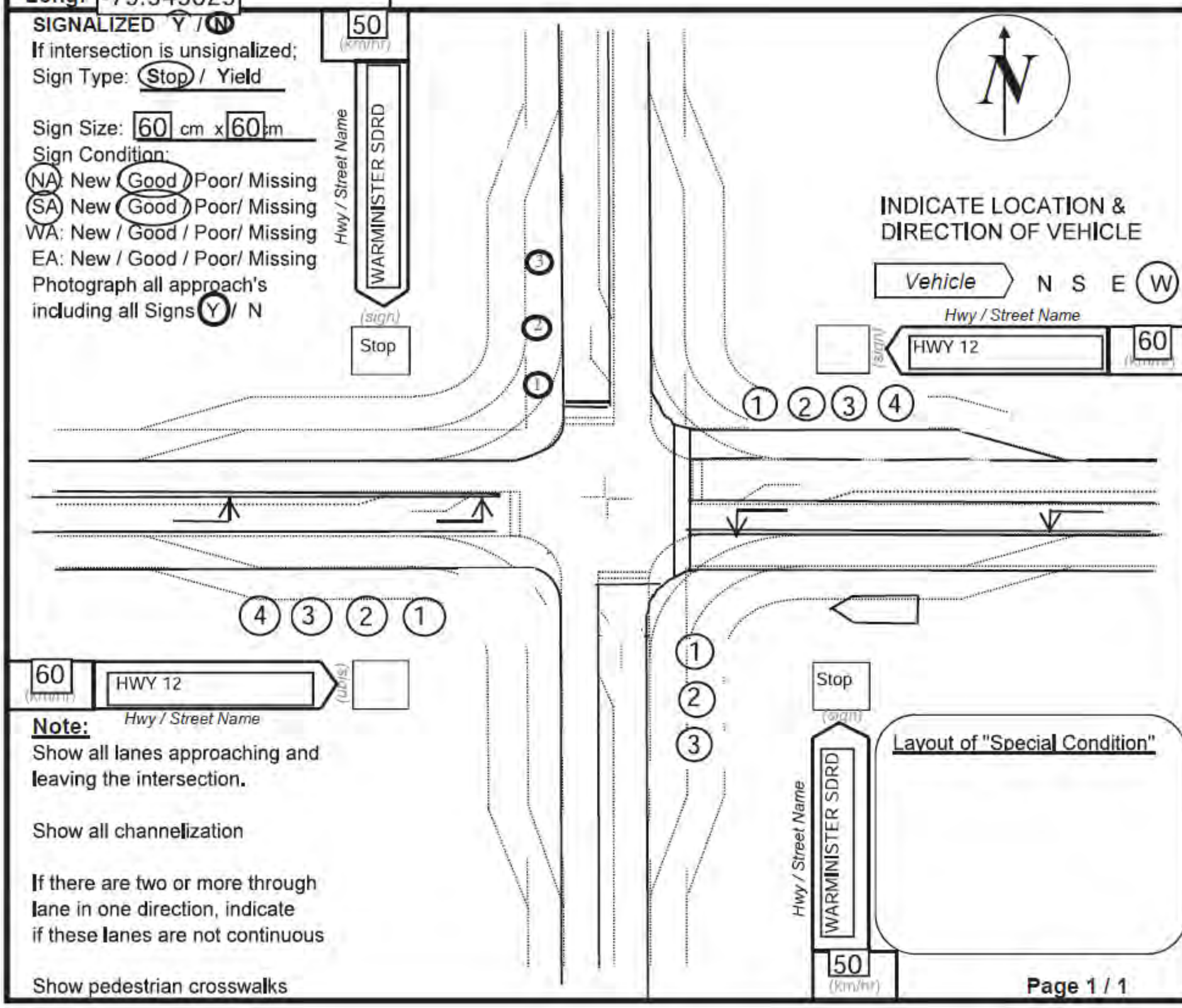
Lat: 44.639911

Long: -79.545029

Comments:

SIGNALIZED Y / N
If intersection is unsignalized;
Sign Type: Stop / Yield

Sign Size: 60 cm x 60 cm
Sign Condition:
NA: New / Good / Poor/ Missing
SA: New / Good / Poor/ Missing
WA: New / Good / Poor/ Missing
EA: New / Good / Poor/ Missing
Photograph all approach's including all Signs Y / N



Note:
Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continuous

Show pedestrian crosswalks

Page 1 / 1

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

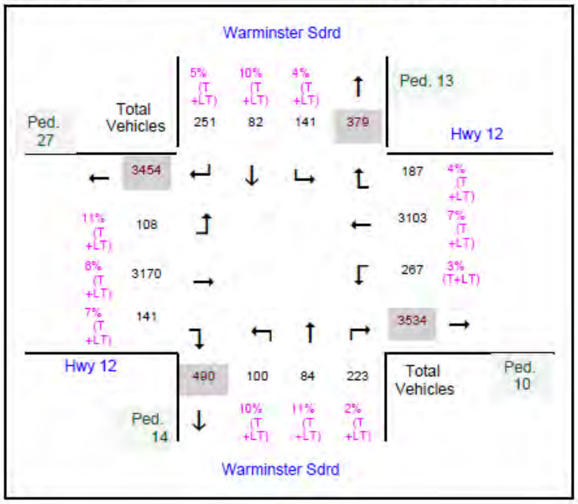
Turning Movement Total Count and Peak Summary Report

Description: Hwy 12 @ Warminster Sdrd

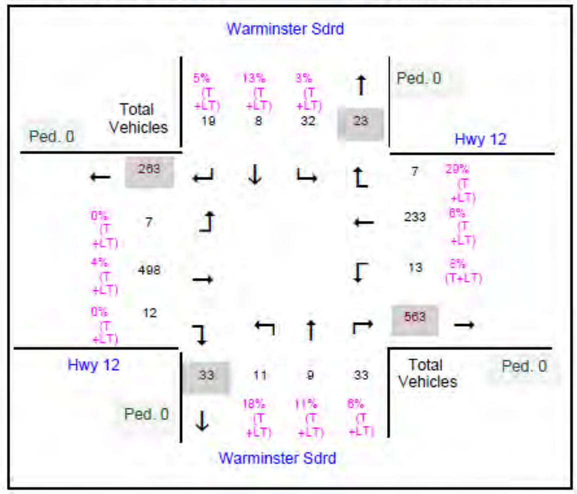
Region:	CENTRAL	**Survey Type:**	TM – Intersection	**Hwy:**	12
Start Date:	13-Nov-2019 (Wed)	**I/C Side:**		**LHRS:**	19480
End Date:	13-Nov-2019 (Wed)	**Int. Type:**	Four Leg	**Offset:**	0

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

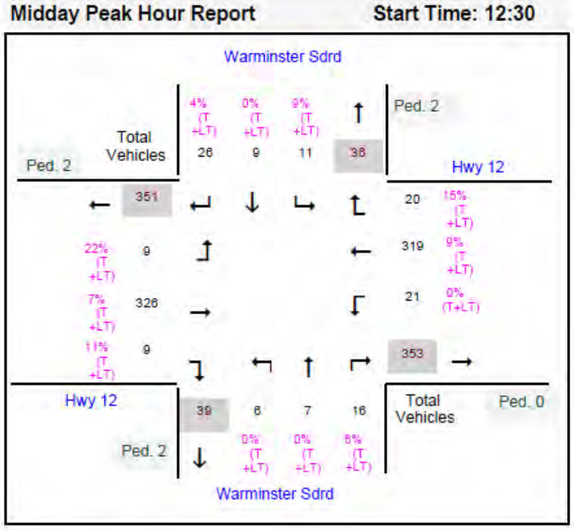
Total Count Number of hours: 8



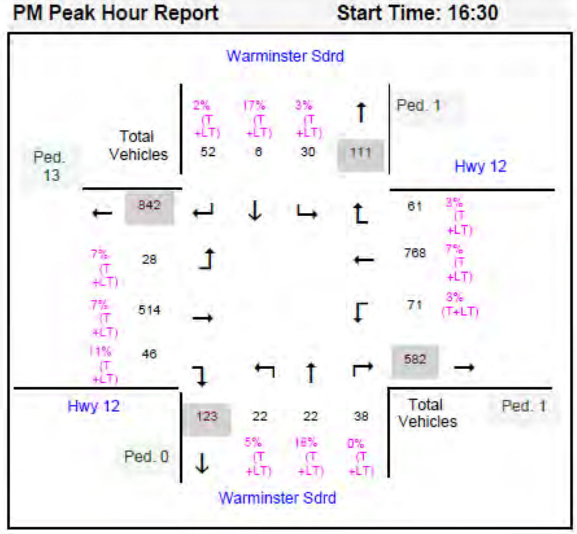
AM Peak Hour Report Start Time: 07:15



Midday Peak Hour Report Start Time: 12:30



PM Peak Hour Report Start Time: 16:30



Ontario
Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement 15 Minute Report

Description: Hwy 12 @ Warminster Sdrd
Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12
Start Date: 13-Nov-2019 (Wed) **I/C Side:** **LHRS:** 19480
End Date: 13-Nov-2019 (Wed) **Int. Type:** Four Leg **Offset:** 0
Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

	Major Road Approaches																				Minor Road Approaches																				
	East Hwy 12										West Hwy 12										North Warminster Sdrd										South Warminster Sdrd										
Start	Cars			Trucks			Long Trucks				Cars			Trucks			Long Trucks				Cars			Trucks			Long Trucks				Cars			Trucks			Heavy Trucks				Total
Time	←	↑	→	←	↑	→	←	↑	→	Ped	←	↑	→	←	↑	→	←	↑	→	Ped	←	↑	→	←	↑	→	←	↑	→	Ped	←	↑	→	←	↑	→	←	↑	→	Ped	Veh.
Period 1																																									
07:00	7	68	2	0	1	0	0	2	0	1	0	87	0	0	2	0	0	3	0	4	4	0	1	0	0	0	0	0	0	0	1	2	5	0	0	0	0	0	0	0	185
07:15	4	51	1	0	3	0	1	1	0	0	1	94	4	0	2	0	0	6	0	0	11	0	6	0	0	0	1	0	0	0	1	4	9	0	0	0	2	0	0	0	202
07:30	0	52	0	0	1	0	0	2	0	0	1	166	3	0	4	0	0	1	0	0	3	3	3	0	0	0	0	0	0	0	3	1	13	0	0	0	0	0	1	0	257
07:45	6	41	2	0	6	0	0	1	1	0	3	109	3	0	5	0	0	1	0	0	6	3	4	0	0	0	0	0	0	0	2	3	2	0	0	0	0	1	0	0	199
08:00	2	74	2	0	1	0	0	0	1	0	2	108	2	0	2	0	0	0	0	0	11	1	5	0	0	0	0	1	1	0	3	0	7	0	0	0	0	0	1	0	224
08:15	2	57	2	0	1	0	0	2	0	0	3	103	4	0	0	0	1	2	0	1	5	0	9	1	0	0	0	0	0	0	3	0	6	0	0	0	0	0	0	0	201
08:30	12	59	0	0	6	0	0	3	0	1	0	110	3	0	2	0	0	2	0	0	3	2	1	0	0	0	0	0	0	3	1	3	7	0	0	0	1	0	0	3	215
08:45	9	52	1	0	5	0	0	1	0	0	1	105	2	0	4	0	0	4	0	2	4	5	4	0	1	0	0	2	0	3	2	1	6	0	0	0	0	0	0	3	209
Period 2																																									
11:00	10	74	3	0	2	0	0	3	0	0	0	94	1	1	6	0	0	1	0	2	4	2	4	0	0	0	0	0	0	0	1	2	4	0	0	0	0	0	0	0	212
11:15	2	45	2	1	3	0	0	2	0	0	1	67	1	0	3	1	0	3	0	0	2	1	5	0	0	1	0	0	0	0	5	1	3	0	0	0	2	0	0	0	151
11:30	2	48	5	0	4	1	0	3	0	1	0	66	1	0	4	0	0	2	0	0	3	3	3	0	0	1	0	0	0	0	0	1	9	0	0	1	0	0	0	0	157
11:45	4	61	2	0	6	0	0	4	0	2	0	54	2	0	3	0	0	1	0	1	2	4	4	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	2	148
12:00	5	65	2	1	3	0	0	0	0	0	1	77	6	0	3	0	0	1	0	1	3	5	3	0	0	0	0	0	0	0	4	2	8	1	0	0	0	0	0	0	190
12:15	8	61	4	0	7	0	0	0	0	0	1	72	2	1	5	0	0	2	0	0	1	1	9	0	0	0	0	0	1	0	2	0	5	0	0	0	1	0	0	0	183
12:30	8	69	7	0	5	0	0	0	0	0	1	87	2	0	3	1	0	4	0	1	5	1	9	0	0	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	206
12:45	1	71	2	0	8	1	0	2	1	0	1	57	3	0	2	0	0	1	0	1	2	3	10	0	0	0	0	0	0	2	3	2	3	0	0	0	0	0	0	2	173
13:00	4	75	6	0	3	0	0	0	0	0	1	78	2	1	7	0	0	0	0	0	2	3	3	1	0	0	0	0	0	0	1	1	2	0	0	1	0	0	0	0	191
13:15	8	76	2	0	9	1	0	1	0	0	4	81	1	1	2	0	0	4	0	0	1	2	3	0	0	0	0	0	0	0	1	4	8	0	0	0	0	0	0	0	209
13:30	4	58	4	0	5	0	0	2	0	0	4	78	0	0	1	0	1	5	0	0	2	1	3	0	0	0	0	0	0	0	1	1	4	0	1	0	0	0	0	0	175
13:45	5	54	2	2	3	0	0	1	0	2	0	81	3	0	6	0	0	2	0	0	5	4	5	0	0	0	0	0	0	2	2	0	4	0	0	0	0	0	0	4	179
Period 3																																									
15:00	6	83	6	0	7	0	0	3	0	1	6	87	6	0	3	0	0	2	0	0	2	0	10	1	0	0	0	0	0	0	4	3	6	0	0	0	0	0	0	0	235
15:15	10	103	7	0	3	0	0	2	0	0	5	81	4	1	3	0	0	2	3	0	0	6	15	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	251

)

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement 15 Minute Report

Description: Hwy 12 @ Warminster Sdrd

Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12

Start Date: 13-Nov-2019 (Wed) **I/C Side:** **LHRS:** 19480

End Date: 13-Nov-2019 (Wed) **Int. Type:** Four Leg **Offset:** 0

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

	Major Road Approaches																			
	East Hwy 12										West Hwy 12									
Start	Cars			Trucks			Long Trucks				Cars			Trucks			Long Trucks			
Time	←	↑	→	←	↑	→	←	↑	→	Ped	←	↑	→	←	↑	→	←	↑	→	Ped
15:30	4	88	11	1	7	0	0	3	0	0	4	76	5	0	5	0	1	3	0	0
15:45	7	108	6	0	4	0	0	0	0	0	5	80	6	1	5	0	0	0	0	0
16:00	9	111	12	0	2	0	0	0	0	0	4	77	3	0	1	0	0	4	0	1
16:15	11	142	5	0	8	0	0	1	0	0	3	108	2	0	3	0	1	2	0	0
16:30	12	170	6	2	19	1	0	5	0	0	4	112	10	0	10	1	0	4	0	1
16:45	23	191	24	0	14	0	0	3	0	0	9	146	15	2	9	3	0	1	1	8
17:00	12	153	12	0	9	0	0	1	0	1	6	124	5	0	4	0	0	4	0	3
17:15	22	202	17	0	1	1	0	0	0	0	7	98	11	0	2	0	0	0	0	1
17:30	17	139	8	0	4	0	0	1	0	1	7	90	4	0	2	0	0	0	0	0
17:45	23	192	14	0	1	0	0	0	0	0	11	130	15	0	6	0	0	1	0	0

	Minor Road Approaches																				
	North Warminster Sdrd										South Warminster Sdrd										
Start	Cars			Trucks			Long Trucks				Cars			Trucks			Heavy Trucks				Total
Time	←	↑	→	←	↑	→	←	↑	→	Ped	←	↑	→	←	↑	→	←	↑	→	Ped	Veh.
15:30	4	1	13	0	1	0	0	0	1	0	7	10	16	0	0	0	1	2	0	0	264
15:45	3	0	10	0	0	0	0	1	2	0	7	2	17	0	0	0	0	0	0	0	264
16:00	4	5	8	0	0	0	0	1	0	0	2	3	8	0	1	0	0	0	0	0	255
16:15	2	0	13	0	0	1	0	0	1	0	1	2	2	0	0	0	0	0	0	0	308
16:30	6	0	12	1	0	0	0	0	0	0	4	3	12	0	0	0	1	0	0	0	395
16:45	13	2	24	0	0	0	0	0	0	0	1	8	11	0	0	0	0	0	0	0	500
17:00	3	2	2	0	1	0	0	0	0	1	7	2	9	0	1	0	0	0	0	0	357
17:15	7	1	13	0	0	0	0	0	1	0	9	5	6	0	2	0	0	1	0	0	406
17:30	3	1	4	0	0	1	0	0	0	0	2	3	6	0	0	0	0	0	0	0	292
17:45	10	12	21	0	0	0	0	0	0	0	5	6	16	1	0	0	0	0	0	0	464

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Traffic Signal Warrant

Description: Hwy 12 @ Warminster Sdrd

Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12

Start Date: 13-Nov-2019 (Wed) **I/C Side:** **LHRS:** 19480

End Date: 13-Nov-2019 **Intersection Type:** Four Leg **Offset:** 0

Schedule Summary: Tuesday, Wednesday, Thursday AM 07:00-09:00, Midday 11:00-14:00, PM 15:00-18:00
Default as defined in 2016 Provincial Data Collection Contract

Intersection Configuration:

MAJOR ROADS

Approach	Name	Channel Right	Pattern
E	Hwy 12	☐	C
W	Hwy 12	☐	C

☐ 2 or more approach Lanes

MINOR ROADS

Approach	Name	Channel Right	Pattern
N	Warminster Sdrd	☐	UNCL
	Ramps		
S	Warminster Sdrd	☐	UNCL
	Ramps		

☐ 2 or more approach Lanes

Intersection Type: Four Leg

Traffic Control: Two Way Stop

Flow Condition: Restricted

Justification 1 - Minimum Vehicle Volume:

Calculated using raw data

1A: All approach lanes:

1B: Minor road approaches:

	1A		1B	
	Min. Req.	%	Min. Req.	%
	720	100	170	100
	576	80	136	80

	Major Road Approaches						Minor Road Approaches						1A		1B	
	East Approach			West Approach			North Approach			South Approach						
Time	←	↑	→	←	↑	→	←	↑	→	←	↑	→	Total	%	Total	%
07:00	18	229	6	5	480	10	25	6	14	9	11	30	843	100	95	56
08:00	25	261	6	7	442	11	24	12	20	10	4	27	849	100	97	57
11:00	19	255	13	2	304	6	11	10	18	8	4	18	668	80	69	41
12:00	23	291	17	5	314	14	11	10	33	12	4	18	752	100	88	52
13:00	23	287	15	12	345	6	11	10	14	5	7	19	754	100	66	39
15:00	28	411	30	23	347	24	10	9	51	23	17	41	1014	100	151	80
16:00	57	666	48	23	477	35	26	8	59	9	17	33	1458	100	152	80
17:00	74	703	52	31	461	35	23	17	42	24	20	37	1519	100	163	80
TotalsTM	267	3103	187	108	3170	141	141	82	251	100	84	223	7857	780	881	485
Approach			3557			3419			474			407	Section %	98	Section %	61

Justification 1 Minimum Compliance: 61 %

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Traffic Signal Warrant

Description: Hwy 12 @ Warminster Sdrd

Region: CENTRAL **Survey Type:** TM – Intersection **Hwy:** 12

Start Date: **I/C Side:** **LHRS:** 19480

End Date: **Intersection Type:** Four Leg **Offset:** 0

Schedule Summary: Tuesday, Wednesday, Thursday AM 07:00-09:00, Midday 11:00-14:00, PM 15:00-18:00
Default as defined in 2016 Provincial Data Collection Contract

Justification 2 - Delay to Cross Traffic:

Calculated using raw data

2A: Major road approaches:

2B: Minor road approaches:

	2A		**2B**	
	Min. Req.	**%**	**Min. Req.**	**%**
	720	**100**	**75**	**100**
	576	**80**	**60**	**80**

	Major Road Approaches						**Minor Road Approaches**							2A		2B	
	East Approach			West Approach			North Approach			South Approach							
Time	←	↑	→	←	↑	→	←	↑	→	←	↑	→	*	Total	%	Total	%
07:00	18	229	6	5	480	10	25	6	14	9	11	30	0	748	100	50	67
08:00	25	261	6	7	442	11	24	12	20	10	4	27	0	752	100	50	67
11:00	19	255	13	2	304	6	11	10	18	8	4	18	0	599	80	35	47
12:00	23	291	17	5	314	14	11	10	33	12	4	18	0	664	80	36	48
13:00	23	287	15	12	345	6	11	10	14	5	7	19	0	688	80	28	37
15:00	28	411	30	23	347	24	10	9	51	23	17	41	0	863	100	51	68
16:00	57	666	48	23	477	35	26	8	59	9	17	33	0	1306	100	62	80
17:00	74	703	52	31	461	35	23	17	42	24	20	37	0	1356	100	73	80
Totals: TM	267	3103	187	108	3170	141	141	82	251	100	84	223	0	6976	740	385	494
Approach			3557			3419			474			407		Section %	92	Section %	62

* Pedestrians crossing major road

Justification 2 Minimum Compliance: 62 %

Justification 3 - Volume / Delay Combination:

Calculated using raw data

	Minimum Compliance (%)	
Justification 1 - Minimum Vehicle Volume:	61	%
Justification 2 - Delay to Cross Traffic:	62	%
Justification 3 Minimum Compliance:	61	%

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Traffic Signal Warrant

Description:	Hwy 12 @ Warminster Sdrd				
Region:	CENTRAL	**Survey Type:**	TM – Intersection	**Hwy:**	12
Start Date:		**I/C Side:**		**LHRS:**	19480
End Date:		**Intersection Type:**	Four Leg	**Offset:**	0

Schedule Summary: Tuesday, Wednesday, Thursday AM 07:00-09:00, Midday 11:00-14:00, PM 15:00-18:00
Default as defined in 2016 Provincial Data Collection Contract

Justification 5 - Collision Experience

	Warrant Threshold *	%
	5	100

Preceding Months	Number of Collisions **	%
1 - 12	0	0
13 - 24	0	0
25 - 36	0	0
Totals	0	0

Justification 5 Compliance: 0 %

* Per twelve-month period.

** Include only collisions that are susceptible to correction

Calculation Options - Use raw data

Factors for major road approaches

East Approach	West Approach
Factor 1.0	Factor 1.0

Factor for pedestrian crossing major road 1.0

Factors for minor road approaches

North Approach	South Approach
Factor 1.0	Factor 1.0

CONCLUSION: TRAFFIC SIGNALS ARE NOT WARRANTED

Ontario

INTERSECTION LAYOUT SHEET

Date: Apr. 29 Day: Fri Request # 068 Observer(s) Golant

Gretch Code (LHRS O/S): 1948000000 Ramp # n/a

Hwy # 12 Location WARMINSTER SDRD

Reg/Mun Simcoe Town/City Warminster

Comments

Segment 1 - AM or PM (Please Circle ONE) Weather sunny

DATASETS

For office use only:

Exit File

AM Peak

PM Peak

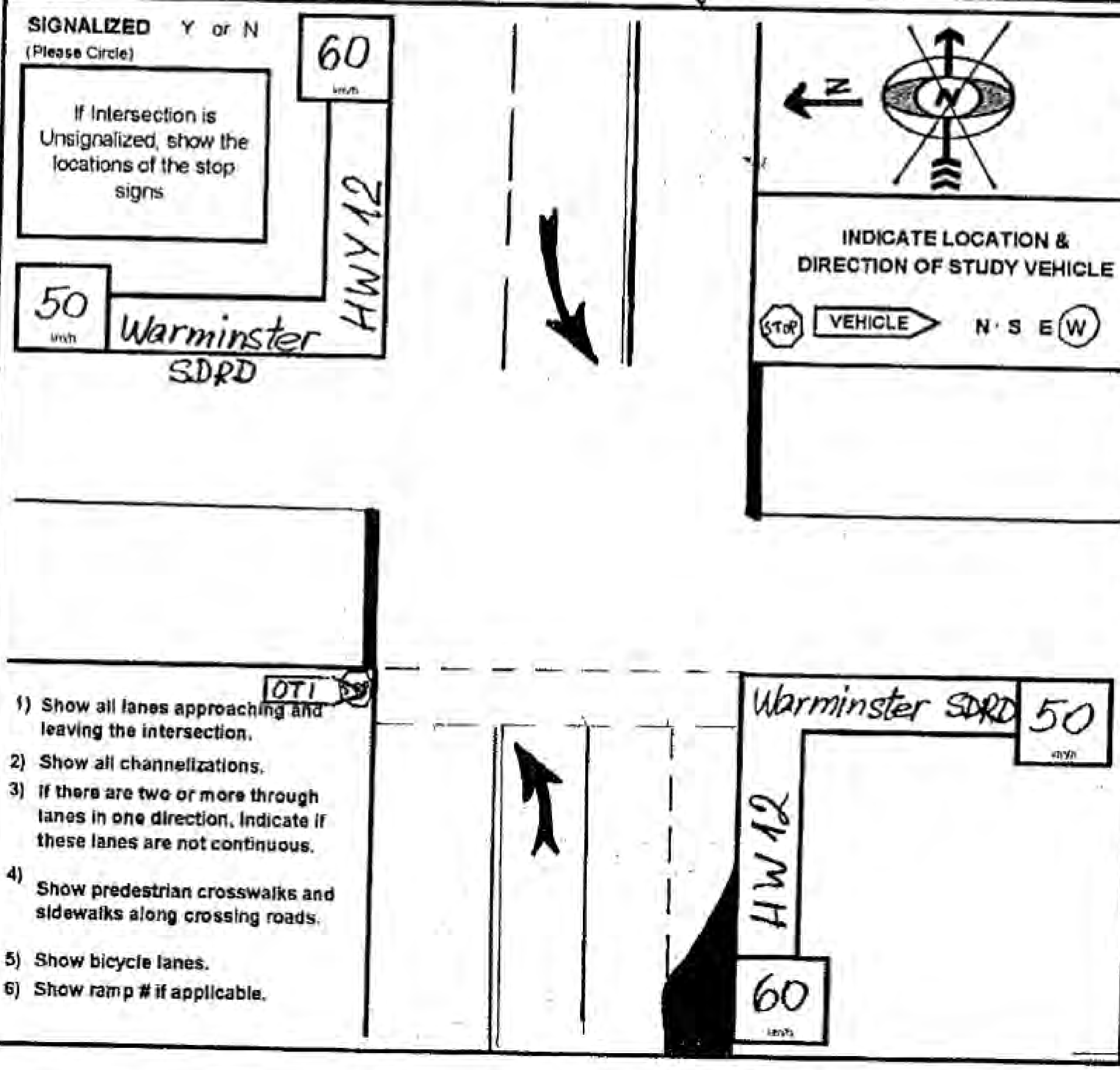
Processed By

SIGNALIZED Y or N
(Please Circle)

If Intersection is Unsignalized, show the locations of the stop signs

INDICATE LOCATION & DIRECTION OF STUDY VEHICLE

STOP VEHICLE N · S E W



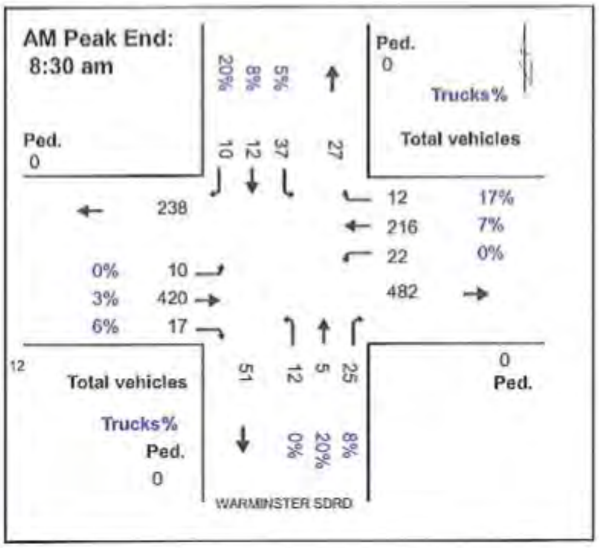
1) Show all lanes approaching and leaving the intersection.
2) Show all channelizations.
3) If there are two or more through lanes in one direction, indicate if these lanes are not continuous.
4) Show pedestrian crosswalks and sidewalks along crossing roads.
5) Show bicycle lanes.
6) Show ramp # if applicable.

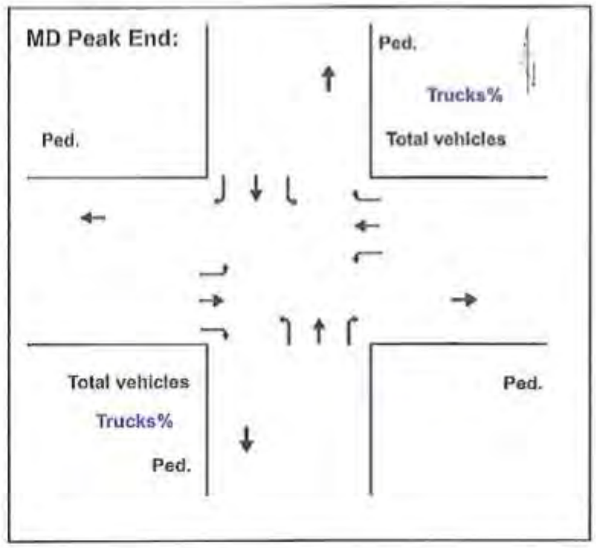
Ontario

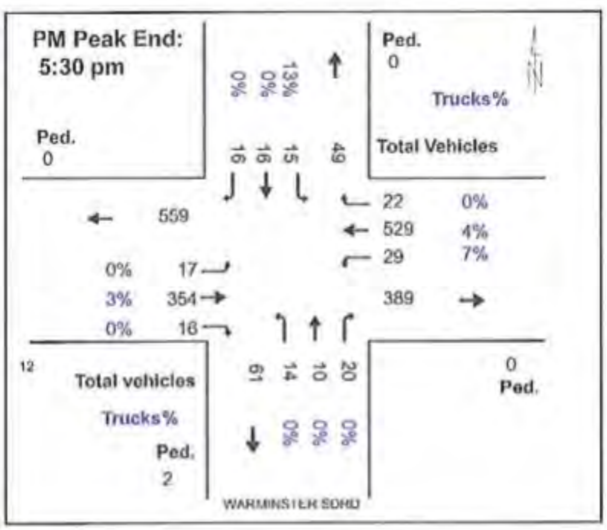
HWY 12 @ WARMINSTER SDRD

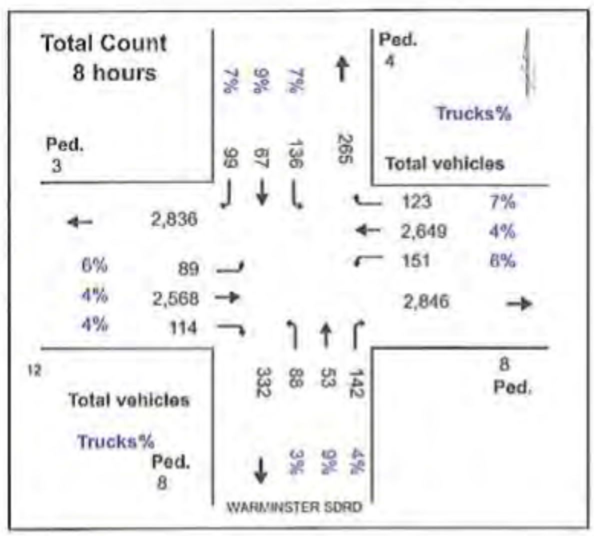
Central

Intersection ID:194800000 Count Day: Friday Count Date: 29-Apr-2016









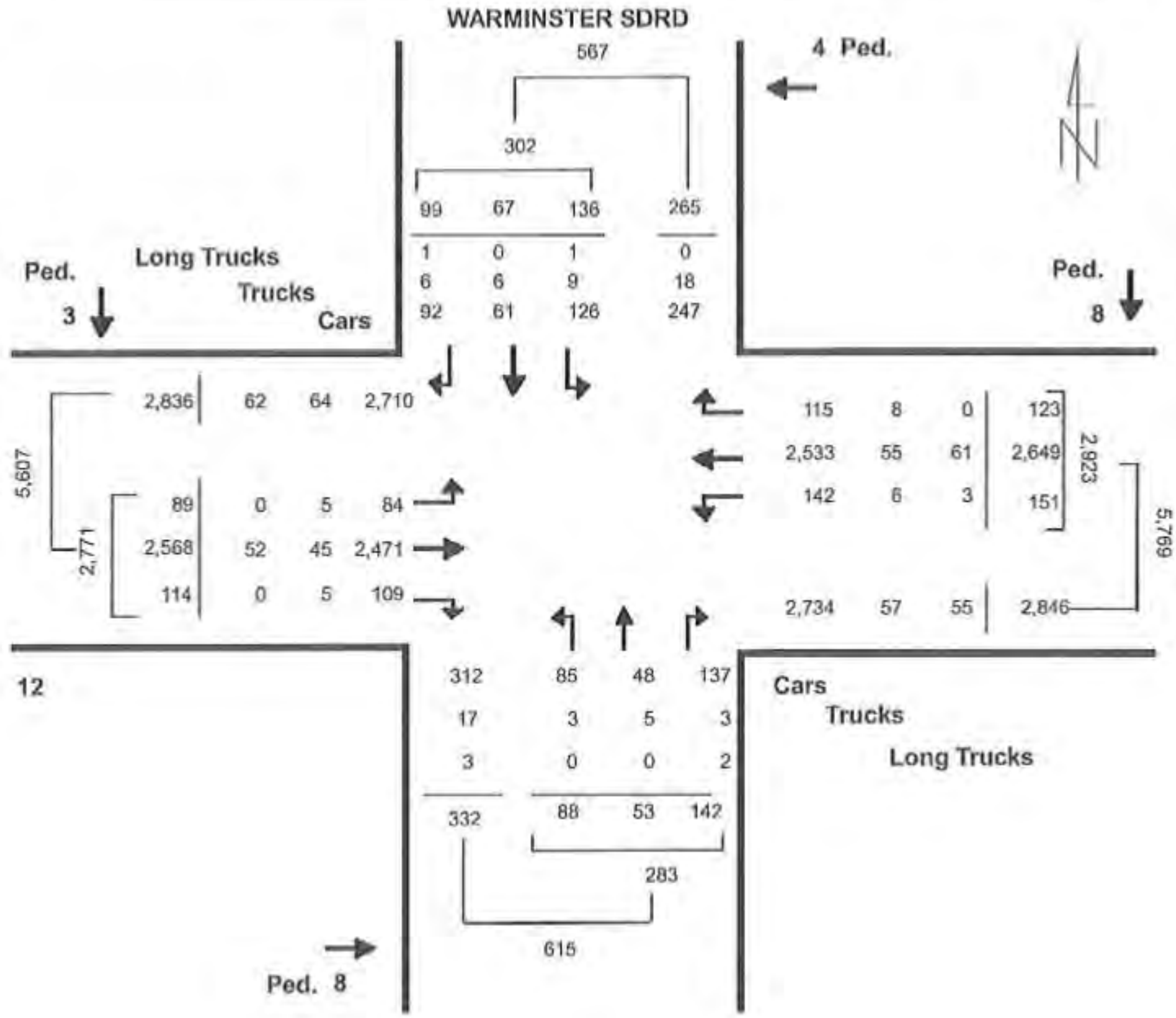
Traffic Engineering Software

COUNT TOTAL

HWY 12 @ WARMINSTER SDRD

Central

Intersection ID:194800000 | **Date: 29-Apr-2016**



15 MIN REPORT

Intersection ID:194800000 HWY 12 @ WARMINSTER SDRD Municipality: Central Date: 29-Apr-2016

Time	NORTH APPROACH Cars			Trucks			Heavies			Ped	EAST APPROACH Cars			Trucks			Heavies			Ped	SOUTH APPROACH Cars			Trucks			Heavies			Ped	WEST APPROACH Cars			Trucks			Heavies			Ped	Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Period1																																									
7:15	5	1	3	0	0	0	0	0	0	0	0	41	4	0	1	0	0	2	0	0	0	0	4	0	1	0	0	0	0	0	3	58	0	0	2	0	0	0	0	0	125
7:30	6	3	5	1	1	0	0	0	0	0	5	47	2	0	2	0	1	1	0	0	2	1	7	1	0	0	0	0	0	0	1	77	0	2	3	0	0	1	0	0	169
7:45	6	5	0	0	0	1	0	0	0	0	6	47	2	0	1	0	0	3	0	0	1	1	7	0	1	0	0	0	0	0	3	129	4	0	1	0	0	2	0	0	220
8:00	8	2	4	0	1	0	0	0	0	0	3	53	4	0	1	1	0	1	0	0	3	0	7	0	0	0	0	0	0	0	2	92	6	0	1	0	0	1	0	0	190
8:15	12	3	3	0	0	1	0	0	0	0	5	37	4	0	2	0	0	1	0	0	6	3	5	0	0	1	0	0	0	0	4	90	2	0	2	0	0	1	0	0	182
8:30	9	1	1	2	0	0	0	0	0	0	8	63	0	0	4	1	0	3	0	0	2	0	4	0	0	1	0	0	0	0	1	97	4	0	3	1	0	1	0	0	206
8:45	2	2	0	1	0	0	0	0	0	0	1	44	2	0	2	0	0	1	0	0	1	1	4	0	0	0	0	0	0	0	2	89	4	1	0	0	0	3	0	0	160
9:00	3	4	3	1	1	0	0	0	0	0	6	40	2	1	5	1	0	2	0	0	3	2	5	0	0	0	0	0	0	0	0	73	3	0	1	1	0	1	0	0	158
Period2																																									
13:15	6	0	2	0	0	0	0	0	0	0	1	67	5	0	1	1	1	7	0	0	1	0	5	0	0	0	0	0	1	0	4	67	3	0	2	0	0	1	0	0	175
13:30	5	1	2	0	0	0	0	0	0	0	4	80	3	0	2	0	0	1	0	0	3	1	6	0	0	0	0	0	0	0	1	59	4	0	0	0	0	3	0	0	175
13:45	3	0	6	0	0	0	0	0	0	0	8	54	1	0	2	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	3	76	4	0	3	0	0	3	0	0	169
14:00	3	2	2	0	0	0	0	0	0	0	5	67	2	0	1	0	0	1	0	0	5	1	6	0	0	0	0	0	0	0	1	56	1	0	1	0	0	3	0	0	157
14:15	2	1	2	0	0	0	0	0	0	0	2	77	3	0	1	0	0	0	0	0	3	1	1	0	0	1	0	0	0	0	4	59	1	0	3	0	0	3	0	0	164
14:30	3	2	3	1	0	0	0	0	0	0	5	69	1	0	0	0	0	3	0	0	4	0	2	0	0	0	0	0	1	0	0	68	3	0	2	0	0	3	0	0	170
14:45	2	1	2	0	0	0	0	0	0	0	2	75	4	1	2	1	0	3	0	0	1	0	0	0	0	0	0	0	0	0	2	74	1	0	0	0	0	1	0	0	172
15:00	1	1	6	1	1	1	0	0	0	0	4	89	3	0	5	1	0	2	0	0	2	0	1	0	0	0	0	0	0	0	4	69	6	0	1	1	0	6	0	0	205
15:15	2	2	4	0	0	0	0	0	0	0	5	87	0	0	2	0	0	2	0	1	0	2	3	0	0	0	0	0	0	1	2	73	6	0	1	0	0	2	0	0	195
15:30	6	1	5	1	0	0	0	0	0	0	5	97	3	0	1	0	0	1	0	0	4	4	1	0	0	0	0	0	0	1	1	72	8	0	1	1	0	2	0	1	216
15:45	1	2	4	0	0	0	0	0	0	2	4	98	6	1	0	0	0	1	0	2	10	4	9	0	1	0	0	0	0	0	2	79	7	1	1	0	0	1	0	2	238
16:00	5	0	1	0	2	2	0	0	0	1	2	66	2	0	0	1	0	3	0	5	1	4	5	0	0	0	0	0	0	1	1	68	5	0	0	1	0	1	0	0	177
16:15	4	1	0	0	0	0	0	0	0	0	8	102	5	1	0	0	0	2	0	0	3	1	2	1	0	0	0	0	0	0	4	90	0	1	3	0	0	2	0	0	230
16:30	1	0	4	0	0	0	0	0	0	0	6	112	7	0	0	0	0	2	0	0	0	2	7	0	1	0	0	0	0	2	5	76	2	0	4	0	0	1	0	0	232
16:45	7	5	5	1	0	0	0	0	0	0	6	130	6	1	5	0	0	1	0	0	2	4	8	0	0	0	0	0	0	2	4	77	2	0	2	0	0	1	0	0	269
17:00	4	5	2	0	0	0	1	0	0	0	6	124	6	0	4	0	0	4	0	0	5	2	3	0	0	0	0	0	0	0	8	82	5	0	1	0	0	1	0	0	263
17:15	2	3	4	0	0	0	0	0	0	0	4	132	7	0	3	0	0	3	0	0	4	3	3	0	0	0	0	0	0	0	2	89	6	0	3	0	0	2	0	0	270
17:30	0	3	5	0	0	0	0	0	0	0	10	120	3	1	2	0	1	1	0	0	3	1	6	0	0	0	0	0	0	0	3	94	3	0	1	0	0	1	0	0	258
17:45	6	2	3	0	0	0	0	0	0	0	8	106	5	0	1	0	0	1	0	0	4	2	6	0	0	0	0	0	0	0	2	82	3	0	0	0	0	1	0	0	232
18:00	4	0	2	0	0	0	0	0	0	0	3	94	3	0	3	0	0	1	0	0	5	3	2	0	0	0	0	0	0	0	1	91	4	0	2	0	0	0	0	0	218
18:15	1	2	4	0	0	0	0	0	0	0	2	94	5	0	1	0	0	2	0	0	0	1	6	0	1	0	0	0	0	0	1	73	5	0	0	0	0	1	0	0	199
18:30	0	3	0	0	0	1	0	0	1	0	3	67	4	0	0	1	0	1	0	0	5	2	6	0	0	0	0	0	0	0	2	60	4	0	0	0	0	2	0	0	162
18:45	3	2	1	0	0	0	0	0	0	0	2	83	6	0	1	0	0	3	0	0	1	0	3	0	0	0	0	0	0	1	5	67	0	0	0	0	0	1	0	0	179
19:00	4	1	4	0	0	0	0	0	0	1	3	71	5	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	6	65	3	0	1	0	0	0	0	0	167

Ministry of Transportation - Traffic Signal Warrants

Municipality: Central
Intersection: HWY 12 @ WARMINSTER SDRD
Major Road: HWY 12
Direction: East-West
Minor Road: WARMINSTER SDRD

Warrant 1 - Minimum Vehicular Volume

A - All Approaches

	Min. Req.	Min. Req.	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00	Total
Volume	720	576	704	706	676	711	809	990	978	705	6279
Warrant %	100	80	80	80	80	80	100	100	100	80	700

Controlling Sectional % 88%

B - Minor Street Both Approaches

	Min. Req.	Min. Req.	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00	Total
Volume	170	136	88	87	65	47	86	81	76	55	585
Warrant %	100	80	52	51	38	28	51	48	45	32	345

Controlling Sectional % 43%

WARRANT 1 HAS BEEN SATISFIED 43%

Warrant 2 - Delay To Cross Traffic

A - Major Street Both Approaches

	Min. Req.	Min. Req.	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00	Total
Volume	720	576	616	619	611	664	723	909	902	650	5694
Warrant %	100	80	80	80	80	80	100	100	100	80	700

Controlling Sectional % 88%

B - Traffic Crossing Major Street

	Min. Req.	Min. Req.	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00	Total
Volume	75	60	46	53	30	26	56	40	37	24	312
Warrant %	100	80	61	71	40	35	75	53	49	32	416

Controlling Sectional % 52%

WARRANT 2 HAS BEEN SATISFIED 52%

Warrant 3 - Accident Experience

A Reportable accident within a 12 month period averaged over 36 consecutive months susceptible to correction by a traffic signal was 0

Based on the minimum warrant value of 5 this section has been satisfied 0%

B Adequate trial of less restrictive remedies requirement was satisfied 100%

C Either Warrant #1 or #2 being satisfied by at least 80% was satisfied 0%

WARRANT 3 HAS BEEN SATISFIED 0%

Warrant 4 - Combination Warrant

Warrant 1 satisfied 80% or more 0%

Warrant 2 satisfied 80% or more 0%

Warrant 3 satisfied 80% or more 0%

WARRANT 4 HAS BEEN SATISFIED 0%

CONCLUSION: TRAFFIC SIGNALS ARE NOT WARRANTED

Appendix E: Community Safety Zone Documents

COMMUNITY SAFETY ZONES

APPLICATION GUIDELINES FOR PROVINCIAL HIGHWAYS

ONTARIO

Ministry of Community Safety and Correctional Services

August 2005

Ce document est aussi disponible en français

What Is A Community Safety Zone?

Community Safety Zones are sections of roadways where public safety is of special concern. These may include roadways near schools, day care centres, retirement facilities, and those with high collision rates. While traffic laws remain the same, fines for moving violations are increased or doubled within these zones.

Municipalities may designate Community Safety Zones on roads that come under their jurisdiction by enacting by-laws. In areas where there is no municipality with jurisdiction over a particular road or a provincial highway, the Minister of Community Safety and Correctional Services[1] has the authority to designate a Community Safety Zone. Provincial highways those roadways that are signed as King's highways, patrolled by the Ontario Provincial Police and maintained by the Ministry of Transportation.

Legislative authority for Community Safety Zones is set out in section 214.1 of the *Highway Traffic Act* and the required signs are found in Regulation 615 of the Act.

This document lays out the protocol that individuals, groups and municipalities must follow to apply for a Community Safety Zone designation on a provincial highway.

[1] The *Highway Traffic Amendment Act (Community Safety Zones)*, when passed and proclaimed in 1998, described the responsible minister as the Solicitor General and Minister of Correctional Services. By Order in Council number 1732/99 dated October 20, 1999, this responsibility was assigned to the Solicitor General. By Order in Council 1708/2003, dated November 23, 2003 the powers and duties of the Solicitor General were assigned and transferred to the Minister of Community Safety and Correctional Services.

What Is The process For Requesting A Community Safety Zone?

Applicants are asked to complete four basic steps in order to request a community safety zone. These consist of:

Step 1: Preparation of background information and a site proposal
Step 2: Preparation of a report justifying the need for a Community Safety Zone for the selected site
Step 3: Consultation with local and provincial authorities
Step 4: Submission of the completed application for a Community Safety Zone

STEP 1: Background Information & Site Proposal

Prepare a detailed written description of the proposed Community Safety Zone. You must ask local and provincial authorities to comment on the merits of your proposal. They will use the information you provide as a guide. The description should include:

- Information on the person or organization making the request and where a key contact can be reached (mailing address and telephone number during business hours).

- A description of the location of the proposed Community Safety Zone, including the highway number, name of the local municipality affected and suggested start / finish points.

- The hours, days of the week and months of the year during which the zone should be active (i.e., during which increased fines will be applied).

STEP 2: Site Justification

A Community Safety Zone must address an identified safety need. The applicant(s) must demonstrate that public safety is of special concern in the area that is under consideration.

Provide a detailed written description of the public safety issues that have prompted the request for a Community Safety Zone for the selected site. You must ask local and provincial authorities to comment on the merits of your proposal. They will use the information you provide as a guide. The description should include:

- knowledge of collisions and/or personal injuries
- presence of pedestrian traffic
- proximity to school(s) and/or related uses which expose vulnerable groups to traffic related hazards
- persistent concerns related to speeding and other traffic offences
- letters of support from local businesses / citizens concerned with road safety issues
- community surveys and/or summary of community meetings
- other supporting documentation which the applicant feels is relevant

STEP 3: Consultation

Discuss your Community Safety Zone proposal with local and provincial authorities, using the information from steps one and two as a guide. There are five sources within the community that you will be expected to consult:

I. Local Service Agencies
II. The Ministry of Transportation
III. The Ontario Provincial Police
IV. The Local Area Governance Body
V. The Member of Provincial Parliament

Contact local service agencies, the Ministry of Transportation (MTO), and the Ontario Provincial Police (OPP) first in order to identify any technical concerns with your proposal prior to seeking support from the local area governance body and Member of Provincial Parliament.

I. Local Service Agencies

Provide documentation reflecting the outcome of discussions with appropriate community agencies / organizations or committees such as:

- Local School Board
- Police Services Board
- Community Policing Committee
- Community Road Safety Coalition
- Local / Regional Municipal Services
  - Roads / Traffic / Engineering Department
  - Planning / By-law Department
- Road Services Board
- Ratepayer's Associations
- Other local groups / committees concerned with public / road safety issues

[Please note that this is a suggested list of contacts: local service agencies/boards will vary by community. The applicant(s) makes the determination of appropriate contacts.]

II. Ministry of Transportation (MTO)

Contact the Ministry of Transportation to discuss your proposal and provide a copy of your background information, site proposal and site justification package.

Upon receiving this information, the Ministry of Transportation's Regional Traffic Office staff will review issues associated with the proposed provincial highway Community Safety Zone designation. A written summary from the Regional Traffic Head will be mailed to the address of the contact identified in your background information.

Ministry of Transportation offices are located in Kingston, Toronto, London, North Bay and Thunder Bay (consult the local blue pages or contact MTO toll free at 1-800-268-4686).

III. Ontario Provincial Police (OPP)

Contact the local detachment of the Ontario Provincial Police to discuss your proposal and provide a copy of your background information, site proposal and site justification package.

Upon receiving this information, the Ontario Provincial Police will review the issues associated with a Community Safety Zone designation and the successful application of the zone to traffic management plans in the detachment area. Detachments may also provide statistics on enforcement activity in the proposed area.

Once you have resolved any technical or enforcement concerns related to your Community Safety Zone proposal, you must seek the support of the local area governance body and Member of Provincial Parliament.

IV. Local Area Governance Body

Seek and obtain a resolution from the local area governance body supporting the proposed designation. The local area governance body may be a municipal council, a band council or a services board.

V. Member of Provincial Parliament (MPP)

Contact your local Member of Provincial Parliament and request a written response on the proposed designation.

STEP 4: Submission of a Community Safety Zone Request

After all of the above information/documentation has been obtained, the entire package must be submitted to the Ministry of Community Safety and Correctional Services. Provide a copy of your information package to the local detachment of the Ontario Provincial Police.

The local detachment of the Ontario Provincial Police will also verify that all information requirements have been met. If the package is incomplete, it will be returned to you for resubmission.

Is your information package complete?

Background Information and Site Proposal

- ☐ Key contact
- ☐ Detailed description of the proposed Community Safety Zone site
- ☐ Hours, days of the week, and months of the year during which the zone should be active

Site Justification

- ☐ Detailed description of the public safety issues associated with the site

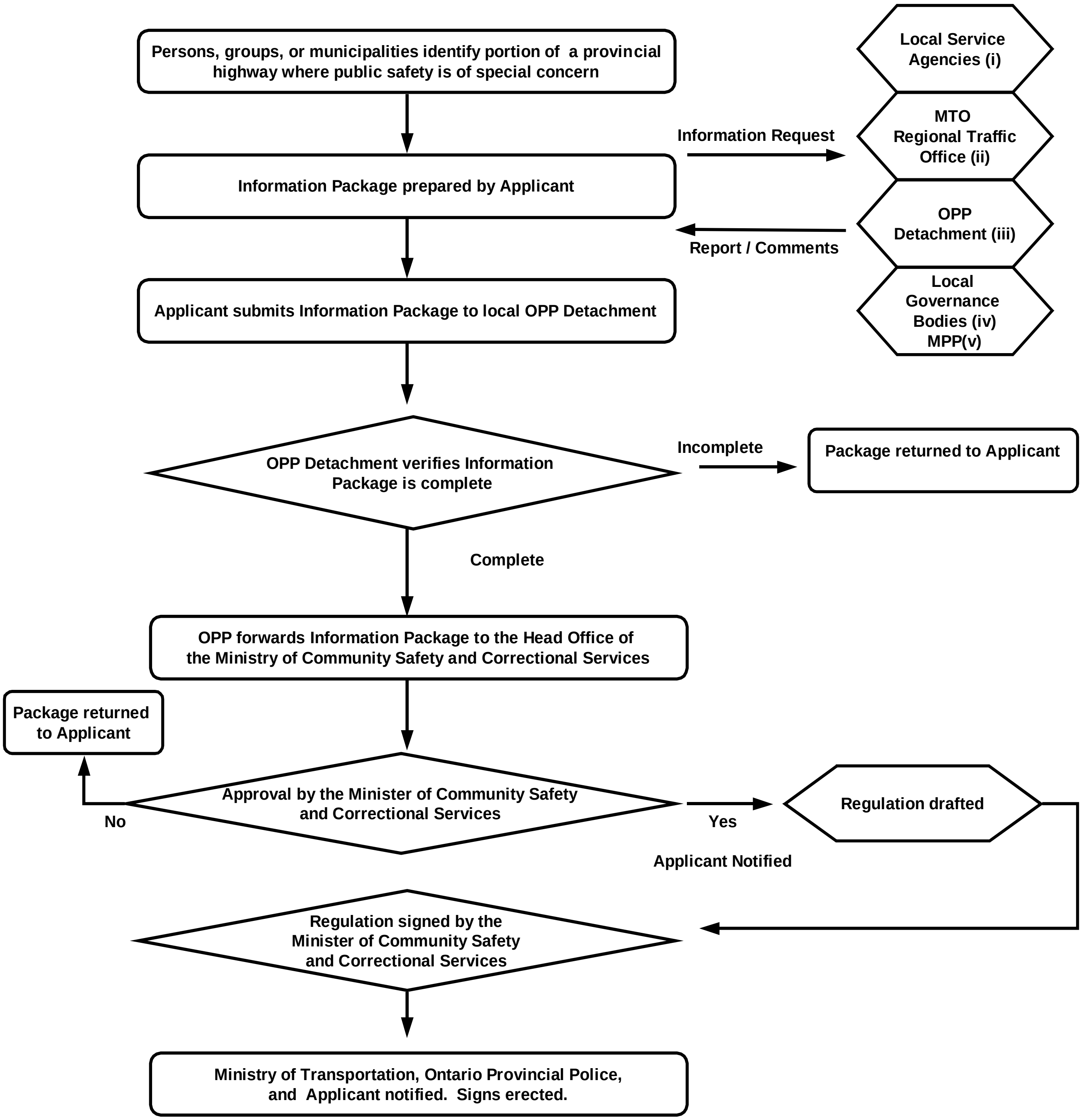
Consultation

- ☐ Documented input from local service agencies
- ☐ MTO review of issues associated with the Community Safety Zone
- ☐ OPP review of issues associated with the Community Safety Zone
- ☐ A signed official copy of the local Municipal Council Resolution, where appropriate, supporting the Community Safety Zone designation request
- ☐ A letter of response from the local Member of Provincial Parliament

Applications are then forwarded to the Head Office of the Ministry of Community Safety and Correctional Services for review and consideration. Applicant(s) will be notified once a determination has been made by the Minister.

Community Safety Zones become active when an Ontario Regulation under the *Highway Traffic Act* is passed and the required signs are placed on the site. The minimum time required to prepare the regulation for approval and erect signs is approximately 3 months.

Requesting a Community Safety Zone on a Provincial Highway



Appendix C:
Natural Heritage Evaluation – Warminster Sideroad Drainage Improvements

Natural Heritage Evaluation for the Warminster Sideroad Drainage Improvements Project - Township of Oro-Medonte, County of Simcoe, Ontario

CAMBIUM

September 28, 2023

Prepared for:
Township of Oro-Medonte

On behalf of:
Tatham Engineering Ltd.

Cambium Reference: 17300-001

CAMBIUM INC.

866.217.7900

cambium-inc.com

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1.0 Introduction

Cambium Inc. (Cambium) was retained by The Township of Oro-Medonte (Township) on behalf of Tatham Engineering (Tatham) to complete a Natural Heritage Evaluation (NHE; The Study) in support of a Municipal Class Environmental Assessment (MCEA) for the proposed drainage improvements within the community of Warminster, Ontario. The proposed area of drainage improvements is located generally between Highway 12 and Town Line, paralleling Warminster Sideroad. The area consists of a mix of rural, forested, and residential development, with residential being the most predominant community type on the landscape. Based on the proposed development scenarios, an area capturing all proposed alternatives, plus adjacent lands within 120 metres (m), was considered the Site for the purposes of this investigation (Figure 1).

Cambium was retained to evaluate alternatives in the context of natural heritage constraints and potential impacts of the project. The purpose of this report is to provide a preliminary review of the Site, identify areas of natural heritage constraints, and evaluate potential impacts to the environment associated with each proposed alternative.

The Site is located within 120 m of the following mapped natural heritage and hydrologic features: an unevaluated wetland located to the south and east of the Site. It should be noted that the Marchmont Swamp Provincially Significant Wetland (PSW) is located east of Townline but is not within 120 m of the proposed alternatives (Figure 1). The Site is within Ecoregion 6E of Ontario (Crins, Gray, Uhlig, & Wester, 2009). The Site is within the County of Simcoe settlement area and is a community within the Township of Oro-Medonte.

The Site is within the jurisdiction of the Nottawasaga Valley Conservation Authority and their regulated area overlaps the Site. The regulated area is within the Township of Oro-Medonte situated on the east side of Highway 12 West and borders just west of Townline in Warminster, Ontario.

The Endangered Species Act, 2007 (ESA) protects endangered and threatened species and their habitats from harm or destruction. Habitat for endangered and threatened species is also afforded protection under provincial natural heritage policy; however, it is ultimately the proponent's responsibility to ensure that no harm to these species or their habitats occurs during their planned activities. This Study includes a habitat-based screening for species of conservation concern to determine if the Site has suitable habitat for any provincially or federally listed species at risk (SAR).

This Study outlines the results of the background information and desktop review, a description of methods used to collect Site specific natural heritage information, and a summary of field investigations conducted on the Site. Information has been compiled to characterize the natural heritage features on and adjacent to the Site and provide a preliminary assessment of development constraints associated with the features. Furthermore, an assessment of potential for impacts to these features in relation to the proposed development is provided. Data was interpreted in accordance with provincial and municipal policies and regulations to guide the decision-making process and address approval authority requirements.

1.1 Summary of Proposed Development

The Site is situated in a rural, residential and agricultural area of central Ontario. The land has been subject to recent residential development over the past few years and is growing in population size. The Township has reported on-going drainage issues along Warminster Sideroad and within the Site, including:

- Frequent overtopping of driveways and road shoulders
- Culvert deterioration
- Sever erosion of roadside ditches
- Poor ditch grading

To rectify drainage problems, Tatham has prepared a preliminary design report entitled *Warminster Sideroad Drainage Improvements Project (*Tatham, 2023), herein referred to as the Preliminary Drainage Report. The proposed drainage improvement alternatives include the following:

1. Alternative #1: Do Nothing
    - This alternative would leave the current drainage infrastructure 'as is' without implementation of any new drainage improvements.
2. Alternative #2: North Ditch Improvements
    - This alternative would consist of improvements to the conveyance capacity of the north roadside ditch along Warminster Sideroad by widening and lowering the roadside ditch and replacing the existing road crossing and driveway culverts with larger culverts. The south roadside ditch would remain undisturbed under this alternative.
3. Alternative #3: South Ditch Improvements
    - This alternative would consist of improvements to the conveyance capacity of the south roadside ditch along Warminster Sideroad by widening and lowering the roadside ditch and replacing the existing road crossing and driveway culverts with larger culverts. Under this alternative, the north roadside ditch of Warminster Sideroad would remain undisturbed.
4. Alternative #4: Dry Pond Construction
    - This alternative consists of construction of a dry pond stormwater management facility (SWMF) to reduce peak flows through the roadside ditches along Warminster Sideroad. This proposed facility will be designed to attenuate peak flows generated west of Richelieu Road, while the north and south roadside ditch of Warminster Sideroad would remain undisturbed. Removal of woodland trees within the Danny McHugh Memorial Park would be required to facilitate this alternative.
5. Alternative #5: Rear Lot Conveyance Channel
    - This alternative would reduce the peak flows through the roadside ditches along Warminster Sideroad by regrading a new conveyance channel along the south property limit of 1922 Warminster Sideroad and 3320 Townline. The new conveyance channel would redirect drainage from the Kayley Estates development,

the soccer pitches in the north and along the rear lots of 1944 Warminster Sideroad to the west roadside ditch of Townline. The current roadside ditch infrastructure would remain undisturbed under this alternative.

6. Alternative #6: Storm Sewer

    - This alternative would improve the drainage capacity within the community by installing a new storm sewer system from 1944 Warminster Sideroad to Townline. The north roadside ditch of Warminster Sideroad would be regraded to convey local drainage and the south roadside ditch of Warminster Sideroad would remain undisturbed.

2.0 Natural Heritage Policy Context

The evaluation of the form and function of natural heritage features present on, and adjacent to, the Site was undertaken to meet the requirements of the following legislation, plans and policies:

- Provincial Policy Statement (PPS), 2020
- Conservation Authority Regulation and Planning and Policy Regulations Manual
- County of Simcoe Official Plan and Township of Oro-Medonte Zoning By-law
- *Endangered Species Act*, 2007 (ESA)
- *Fisheries Act*, 2019
- *Species at Risk Act*, 2002 (SARA)
- *Migratory Birds Convention Act*, 1994 (MBCA)

2.1 Provincial Policy Statement, 2020

The PPS provides direction on matters of provincial interest related to land use planning and development. Section 2.1 of the PPS (Ministry of Municipal Affairs and Housing, 2020) protects the form and function of eight types of significant natural heritage features, which include:

- significant wetlands
- significant coastal wetlands
- significant woodlands (limited to Ecoregions 6E and 7E)
- significant valleylands
- significant wildlife habitat (SWH)
- significant areas of natural and scientific interest (ANSI)
- fish habitat
- habitat of endangered and threatened species

Given their significance, development and Site alteration are prohibited within provincially significant wetlands (PSW) in Ecoregions 5E, 6E, and 7E and within significant coastal wetlands. Development and Site alteration in fish habitat and the habitat of endangered and threatened species shall only be permitted in accordance with provincial and federal requirements. Development and Site alteration within other natural heritage features and on lands adjacent to all natural heritage features may be permitted if it is demonstrated that there will be no negative impacts on the feature or its ecological function. The PPS defines "development" as the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the Planning Act. "Site alteration" means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a Site.

Section 2.2 of the PPS protects the quality and quantity of water, including the form and hydrologic function of sensitive surface water features and sensitive ground water features. Focus is given to maintaining hydrologic linkages and functions at the watershed scale to minimize potential negative impacts, including cross-jurisdictional and cross-watershed impacts of development. Mitigative measures and/or alternative development approaches should be considered for development near water features.

2.2 Conservation Authority Regulation

Conservation Authorities are community-based watershed management agencies, whose mandate is to undertake watershed-based programs to protect people and property from flooding, and other natural hazards, and to conserve natural resources for economic, social and environmental benefits" (Conservation Ontario, 2022). Conservation Authorities each have their own Ontario Regulation under the *Conservation Authorities Act, 1990*.

However, since Bill 23 received royal assent on November 28, 2022, all 36 conservation authority regulations have been consolidated into a single regulation within the *Conservation Authorities Act*, which is effective as of July 1, 2023. Part VI of the *Conservation Authorities Act* outlines that areas within the regional conservation authority's jurisdiction include watercourses, hazard lands, wetlands, river or stream valleys, and the nearshore areas of the Great Lakes, St. Lawrence River, and applicable inland lakes.

2.3 Official Plan and Zoning By-Law

The land use designations and zoning of the Site are summarized in Table 1:

Table 1 Summary of Municipal Official Plan and Zoning By-law Designations

Source	Designation / Zoning
Official Plan – County of Simcoe	Settlement Area (Township of Oro-Medonte)
Official Plan – Township of Oro-Medonte	Neighbourhood Area
Zoning By-law –Township of Oro-Medonte	Rural

2.4 Endangered Species Act

Species listed as endangered or threatened on the Species at Risk in Ontario (SARO) list, and their habitats, are protected under the provincial *Endangered Species Act* (ESA) (Government of Ontario, 2007). Section 9(1) of the ESA prohibits a person from killing, harming, harassing, capturing or taking a member of a species listed as endangered, threatened, or extirpated. Section 10(1) of the ESA prohibits the damage or destruction of habitat of species listed as endangered or threatened. Protection of special concern species is provided through designation of their habitat as significant wildlife habitat (SWH), a provincially protected natural heritage feature. Species at risk (SAR) are discussed throughout this report, as applicable.

2.5 Fisheries Act

The Department of Fisheries and Oceans Canada (DFO) administers the federal *Fisheries Act* which defines fish habitat as "*spawning grounds and other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes*" (Subsection 2(1)). Works within and adjacent to lakes, watercourses, and other bodies of water containing fish have the potential to impact fish and/or fish habitat. The Fisheries Act prohibits the harmful alteration, disruption, or destruction (HADD) of fish habitat (Subsection 35(1)), which is defined as "*any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes*".

As a result of amendments to the federal Fisheries Act in 2019, projects near water that could potentially impact fish or fish habitat may require DFO review. The primary purpose of the review is to determine whether HADD of fish habitat, as defined by the Act, can be avoided. The DFO Fisheries Protection Program provides a Decision Framework and guidance material applicable to these reviews (available on-line at www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html).

2.6 Species at Risk Act

The federal *Species at Risk Act* (SARA) was adopted in 2002 to prevent endangered or threatened species from becoming extinct or extirpated, to help in the recovery of endangered, threatened, and extirpated species, and to manage species of special concern to help prevent them from becoming endangered or threatened. Habitat which is deemed necessary for the survival/recovery of a listed wildlife species, referred to as Critical Habitat, is protected under Section 56 of the SARA. The SARA applies to all federal lands in Canada; however, at-risk aquatic and migratory bird species located on private property in Ontario also receive protection under the Act.

2.7 Migratory Birds Convention Act

The federal *Migratory Birds Convention Act* (MBCA) prohibits killing, capturing, injuring, taking or disturbing of the listed migratory birds. Including damaging, destroying, removing, or disturbing of nests of all migratory bird species that contain a live birds or viable eggs. In 2022, new *Migratory Birds Regulations* (MBR) were adopted that offer year-round protection for the nests of 18 migratory species, until the nest is deemed to be abandoned. Nest abandonment must be reported through the Abandoned Nest Registry, administered by Environment and Climate Change Canada (ECCC), if there is a need to damage, disturb, destroy or remove a nest of a species listed in Schedule 1 of the MBR. The time period to confirm nest abandonment varies by species, and ranges from 12-36 months.

To ensure compliance with the MBCA during development, best management practices should be implemented to detect and avoid disturbances to active nests of listed species. Active nests are protected and should be left undisturbed until all young have fledged, the nest is determined by a professional to be inactive or abandoned.

3.0 Technical Approach and Data Collection Methods

3.1 Background Information Review

Supporting background information pertaining to the Site and surrounding landscape was compiled and reviewed, as part of a comprehensive desktop exercise, to better understand local biophysical conditions. Data was obtained from provincial, municipal, and other online resources to provide context to the development proposal, and to guide development of the Site-specific work program. Field studies were subsequently conducted to verify and/or add detail to the high-level contextual information derived from these publicly available resources.

The comprehensive desktop review for this Site included the following resources:

- Land Information Ontario (LIO) database via the online Natural Heritage Areas: Make-a-Map tool (Ministry of Natural Resources and Forestry, 2022)
- Natural Heritage Information Center (NHIC) database: species at risk (SAR) occurrence records
- Online Atlas Data:
    - Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature, 2018)
    - Ontario Breeding Birds Atlas (OBBA) (2001-2005) (Bird Studies Canada, 2005)
- Nottawasaga Valley Conservation Authority maps and regulations
- Warminster Sideroad Drainage Improvements Project – Preliminary Design Report (Tatham, 2023)

Mapped natural heritage features present in the general area of the Site are shown on Figure 1. A summary of background review results is provided in Table 2.

Table 2 Background Review Summary

Source	Location Reference	Relevant Records
LIO Geographic Database	Site and 120 m adjacent lands	Woodlands Unevaluated Wetlands
NHIC Database	17PK1643 17PK1543 17PK1443 17PK1644 17PK1545 17PK1645 17PK1444 17PK1445	Barn Swallow - SC Bobolink - THR Eastern Meadowlark – THR Eastern Wood-pewee – SC Wood Thrush - THR Eastern Milksnake – SC Midland Painted Turtle - SC Snapping Turtle – SC Western Chorus Frog – THR
Ontario Breeding Bird Atlas (OBBA)	17TPK14	Incorporated into list of species within Appendix B
Ontario Reptile and Amphibian Atlas (ORAA)	17PK14	Incorporated into list of species within Appendix B
Aquatic SAR distribution maps	Site and 120 m adjacent lands	No aquatic SAR within 120 m

Note: THR = Threatened species on SARO list
END = Endangered species on SARO list
SC = Special concern species on SARO list
The species of conservation concern screening provided in Appendix B includes a list of all species within the overlapping OBBA and ORAA squares with potential policy implications.

3.2 Field Investigations

Ecological investigations were completed on the Site by qualified ecologists. Information gathered through the background review was used to guide the development of the fieldwork program and was supplemented with additional Site-specific information gathered through various standard methodologies. Survey methodologies for each of the field investigations completed on the Site are described in the following sections.

All surveys were conducted by appropriately trained Cambium staff. Survey stations were GPS marked in the field. Data were documented manually, reviewed upon return to the office, and transposed to digital format for secure data management.

3.2.1 Ecological Land Classification and Vegetation Inventory

The Ecological Land Classification (ELC) System for Southern Ontario (Lee, et al., 1998) was used to classify vegetation communities on the Site. Definitions of vegetation types are derived from the ELC for Southern Ontario First Approximation Field Guide (Lee, et al., 1998) and the revised 2008 tables. ELC units were initially delineated and classified by orthoimagery interpretation. Field investigations served to confirm the type and extent of ELC communities on the Site through vegetation inventory, and soil assessment with a hand auger where vegetation types could not be classified based on vegetation alone. Where vegetation communities extended off the Site, classification was done through observation from property boundaries and publicly accessible lands.

Data includes the provincial status of plant species and vegetation communities, where such information exists. Sensitivity of individual vegetation species was evaluated based on the coefficient of conservatism (CC) which is a measure of the tolerance of a species to disturbance and fidelity to a specific habitat type; species with CC of 9-10 exhibit a high degree of fidelity to a narrow range of habitat parameters. The sensitivity of vegetation communities was evaluated through an assessment of various community attributes including age, habitat quality, degree of disturbance, presence of non-native/invasive species, and presence of sensitive plant species (plants with CC of > 9). A description of CC values is provided in Table 3.

Table 3 Coefficient of Conservatism (Adapted from Oldham et al. 1995)

Coefficient of Conservatism	Rank	Description
0 to 3	Tolerant	Found in a wide variety of plant communities, including disturbed Sites.
4 to 6	Moderately Conservative	Typically associated with a specific plant community but tolerate moderate disturbance.
7 to 8	Conservative	Typically associated with a plant community in an advanced successional stage that has undergone minor disturbance.
9 to 10	Highly Conservative	Typically displaying a high degree of fidelity to a specific plant community or a narrow range of synecological parameters.

3.2.2 Wetland Boundary Delineation

In Ontario, wetlands are mapped and evaluated under the Ontario Wetland Evaluation System (OWES). Mapped evaluated wetlands have undergone extensive study and been assessed based on their form and function under four categories: Biological, Social, Hydrological, and Special Features (Ministry of Natural Resources, 2022). Evaluated wetlands that score high enough are deemed Provincially Significant Wetlands (PSW). Evaluated wetlands that did not score high enough to be a PSW are called Locally Significant Wetlands (LSW). The province also maps unevaluated wetlands. These mapped wetlands are approximate; as such, they require field verification in order to confirm their presence and determine their boundaries.

The subject wetland was delineated following provincially approved methods outlined in the Ontario Wetland Evaluation System: Southern Manual, 4th Ed. (Ministry of Natural Resources, 2022). Fieldwork was carried out by provincially certified Cambium staff. Wetland boundaries were initially delineated and classified by orthoimagery interpretation. The presence/absence of wetlands on the Site was confirmed through field investigations during the growing season (late May through October). Wetland boundaries were determined using the 50% wetland vegetation rule. Where vegetation-based delineation was inconclusive, soil assessment with a hand auger was used to confirm wetland boundaries. Wetland boundaries on the Site were marked with a hand-held GPS unit and staked/flagged in the field. Where wetland communities extend off the Site, classification was done through observation from property boundaries and publicly accessible lands.

3.2.3 Surface Water and Drainage Feature Mapping

Presence, location, boundary, and direction of flow were confirmed for all surface water features on and adjacent to the Site through visual investigation. Where feasible, the substrate type and cover features of surface water features were also noted. Indicators of surface drainage, including erosion of soils, gullies, and sediment deposition areas were noted and traced to identify sources of erosion. All watercourse and drainage feature crossings were noted and GPS marked in the field, including bridges, culverts, and bed-level crossings.

3.2.4 Habitat-Based Wildlife Evaluation

Given the scale of the proposed development, a habitat-based approach was used to assess potential impacts to wildlife, consistent with standard practice. General habitat information gathered through the field investigations was used to assess the connectivity of the Site with the surrounding landscape and evaluate the ecological significance of the local area. Cambium staff actively searched for features that may provide specialized habitat for wildlife. These searches included inspecting tree cavities, overturning logs, rocks and debris, and scanning for scat, browse, sheds, fur, etc. Any evidence of breeding, forage, shelter, or nesting was noted. Species habitat and nesting observations were documented and photographed.

4.0 Characterization of Natural Features and Constraints Analysis

Data acquired through the background information review and field investigations is summarized in the following sections. Based on the information gathered, a preliminary assessment has been completed to identify protected natural heritage and hydrologic features on and/or adjacent to the Site.

A summary of the field investigations completed on the Site is presented in Table 4. Representative Site photos are included within the Photo Log in Appendix C. Natural Heritage Features are shown on Figure 2.

Table 4 Summary of Field Investigations

Date	Time On Site	Weather	Observer	Activities
2023-07-14	0900 – 1300	21.0 – 29.0ºC Clear or few clouds Wind = 0,1 Noise = 1	M. Horn	Ecological Land Classification and Vascular Plant Survey Surface Water and Drainage Feature Mapping Habitat-Based Wildlife Survey

Notes: Wind = Beaufort Wind Scale value (0 = 0-2 kph, 1 = 3-5 kph, 2 = 6-11 kph, 3= 12-19 kph, 4 = 20-30 kph, 5 = 31-39 kph, 6 = 40-50 kph). Noise is reported based on background noise levels: Index 0 – no appreciable effect, 1 – slightly affecting sampling, 2 – moderately affecting sampling, 3 – seriously affecting sampling, 4 – profoundly affecting sampling.

4.1 Landscape Position and Topography

The Site is located within the Mixedwood Plains Ecozone: Lake Simcoe Rideau Ecoregion 6E, which extends southward from a line connecting Lake Huron in the west to the Ottawa River in the east, including Ottawa, Kingston, Peterborough, Barrie, Tobermory, Kitchener, and Toronto. This Ecoregion is characterized by a mixed geology that includes both shallow soil areas such as alvar and bedrock plains, as well as deep soil areas such as the Oak Ridges Moraine. It falls within the Great-Lakes St. Lawrence Forest Region, including deciduous and mixed forests; however, over 50% of the landscape in this Ecoregion is currently in use as agricultural land (Lee, et al., 1998).

Based on available mapping contours and field investigations the Site is described as gently sloping, commercial / residential dominated area, with agricultural dominated areas in the northeast portion of the Site. Two forested communities are present in the southwest and southeast areas of the Site. The Site has experienced significant changes to the landscape in recent decades, notably with addition of residential development and associated increase in impervious surfaces.

4.2 Surface Water and Drainage Feature Mapping

No watercourses are present on or adjacent to the Site. Overall, Site drainage and surface water features are highly anthropogenically influenced with a series of culverts, ditches and stormwater infrastructure conveying flows generally eastward from Highway 12 to Town Line, under existing conditions. All drainage from the Site is generally directed towards the mapped wetlands discussed in Section 4.3.

An unnamed watercourse is mapped outside of the 120 m adjacent lands boundary. This feature crosses Town Line approximately 770 m southeast of the Site and flows east toward the mapped wetlands.

4.3 Wetland Delineation

No wetlands are mapped on the Site, and no wetlands were identified within the Site during the field investigations.

An unevaluated wetland is mapped on adjacent lands (i.e., within 120 m), located immediately south and east of the Site boundary, and extending east of Town Line. The Marchmont Swamp PSW is mapped outside of the 120 m adjacent lands boundary, approximately 400 m east of the Site (Figure 1). Based on provincial mapping, the unevaluated wetlands are directly connected to the PSW, comprised of edge wetlands associated with this feature. All mapped wetlands on adjacent lands are assumed to be present as mapped for the purposes of this Study.

4.4 Vegetation Communities and Inventory

The vegetation communities on the Site are summarized in Table 5 and are mapped on Figure 2.

Table 5 Vegetation Communities

No.	ELC Code	Community Description	Community Type	S - Rank
1	CUP3-3	Scots Pine Coniferous Plantation Type	Cultural	SNA
2	FOC5	Dry – Fresh White Spruce Coniferous Forest	Terrestrial	S5
3	CVR	Constructed Residential	Constructed	SNA
4	CUM	Cultural Meadow	Terrestrial	SNA
5	FOC2-2	Dry – Fresh White Cedar Coniferous Forest Type	Terrestrial	S5
6	FOD5-8	Fresh Sugar Maple – White Ash Deciduous Forest Type	Terrestrial	S5
7	AG	Agriculture	Cultural	SNA
8	FODM11	Naturalized Deciduous Hedgerow	Terrestrial	SNA

No provincially rare vegetation communities were observed on the Site or adjacent lands. No at risk or provincially rare (S1, S2) species were identified on the Site. Overall, the floristic quality of vegetation identified on the Site was low.

4.5 Significant Woodlands

In the past 200 years over 70 percent of woodland cover has been lost in Ecoregions 6E and 7E (Ministry of Natural Resources, 2010). The protection of woodland cover in southern Ontario is an important concern (Ministry of Natural Resources, 2010). Planning authorities are responsible for protecting significant woodlands within Ecoregions 6E and 7E in accordance with policies 2.1.4(b) and 2.1.6 of the PPS. The amount of woodland cover is high across the landscape within Ecoregion 5E. As such, the Natural Heritage Reference Manual and the PPS do protect or designate significant woodlands within Ecoregion 5E.

The County of Simcoe Official Plan defines significant woodlands as: "*an area which is ecologically important in terms of features such as species composition, age of trees, and* *stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to Site quality, species composition, or past management history.*" (County of Simcoe, 2023).

The Township of Oro-Medonte describes significant woodlands as a treed area, woodlot, or forested areas, that provides environmental and economic benefits such as erosion prevention, water retention, provision of habitat, recreation and sustainable harvest of woodland products (Township of Oro-Medonte, 2023).

Following review of the Township of Oro-Medonte Official Plan (Township of Oro-Medonte, 2023) and the County of Simcoe Official Plan (County of Simcoe, 2023) there are no mapped significant woodlands on the Site or on adjacent lands. As such, significant woodlands are not discussed further in this study.

4.6 Significant Valleylands

The County of Simcoe Official Plan (2023) defines valleylands as: within areas of conservation authority jurisdiction, all lands below/within the stable top of bank, predicted top of stable slope, floodplain limit, or predicted meander belt limit, as prescribed in Section 2(b) of each conservation authority's *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* regulation under the Conservation Authorities Act. In the remainder of the County (i.e., outside Conservation Authority jurisdiction), valleylands are defined and managed as defined by the Provincial Policy Statement.

There were no valleylands identified through field investigations while on the Site. As such, significant valleylands are not discussed further in this study.

4.7 Significant Wildlife Habitat

The Natural Heritage Reference Manual (NHRM) states the assessment requirements for Significant Wildlife Habitat (SWH) for applications under the *Planning Act, 1990*. The Province recommends that the evaluation of SWH be investigated on lands beyond the boundary of a settlement area and in some cases regarding undeveloped portions of the settlement area (Ministry of Natural Resources, 2010).

Given the context of this Study, and that no change in land use is proposed, a fulsome assessment of SWH was not undertaken for the Site. However, details on species of conservation concern (including special concern species) and their protected habitats are provided in Section 4.8.

4.8 Species of Conservation Concern

According to the Significant Wildlife Habitat Technical Guide (Ministry of Natural Resources, 2000), Species of Conservation Concern (SCC) include species that are identified as at risk by COSEWIC or on the SARO list, known rare species (provincially, regionally, locally), and species with populations in known decline. A list of SCC, including SAR, with potential to occur in the general vicinity of the Site has been compiled based on known species' ranges, habitat requirements, and review of background information sources (as listed in Section 3.1). In addition, the list has been augmented with direct field observations from the Study, as detailed in the previous sections.

Cambium has employed a habitat-based screening, in order to identify suitable habitat for species located on or adjacent to the Site. The screening seeks to identify species that could be present within the Site, and if present, are likely to be impacted from the work. While the review has been completed to inform the decision-making process of the project, it is not considered an exhaustive analysis by industry standards, nor were there targeted SAR investigations completed. As such, additional SAR analysis and investigations may be required, pending the selection of the preferred alternative, to ensure the proponent avoids contravention of the ESA. A preliminary analysis is provided in Appendix B that outlines species that have a reasonable likelihood of being impacted and discussed further below.

4.8.1 Endangered and Threatened Species

The habitat of endangered and threatened species is regulated under the ESA, 2007, and associated regulations. The following (endangered/threatened) species are known to occur in the regional area of the Site, and the habitat types occurring on the Site may support these species. Accordingly, an evaluation of habitat type, size, and availability was completed, to determine whether the Site could be used by any of the species listed below.

The Eastern Whip-poor-will is threatened both federally and provincially. It uses habitats with a mix of open and forested areas, and its breeding is dependent on forest structure being semi-open or with patchy clearings such as found in ELC community 1, 2, 5, and 6, which consist of semi open woodland with clearings and a mix of deciduous and coniferous canopy cover.

The Site may provide habitat for the following bat species: Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, and Tri-coloured Bat. Potential for Bat Maternity Roost habitat were observed on Site within the woodland areas (i.e., Communities 1, 2, 5 and 6). However, while there are suitable cavity trees for bats to roost, these trees may not occur at a density that meets the threshold for maternity roosting colonies. Open areas of the Site may be used as foraging habitat for these species; however, foraging habitat is not protected under the ESA. Recommended avoidance and mitigation measures relating to the general protection of bats are provided in Section 6.0.

Butternut is listed as federally and provincially endangered. Butternut trees naturally grow in a variety of treed and open habitats in Ontario. They occur along fencerows, within treed riparian zones, on the lower slopes of treed ravines, and in and around mixed deciduous woodlots and forests, where they grow beneath canopy openings, near forest edges and along forest roads. Trees occur on rich, moist, well-drained loams and on well-drained rocky soils, especially of limestone origin. Cultivated Butternut trees may be present in additional habitats such as manicured gardens and parks. No evidence of Butternut was observed while on the Site.

The background review identified records for the following additional species within 1 km of the Site: Eastern Meadowlark (threatened) and Bobolink (threatened). While a small cultural meadow is present within the Site (Community 4), it is approximately 0.5 ha in size and does not meet the threshold of 4 ha to be considered suitable nesting habitat for the species.

4.8.2 Special Concern Species

Barn Swallows are listed as special concern provincially. They require open habitats including grassy fields, pastures, agricultural crops, shorelines, cottage areas, wetlands, or sub-artic tundras which are also in close association with human populations as this swallow typically nests inside man-made structures such as abandoned barns or other buildings with sufficient openings or road culverts. ELC Community 3 and 7 may support this species due to the presence of barns, outbuildings, and other man-made structures throughout the Site. No evidence of Barn Swallows was observed on Site.

The Eastern Wood-pewee lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests with little understorey vegetation, as available in ELC Communities 1, 2, 5, and 6 on the Site, as well as woodland areas on adjacent lands. Woodlands on the Site offer a mix of deciduous and coniferous tree cover with little understorey vegetation, which provides forest edges where Eastern Wood-pewee could forage for food.

The Monarch Butterfly uses a variety of habitats with wildflowers, including habitats such as Community 4, but requires milkweed plants as a food source for their caterpillars. No Monarch Butterflies were observed and no high density observations of milkweed were noted during the site visit.

The Yellow-banded Bumble Bee is a habitat generalist and therefore could utilize a variety of areas on Site. Several communities provide nectaring plants and native grasses for the Yellow-banded Bumble Bee to forage upon.

Special concern species are protected locally through the implementation of SWH. Protection of SWH is not required in relation to the proposed scale of development (see Section 4.6). Furthermore, no impact to special concern species is reasonably anticipated, provided the general recommendations provided in Section 5.2 are implemented (i.e., primarily regarding removal of vegetation outside of the bird breeding timing window). As such, special concern species will not be discussed further in this report.

4.8.3 Locally Important Species

The Piliated Woodpecker typically nests in mature forest but may also be found in younger forests with remnant mature trees. As a keystone species, the nesting cavities of Piliated Woodpeckers are of importance for other migratory birds that reuse Piliated Woodpecker nest cavities in subsequent years. As a migratory bird, Piliated Woodpecker nesting cavities are protected under the MBCA, unless they have been proven to be abandoned in accordance with the MBR. To verify that a Piliated Woodpecker nesting cavity has been abandoned, the nest must be reported to the Abandoned Nest Registry, and appropriate surveys must occur to confirm nest use. The nest must remain inactive for 36 months after registration before the nest will be deemed abandoned by the ECCC.

5.0 Evaluation of Preferred Alternatives

The purpose of this report is to provide a preliminary review of the Site, identify areas of natural heritage constraints, and evaluate potential impacts to the environment associated with each proposed alternative. The proposed drainage improvement alternatives include the following:

1. Do nothing;
2. Increase conveyance capacity of north roadside ditch;
3. Increase conveyance capacity of south roadside ditch;
4. Construct dry pond stormwater management facility in park block
5. Construct rear lot conveyance channel
6. Install storm sewer

5.1 Alternative 1 – Do Nothing

This alternative would leave the current drainage infrastructure 'as is' without implementation of any new drainage improvements.

5.1.1 Potential Constraints and Impacts to Natural Heritage Features

In this scenario, runoff from existing agricultural fields within the Site is expected to increase with the further introduction of impermeable surfaces within the catchment (i.e., constructed roadways, subdivisions, and walkways in the northwest portion of the Site) and compacted surfaces with reduced infiltration capacity. While potential constraints to the project are not applicable in this alternative, doing nothing is expected to negatively impact existing anthropogenic infrastructure and likely to result in erosion and sedimentation to downgradient hydrologic communities (i.e., wetlands and watercourses).

5.1.2 Recommendations and Mitigation Measures

If this alternative is selected, stormwater runoff from agriculture fields should be investigated regularly to monitor for impacts, water quality, flooding and erosion within the community and surrounding natural heritage landscape.

5.2 Alternative 2 – North Ditch Improvements

This alternative would consist of improvements to the conveyance capacity of the north roadside ditch along Warminster Sideroad by widening and lowering the roadside ditch and replacing the existing road crossing and driveway culverts with larger culverts. The south roadside ditch would remain undisturbed under this alternative.

The capacity of the north roadside ditch can be increased to the greatest extent possibly within the municipal right-of-way by removing the mature trees on the north side of Warminster Sideroad and regrading the ditch from the property line down at 2:1 (H:V) side slopes to a depth of 1.12 m. The new gravel shoulder can be maintained with a 0.5 m width and driveway culverts on the north side of Warminster Sideroad can be replaced with 750 mm diameter culverts. Under this alternative, the north roadside ditch conveyance capacity can be increased from 0.9 m^3/s to 1.6 m^3/s, which only provides a minor improvement in flooding.

5.2.1 Potential Constraints and Impacts to Natural Heritage Features

Based on design details and the analysis in Section 4.0, this alternative will likely result in the loss or impact of mature, deciduous street trees along the north ditch line of Warminster Sideroad; although it is acknowledged that efforts can be implemented to minimize the extent of disturbance. The area is composed of a residential development which includes disturbed areas and highly anthropogenic features such as manicured lawns and ditch line. Ecological function of the ditch line is limited and composed of tolerant vegetation species and wildlife (if present). As such, potential impacts to the environment are anticipated to be limited, and where present, indirect in nature (i.e., water quantity, quality, sedimentation, and erosion).

5.2.2 Recommendations and Mitigation Measures

To facilitate this alternative, best efforts should be implemented to minimize and/or avoid impacting the mature trees along Warminster Sideroad to the extent feasible. When tree trimming or clearing is required, standard industry best management practices and mitigation measures are recommended such as completed work outside the migratory bird window (September 1 to March 31) of any given calendar year. In addition, consideration should be made to the township Site Alteration By-Law (2016-056) Policy 2.4 regarding the alteration, injury or destruction of municipal trees. Restoration planting can be explored to re-gain existing canopy cover and biodiversity, if significant tree removal is anticipated during development of the design. Finally, the ditch should be immediately stabilized following final grading to mitigate erosion and maintain water quality thresholds to downgradient receivers. All ESC controls and temporary measures should be inspected regularly by qualified professionals until the exposed areas are stabilized (typically 80% vegetated).

5.3 Alternative 3 – South Ditch Improvements

This alternative offers an opportunity to improve the conveyance capacity of the south roadside ditch along Warminster Sideroad by widening and lowering the roadside ditch and replacing the existing road crossing and driveway culverts with larger culverts. Under this alternative, the north roadside ditch of Warminster Sideroad would remain undisturbed.

The overall capacity of the south roadside ditch of Warminster Sideroad would be increased to the greatest extent possible within the municipal right-of-way (ROW) by removing mature trees on the south side of Warminster Sideroad and regrading the shoulders and ditch from the property line down at 2:1 (H:V) side slopes to a depth of 1.1 m, while the gravel shoulder will be maintained with a 1.5 m width. Driveway culverts along the southside of Warminster Sideroad will be replaced with 1030 mm x 740 mm culverts. The drainage capacity of the south roadside ditch will increase from 0.2 m^3/s to 0.7 m^3/s which is a minor improvement in flooding.

5.3.1 Potential Constraints and Impacts to Natural Heritage Features

Similar to Alternative 2, Alternative 3 will likely result in the loss or impact of mature, deciduous trees along the south roadside ditch of Warminster Sideroad; although it is acknowledged that efforts can be implemented to minimize the extent of disturbance. The area is composed of a residential development which includes disturbed areas and highly anthropogenic features such as manicured lawns and ditch line. Ecological function of the ditch line is limited and composed of tolerant vegetation species and wildlife (if present). As such, potential impacts to the environment are anticipated to be limited, and where present, indirect in nature (i.e., water quantity, quality, sedimentation, and erosion).

5.3.2 Recommendations and Mitigation Measures

To facilitate this alternative, best efforts should be implemented to minimize and/or avoid impacting the mature trees along Warminster Sideroad. When tree trimming or clearing is required, standard industry best management practices and mitigation measures are recommended such as completed work outside the migratory bird window (September 1 to March 31) of any given calendar year. In addition, consideration should be made to the township Site Alteration By-Law (2016-056) Policy 2.4 regarding the alteration, injury or destruction of a municipal trees. Restoration planting can be explored to re-gain existing canopy cover and biodiversity if significant tree removal is anticipated during development of the design. Finally, the ditch should be immediately stabilized following final grading to mitigate erosion and maintain water quality thresholds to downgradient receivers. All ESC controls and temporary measures should be inspected regularly by qualified professionals until the exposed areas are stabilized (typically 80% vegetated).

5.4 Alternative 4 – Dry Pond Construction

This alternative consists of constructing a dry pond stormwater management facility (SWMF) to reduce peak flows through the roadside ditches along Warminster Sideroad. This proposed facility will be designed to attenuate peak flows generated west of Richelieu Road, while the north and south roadside ditch of Warminster Sideroad would remain undisturbed.

The dimensions of the dry pond would be approximately 0.7 ha and 10,650 m^3 of active storage constructed in the southwest portion of Danny McHugh Memorial Park which is located in Community 1 (CUP3-3), see Figure 2. This would also require a new storm sewer from Warminster Sideroad, aligned east of Oro-Medonte Fire Station 5, to convey surface runoff from Warminster Sideroad to the SWM facility. Two swales would also be graded, one to convey flows from the culverts to the dry pond, and one graded around the baseball diamond to tie into the south roadside ditch of Warminster Sideroad west of 1945 Warminster Sideroad.

5.4.1 Potential Constraints and Impacts to Natural Heritage Features

The propose dry pond footprint is located with Community 1, a Scots Pine Coniferous Plantation. While it is acknowledged that the area is anthropogenic in origin, it is among the most naturalized habitat type within the Site. The woodland community has the potential to support species of conservation concern, such as Eastern Whip-poor will, Eastern Wood Pewee, and SAR bats.

5.4.2 Recommendations and Mitigation Measures

If this alternative were selected, the project would need to consider the sensitivity of the woodland and its function in supporting wildlife in further detail. The following mitigation measures would be recommended:

5.4.2.1 Feature Specific Recommendations and Mitigation Measures

- Supplemental investigations within the Alternative #4 footprint to adequately characterize the area and its ecological function, which were beyond the scope of this Study. This would include, but may not be limited to:
    - Two breeding bird surveys should be carried out during the peak breeding season between May 24 and July 10, a minimum of seven days apart based on guidelines in the Ontario Breeding Bird Atlas (OBBA) Guide for Participants (Ontario Breeding Bird Atlas, 2001).

- In order to determine if the Site is being used as nesting habitat by Eastern Whip-poor-will, avian surveys should be conducted following the approved MNDMRF protocol (Ministry of Natural Resources and Forestry, 2013).
- To determine if suitable habitat for SAR bats existed on/or adjacent to the community, bat maternity roost survey should be completed using the methods detailed in the *Bat and Bat Habitats: Guidelines for Wind Power Projects* (Ontario Ministry of Natural Resources, 2011). Pending results, and recommended consultation with MECP, acoustic monitoring may also be required.

5.4.2.2 General Timing and Mitigation

- Nesting birds and their nests, eggs, and young are protected under the *Migratory Birds Convention Act, 1994*. Vegetation clearing on the Site should occur outside the breeding bird season, which extends from April 15 to August 15 in the local area (as per Environment and Climate Change Canada Guidelines).
- Tree removal should be limited to the building envelope to the extent possible. Small scale tree removal will not result in impairing or eliminating the function of habitat to support bat life processes provided the tree removal avoids the active bat season (April 1 – September 30).
- The spread of invasive species should be minimized as much as possible when vegetation clearing is occurring. Best management practices to reduce the spread of invasive species include:
  - Revegetate with species native to the local area.
  - Request fill and compost from reputable sources that are conscious of the potential for the spread of invasive species via these media.
  - Get to know the most common invasive species in the area.
  - Brush off or clean any shoes, boots and equipment that have encountered invasive species before returning to the property. Equipment and vehicles coming into the work

area should be free of soil and seeds that could introduce non-native and invasive species following the Clean Equipment Protocol for Industry: Inspecting and Cleaning Equipment for the Purposes of Invasive Species Prevention (Halloran, 2013)

- Immediately eradicate invasive species if they are observed on the property.
- Do not compost invasive species; put them in plastic bags and dispose of them in the garbage.
- Do not dispose of lawn or garden clippings in the forest or wetlands to avoid species introductions.

5.5 Alternative 5 – Rear Lot Conveyance Channel

This alternative would reduce the peak flows through the roadside ditches along Warminster Sideroad by regrading a new conveyance channel along the south property limit of 1922 Warminster Sideroad and 3320 Townline. The new conveyance channel would redirect drainage from the Kayley Estates development, the soccer pitches in the north, and along the rear lots of 1944 Warminster Sideroad to the west roadside ditch of Townline. The current roadside ditch infrastructure would remain undisturbed under this alternative.

5.5.1 Potential Constraints and Impacts to Natural Heritage Features

From a natural heritage perspective, potential impacts of this alternative are limited, given the proposed footprint is predominantly within residential property or actively farmed agricultural fields. As such, potential impacts to the environment, if present, are anticipated to be indirect in nature (i.e., water quantity, quality, sedimentation and erosion).

5.5.2 Recommendations and Mitigation Measures

The proposed drainage improvements should address potential stormwater-related impacts to the surrounding wetlands and watercourses, through quality and quantity control measures. Efforts should be made to naturalize and stabilize the channel with native vegetation species to mitigate erosion and provide thermal buffering to downgradient receivers. In addition, consideration should also be given to impacts and mitigation measures to address agricultural specific run-off from adjacent lands, such as:

- Maintain vegetated buffer strips around fields and streams to intercept runoff.
- Add conservation buffers to catch runoff and provide setbacks to drainage features.
- Implement nutrient management techniques.
- Control livestock access to waterways.

A comprehensive and site-specific ESC plan should be developed concurrently with the design that includes a multi-barrier mitigation approach to sediment control. This could include the incorporation of check dams, sediment fencing, and stabilization measures. The conveyance channel should be immediately stabilized following final grading to mitigate erosion and maintain water quality thresholds to downgradient receivers. All ESC controls and temporary measures should be inspected regularly by qualified professionals until the exposed areas are stabilized (typically 80% vegetated).

5.6 Alternative 6 – Storm Sewer

This alternative would improve the drainage capacity within the community by installing a new storm sewer system from 1944 Warminster Sideroad to Townline. The north roadside ditch of Warminster Sideroad would be regraded to convey local drainage and the south roadside ditch of Warminster Sideroad would remain undisturbed.

5.6.1 Potential Constraints and Impacts to Natural Heritage Features

Given the footprint of this alternative, potential impacts are similar to those outlined in Section 5.2 for Alternative 2. This alternative is likely to result in the loss or impact of mature, deciduous street trees adjacent to the North ditch line, although it is acknowledged that efforts can be implemented to minimize the extent of disturbance. The area is composed of a residential development which includes disturbed areas and highly anthropogenic features such as manicured lawns and ditch line. Ecological function of the ditch line is limited and composed of tolerant vegetation species and wildlife (if present). As such, potential impacts to the environment are anticipated to be limited, and where present, indirect in nature (i.e., water quantity, quality, sedimentation, and erosion).

5.6.2 Recommendations and Mitigation Measures

To facilitate this alternative, best efforts should be implemented to minimize and/or avoid impacting the mature trees along Warminster Sideroad. When tree trimming or clearing is required, standard industry best management practices and mitigation measures are recommended such as completed work outside the migratory bird window (September 1st to March 31st) of any given calendar year. Further, restoration planting can be explored to re-gain existing canopy cover and biodiversity if significant tree removal is anticipated during development of the design.

6.0 Summary and Conclusions

As outlined in the preceding sections, Alternatives 2, 3 and 6 are all proposed within anthropogenically pre-disturbed residential communities and their associated ditch networks. The three alternatives are similar with respect to potential impacts to the environment, given the proposed footprint and type of habitat disturbance. From a natural heritage policy perspective, development within pre-disturbed areas is typically preferable. Recommendations to facilitate these alternatives are outlined in Sections 5.2, 5.3, and 5.6, respectively.

Alternative 5, which consists of a rear lot conveyance channel, is proposed within semi-disturbed habitat and active agricultural fields. Minimal tree clearing would be required to accommodate the design, and given the habitat type and land use present, impacts to local flora and flauna are expected to be minor. Naturalization of the channel is recommended and can be achieved through implementation of industry best management practices and stabilization measures. Further discussion in provided in Section 5.1 and Section 5.5.

Alternative 4 is the most ecologically constrained, and potentially impactful alternative, given the forested community (Community 1) situated within the southwest limit of the Site. If this alternative is pursued, supplemental investigations and mitigation efforts, outlined in Section 5.4.2, should be implemented.

7.0 Closing

In closing, the proposed alternatives have been reviewed in the context of existing natural heritage policy framework. The information presented herein outlines mitigation measures and recommendations that would align each alternative with applicable policies and minimize or avoid adversely impacting natural heritage and hydrologic features identified on or adjacent to the subject Site.

Respectfully submitted,

Cambium Inc.

Mitchell Horn
Technician

Camden Jermey, B.Sc., Can-CISEC
Senior Ecologist / Project Manager

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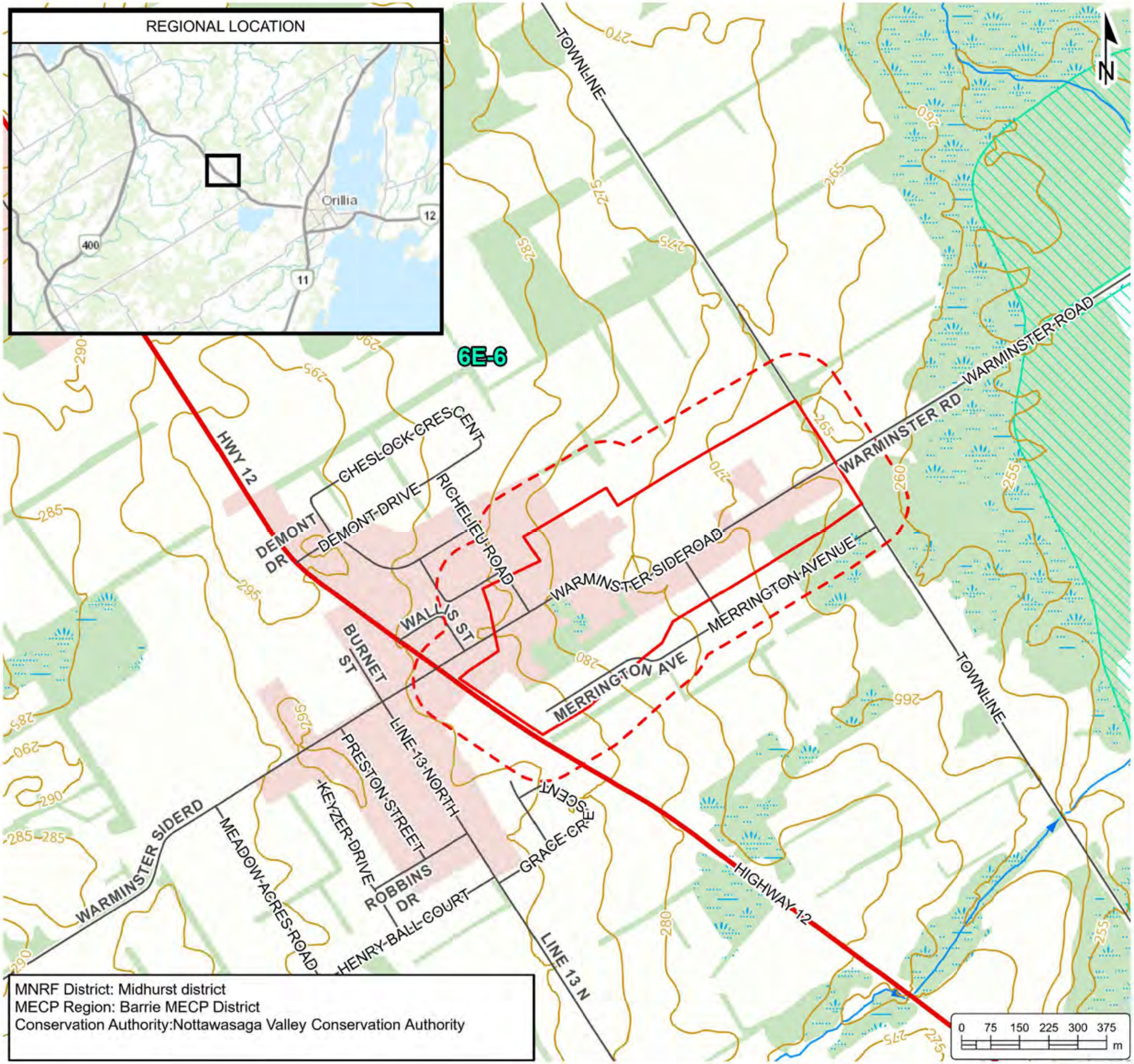
9.0 Glossary of Terms

ANSI: Area of Natural and Scientific Interest
ARA: Aquatic Resources Area
ARA: Aggregate Resources Act
AS: Agricultural System
ATK: Aboriginal Traditional Knowledge
BMA: Bear Management Area
BMP: Best Management Practice
CA: Conservation Authority
CEAA: Canadian Environmental Assessment Act/Agency
CFA: Canadian Forestry Association
CFIP: Community Fisheries Involvement Program
CFS: Canadian Forestry Service
CHU: Critical Habitat Unit
CH: Cultural Heritage
CLI: Canada Land Inventory
CLU: Crown Land Use
COSSARO: Committee on the Status of Species at Risk in Ontario
CR: Conservation Reserve
CWIP: Community Wildlife Involvement Program
CWS: Canadian Wildlife Service
DFO: Fisheries and Oceans Canada
EA: Environmental Assessment
EAA: Environmental Assessment Act
EAB: Emerald Ash Borer
EBR: Environmental Bill of Rights
EIA: Environmental Impact Assessment
EIS: Environmental Impact Study/Statement
ELC: Ecological Land Classification System
ELUP: Ecological Land Use Plan
END: Endangered species
EPA: Environmental Protection Act
ER: Environmental Registry
ESA: Endangered Species Act (2007)
ESA: Environmentally Sensitive Area
ESC: Erosion and Sediment Control
GIS: Geographic Information System
GLSL: Great Lakes – St. Lawrence
GPGGH: Growth Plan for the Greater Golden Horseshoe
GPS: Global Positioning System
HSA: Habitat Suitability Analysis
HSI: Habitat Suitability Index
KHA: Key Hydrologic Areas
KHF: Key Hydrologic Features
KNHF: Key Natural Heritage Features
LCFSP: Licence to Collect Fish for Scientific Purposes
LIO: Land Information Ontario
LRIA: Lake and Rivers Improvement Act
LUP: Land Use Permit or Plan
MA: Management Area
MAFA: Moose Aquatic Feeding Area
MCEA: Municipal Class Environmental Assessment
MECP: Ontario Ministry of Environment, Conservation and Parks
MNRF: Ontario Ministry of Natural Resources and Forestry
NER: Natural Environment Report
NHIC: Natural Heritage Information Centre
NHIS: Natural Heritage Information System
NHS: Natural Heritage System
OBM: Ontario Base Map
OFIS: Ontario Fisheries Information System
OLI: Ontario Land Inventory
OMAFRA: Ontario Ministry of Agriculture, Food and Rural Affairs
OWES: Ontario Wetland Evaluation System
PPS: Provincial Policy Statement (2014)
PSW: Provincially Significant Wetland
RLUP: Regional Land Use Plan
RMP: Regional Management Plan
R.P.F.: Registered Professional Forester
SAR: Species at Risk
SARO: Species at Risk in Ontario
SC: Special Concern species

F&W: Fish and Wildlife
FA: Fisheries Act (Federal)
FEC: Forest Ecosystem Classification
FMP: Forest Management Plan
FRI: Forest Resources Inventory
FWCA: Fish and Wildlife Conservation Act
GGH: Greater Golden Horseshoe
GHP: General Habitat Protection
SWH: Significant Wildlife Habitat
SWM: Stormwater Management
THR: Threatened species
TOR: Terms of Reference
TPP: Tree Preservation Plan
WIA: Woodlands Improvement Act
WMU: Wildlife Management Unit

Appended Figures



NATURAL HERITAGE REVIEW
TATHAM ENGINEERING
1885 Warminster Sideroad,
Oro-Medonte, Ontario

LEGEND

- Highway
- Minor Road
- Contour 5m Interval (Major)
- Contour 5m Interval (Minor)
- Watercourse, Permanent
- Watercourse, Intermittent
- Wetland Unevaluated
- Provincially Significant Wetlands
- Wooded Area
- Built Up Area
- Adjacent Lands (120m)
- Site (approximate)

Notes:
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194 Sophia Street
Peterborough, Ontario, K9H 1E5
Tel: (705) 742.7900 Fax: (705) 742.7907
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LANDSCAPE SETTING AND POLICY AREAS

Project No.: 17300-001	Date: September 2023	Rev.:	
Scale: 1:14,000	Projection: NAD 1983 UTM Zone 17N		
Created by: DBB	Checked by: CJ	Figure: 1	

NATURAL HERITAGE REVIEW

TATHAM ENGINEERING
1885 Warminster Sideroad,
Oro-Medonte, Ontario

Community Number	Code
1	CUP3-3 Scots Pine Coniferous Plantation Type
2	FOC5 Dry - Fresh White Spruce Coniferous Forest
3	CVR Residential
4	CUM Cultural Meadow
5	FOC2-2 Dry - Fresh White Cedar Coniferous Forest Type
6	FOD5-8 Fresh Sugar Maple - White Ash Deciduous Forest Type
7	Agriculture
8	FODM11 Naturalized Deciduous Hedgerow

LEGEND

- Vegetation Community
- Adjacent Lands (120m)
- Site (approximate)

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NATURAL HERITAGE FEATURES

Project No.: 17300-001		Date: September 2023 Rev.:	
Scale: 1:7,500		Projection: NAD 1983 UTM Zone 17N	
Created by: DBB	Checked by: CJ	Figure: 2	

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NATURAL HERITAGE REVIEW

TATHAM ENGINEERING
1885 Warminster Sideroad,
Oro-Medonte, Ontario

LEGEND

- Alternative 1 - Do Nothing
- Alternative 2 - North Ditch Improvements
- Alternative 3 - South Ditch Improvements
- Alternative 4 - Dry Pond Construction
- Alternative 5 - Rear Lot Conveyance Channel
- Alternative 6 - Storm Sewer
- Adjacent Lands (120m)
- Site (approximate)

Notes:
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PROPOSED DEVELOPMENT

Project No.:	17300-001	Date:	September 2023
		Rev.:	
Scale:	1:7,500	Projection:	NAD 1983 UTM Zone 17N
Created by: DBB	Checked by: CJ	Figure:	3

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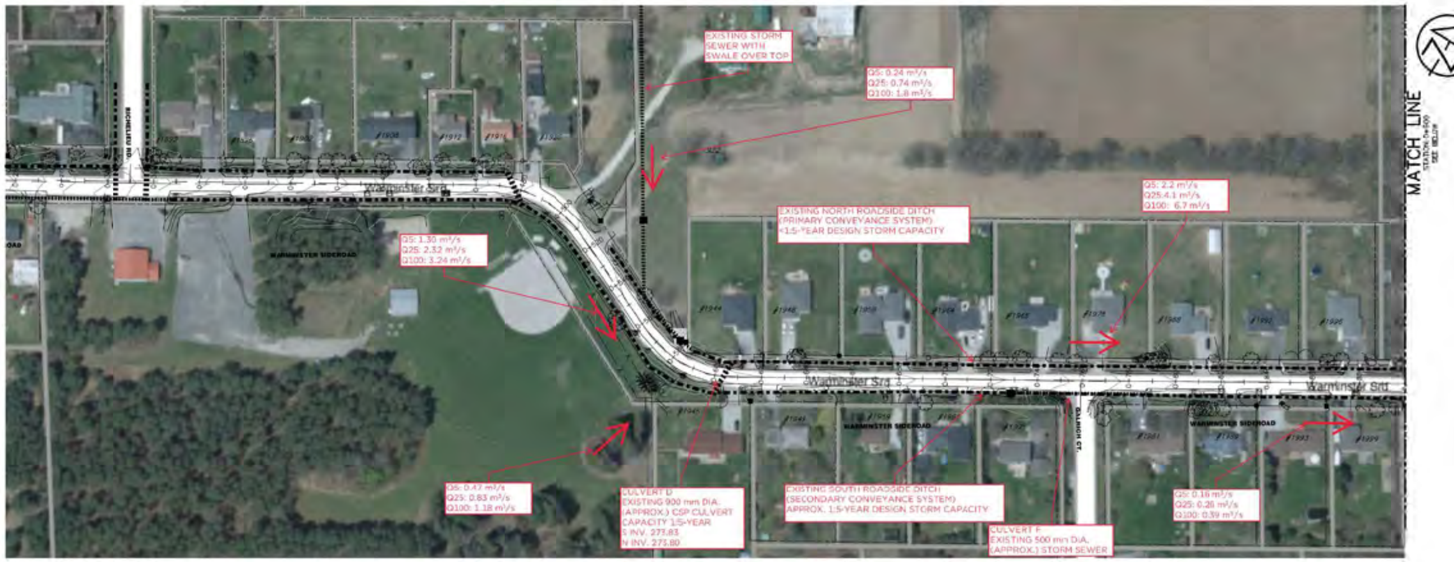
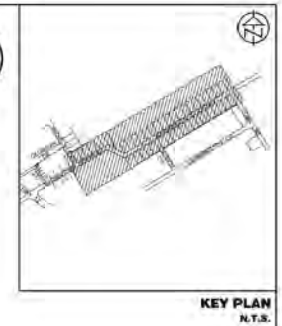
Appendix A

Design Drawings





ALTERNATIVE 1: "DO NOTHING" EXISTING CONDITIONS:

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 2.2 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 4.1 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.7 m^3/s

1) CONVEYANCE CAPACITY <1:5-YEAR (0.9 m^3/s);

2) INSUFFICIENT COVER OVER DRIVEWAY CULVERTS;

3) STEEP DITCH SIDE SLOPES POSE SAFETY HAZARDS; AND

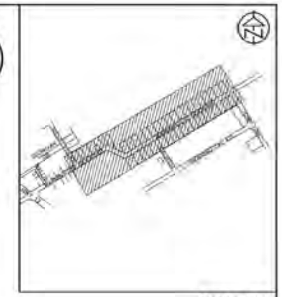
4) EROSION IN DITCH EVIDENT.

LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 1 - DO NOTHING



KEY PLAN
N.T.S.

ALTERNATIVE 2: INCREASE THE CAPACITY OF THE NORTH ROADSIDE DITCH TO THE GREATEST EXTENT POSSIBLE WITHIN THE
MAINTAINING A GRAVEL SHOULDER AND IMPROVED DITCH SIDE SLOPES

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 2.2 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 4.1 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.7 m³/s

1) REGRADE DITCH FROM PROPERTY LINE DOWN AT 2:1 (H:V) TO 1.12 m DEPTH, REGRADE DITCH BOTTOM TO 0.90 m WIDTH, REGRADE DITCH UP AT 2:1 (H:V) MAINTAIN 0.5 m GRAVEL SHOULDER;

2) CONVEYANCE CAPACITY IMPROVED BUT REMAINS <1:5-YEAR (1.4 m³/s);

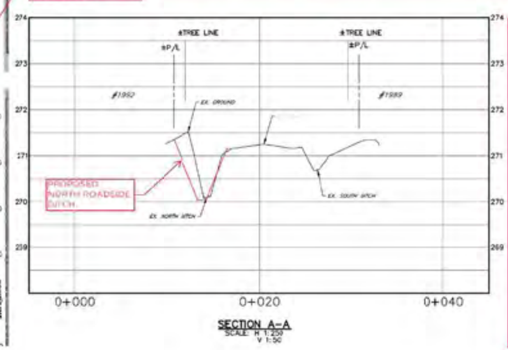
3) SEVERITY OF 1:100-YEAR FLOODING REDUCED (MINOR REDUCTION);

4) MAXIMUM CULVERT HEIGHT ACHIEVABLE APPROX. 900 mm WITH 0.30 m COVER; 1150 x 820 mm CSPA (1000 mm DIA EQUIV.);

5) WILL LOSE MATURE TREES ON NORTHSIDE OF ROAD;

6) SLOPE IMPROVED FROM A SAFETY PERSPECTIVE, DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE; AND

7) EXISTING HYDRANTS, TRANSFORMERS, HYDROPOLES, SIGNS, SERVICES, ETC. MUST BE RELOCATED ON NORTH SIDE OF ROAD.



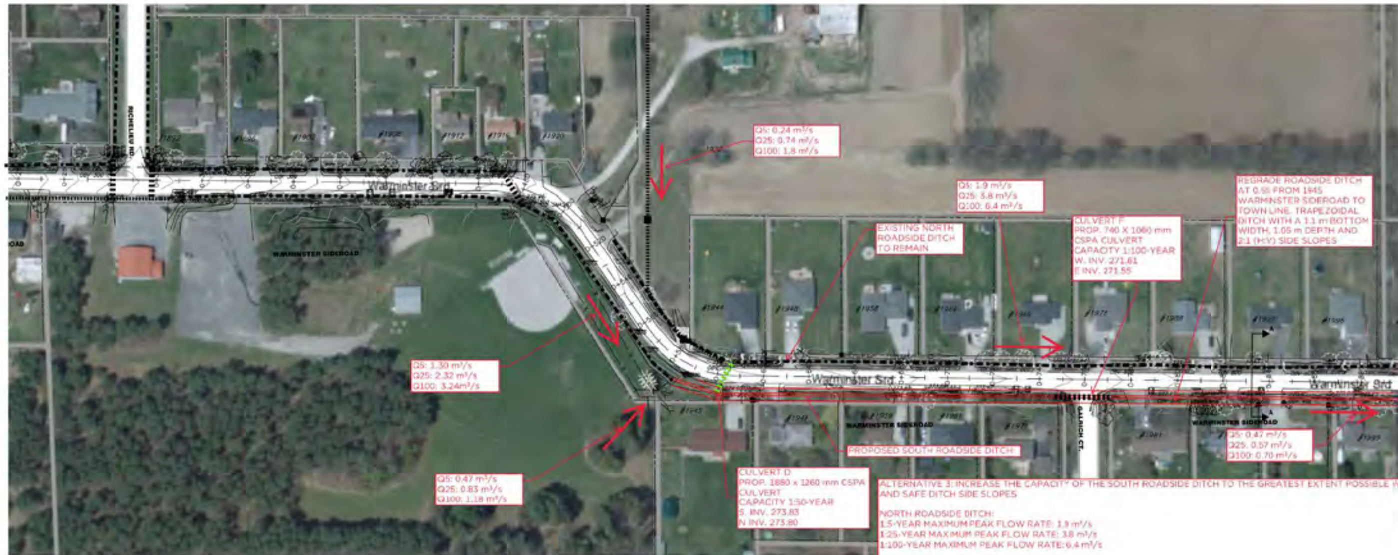
SECTION A-A
SCALE H 1:250
V 1:50

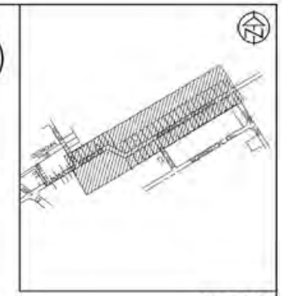
LEGEND

	EXISTING ROADSIDE DITCH
	EXISTING STORM SEWER
	EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
	EXISTING CULVERT
	PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
	PROPOSED STORM SEWER
	PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
	PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 2 - INCREASE CONVEYANCE CAPACITY OF NORTH ROADSIDE DITCH





KEY PLAN
N.T.S.

ALTERNATIVE 3: INCREASE THE CAPACITY OF THE SOUTH ROADSIDE DITCH TO THE GREATEST EXTENT POSSIBLE WITHIN THE MUNICIPAL R.O.W. WHILE MAINTAINING A GRAVEL SHOULDER AND SAFE DITCH SIDE SLOPES

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 1.9 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 3.8 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.4 m³/s

SOUTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 0.47 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 0.57 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 0.70 m³/s

1) REGRADE DITCH FROM PROPERTY LINE DOWN AT 2:1 (H:V) TO 1.05 m DEPTH, REGRADE DITCH BOTTOM TO 1.1 m WIDTH, REGRADE DITCH UP ... SHOULDER;

2) PEAK FLOWS TO NORTH ROADSIDE DITCH REDUCED;

3) CONVEYANCE CAPACITY REMAINS <1:5-YEAR ON NORTH SIDE;

4) CONVEYANCE CAPACITY INCREASED TO 0.7 m³/s ON SOUTH SIDE;

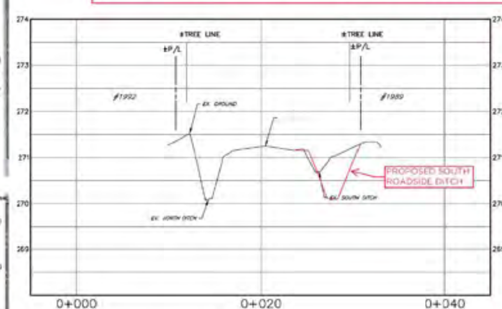
5) SEVERITY OF 1:100-YEAR FLOODING ON NORTH SIDE REDUCED;

6) SHOULDER, SLOPE AND DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE;

7) MAXIMUM CULVERT HEIGHT ACHIEVABLE APPROX. 800 mm WITH 0.30 m COVER 1030 x 740 mm CSPA (900 mm DIA EQUIV.);

8) WILL LOSE MATURE TREES ON SOUTH SIDE OF ROAD; AND

9) EXISTING HYDRANTS, TRANSFORMERS, HYDROPOLES, SIGNS, SERVICES, ETC. MUST BE RELOCATED ON SOUTH SIDE OF ROAD.



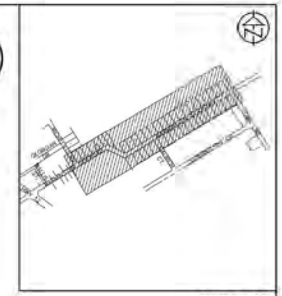
SECTION A–A
SCALE: H 1:250
V 1:50

LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 3 - INCREASE CONVEYANCE CAPACITY OF SOUTH ROADSIDE DITCH



ALTERNATIVE 4: CONSTRUCT DRY POND WITH 0.7 HA FOOTPRINT AREA (10,650 m³ ACTIVE STORAGE VOLUME) W

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 1.4 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 3.1 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 5.3 m³/s

1) APPROX. 0.70 HA FOOTPRINT REQUIRED;

2) CONVEYANCE CHANNEL REALIGNMENT FROM HIGHWAY 12 CROSSING ADJACENT TO LEGION TO DRY POND REQUIRED

3) STORM SEWER TO CONVEY WARMINSTER SR. FLOWS TO POND

4) WILL LOSE MATURE TREES IN PARK;

5) NEW CONEYANCE CHANNEL FROM POND TO WARMINSTER SR. REQUIRED;

6) PEAK FLOW RATES TO NORTH ROADSIDE DITCH REDUCED;

7) SHOULDER, SLOPE AND DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE

8) NORTH ROADSIE DITCH CAPACITY REMAINS <1:5-YEAR STORM (0.9 m³/s).

9) IF CSP CULVERTS REPLACED WITH BOSS 2000 HDPE CONVEYANCE CAPACITY INCREASED TO 1:5-YEAR; AND

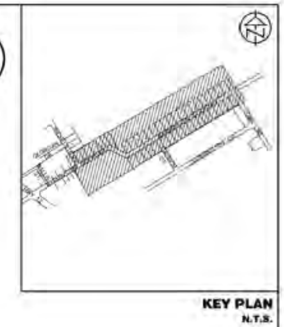
10) SEVERITY OF 1:100-YEAR FLOODING REDUCED.

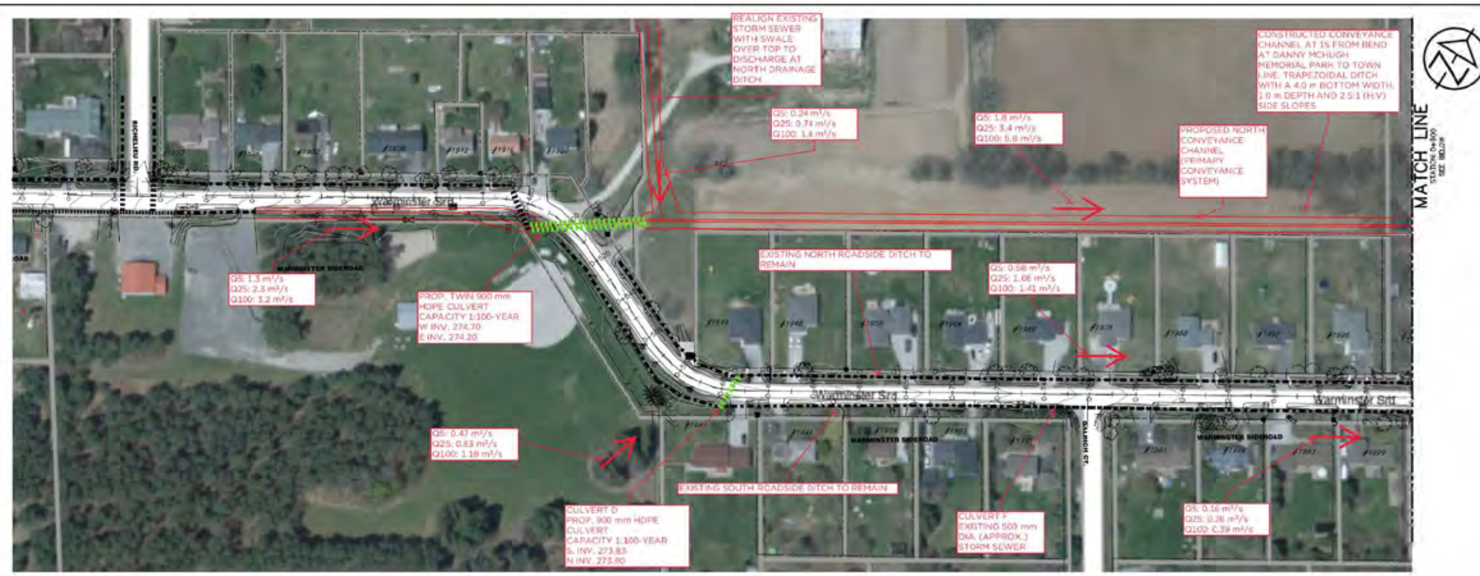
LEGEND

EXISTING ROADSIDE DITCH
EXISTING STORM SEWER
EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
EXISTING CULVERT
PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
PROPOSED STORM SEWER
PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
PROPOSED CULVERT
PROPOSED SWM FACILITY

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 4 - DRY POND SWMFATTENUATION IN PARK BLOCK





ALTERNATIVE 5: CONSTRUCT NORTH CONVEYANCE CHANNEL ALONG REAR LOTS 1944 - 2058 WARMINSTER SR. TO DISCHARGE TO TOWN LINE ROADSIDE DITCH
TRAPEZOIDAL CHANNEL TO BE GRADED 1.0 m DEEP WITH 2.5:1 (H:V) SIDE SLOPES AND 4.0 m BOTTOM WIDTH (0.30 m FREEBOARD IN CHANNEL)

WARMINSTER SR NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 0.6 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 1.1 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 1.4 m³/s

NORTH CONVEYANCE CHANNEL CAPACITY: 6.0 m³/s

1) REQUIRE LAND ACQUISITION ALONG CONVEYANCE CHANNEL;

2) NEW CROSSING REQUIRED AT WARMINSTER SR;

3) POSSIBLE UTILITIES TO BE RELOCATED;

4) PEAK FLOW RATES TO NORTH ROADSIDE DITCH REDUCED;

5) FARM RUNOFF INTERCEPTED FROM DRAINING TOWARD REAR LOTS #1944 - #2058

6) SHOULDER, SLOPE AND DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE;

7) NORTH ROADSIDE DITCH CAPACITY INCREASED TO 1:25-YEAR STORM; AND

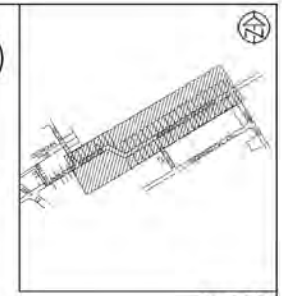
8) IF CSP CULVERTS REPLACED WITH BOSS 2000 HDPE CONVEYANCE CAPACITY INCREASED TO 1:50-YEAR.

LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 5 - CONVEYANCE CHANNEL



ALTERNATIVE 6: INSTALL STORM SEWER FROM 1944 - 2058 WARMINSTER SR. TO DISCHARGE TO TOWN LINE ROADSIDE DITCH WITH [illegible] CAPACITY. NORTH ROADSIDE DITCH TO BE REGRADED TO CONVEY LOCAL FLOWS TO CB INLETS WITH 600 mm DIA DRIVEWAY CULVERTS.

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 0.2 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 0.4 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 0.6 m³/s

STORM SEWER:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 2.2 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 4.1 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.7 m³/s

1) LARGE STORM SEWER (1350 mm - 1500 mm DIA)

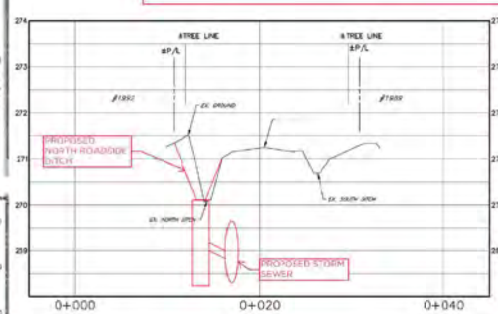
2) ROAD RECONSTRUCTION (MAJOR WORKS);

3) POSSIBLE UTILITY CONFLICTS;

4) NORTH ROADSIDE DITCH CAPACITY INCREASED TO 1:100-YEAR STORM FOR LOCAL RUNOFF;

5) WILL LOSE MATURE TREES ON NORTH SIDE; AND

6) EXISTING HYDRANTS, TRANSFORMERS, HYDROPOLES, SIGNS, SERVICES ETC. MUST BE RELOCATED ON NORTH SIDE.



SECTION A-A
SCALE H 1:250
V 1:50

LEGEND

	EXISTING ROADSIDE DITCH
	EXISTING STORM SEWER
	EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
	EXISTING CULVERT
	PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
	PROPOSED STORM SEWER
	PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
	PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 6 - STORM SEWER

Appendix B

Species of Conservation Concern Screening

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Birds								
Bald Eagle	*Haliaeetus leucocephalus*	No Status	SC	S2N,S4B	The Bald Eagle is a bird of prey with a white head, neck and tail, a massive bright yellow beak, powerful legs, and a wingspan of over 2 m. It nests in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. These nests are usually on islands in freshwater lakes or in large trees such as the pine and poplar. During the winter, they may also be found near open bodies of water that do not freeze (1).	No	Known to occur in the general area	No further consideration required
Bank Swallow	*Riparia riparia*	THR	THR	S4B	The Bank Swallow is a small songbird of around 12 cm long with a distinctive dark breast band, that flies with quick and erratic wingbeats (1). It nests in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. This can include banks of rivers and lakes, bluffs, active sand and gravel pits, road cuts and stockpiles of soils. However, they prefer sand-silt substrates for excavating their nest burrows. They often use large wetlands as communal nocturnal roosts post-breeding or during wintering periods (2).	No	Known to occur in the general area	No further consideration required
Barn Swallow	*Hirundo rustica*	THR	THR	S4B	The Barn Swallow is a mid-sized songbird with steel-blue backs and wings, glossy in males, and a line of white spots across its upper tail. It lives in a variety of open habitats for foraging, such as grassy fields, pastures, certain agricultural crops, shorelines, cottage areas, wetlands, or subarctic tundra (2). They prefer to nest within human made structures such as barns, bridges, and culverts. Barn Swallow nests are cup-shaped and made of mud, typically attached to horizontal beams or vertical walls underneath an overhang (1).	Yes: on-site	Known to occur in the general area	Potential significant wildlife habitat on-site
Black Tern	*Chlidonias niger*	No Status	SC	S3B	The Black Tern is a small waterbird with a forked tail, straight pointed bill, slender shape, and black head during breeding season. It builds floating nests in loose colonies in shallow marshes, with a preference for cattails. They breed primarily in the marshes along the edges of the Great Lakes, but may also use wetlands further north if suitable (1).	No	Known to occur in the general area	No further consideration required
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4B	The Bobolink is a mid-sized songbird of tan colour with black stripes, except for males during summer breeding season who are black with a white back and yellow collar. It prefers tall, grassy meadows, hayfields and some croplands, and feeds (largely on insects) on the ground in dense grasses (1). It tends to nest in forage crops: hayfields and pastures dominated by species including clover, bluegrass, and broadleaf plants (2).	No	Known to occur in the general area	No further consideration required
Canada Warbler	*Cardellina canadensis*	THR	SC	S4B	The Canada Warbler is a small songbird with bright yellow underparts and bluish-grey back and tail (1). It can be found in a variety of forest types, but is most abundant in moist, mixed forests with a well-developed, dense shrub layer. Nests are usually located on or near the ground on mossy logs, and along stream banks (3).	No	Known to occur in the general area	No further consideration required

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Cerulean Warbler	*Setophaga cerulea*	END	THR	S3B	The Cerulean Warbler, a small songbird, is blue-green with white eyebrows and two prominent white wing bars (1). It requires relatively large tracts of mature deciduous forest (>100 ha), and nests in older, second-growth deciduous forests. During breeding season, it is found in relatively large tracts of mature deciduous forests that feature large, tall trees and an open understorey (4).	No	Known to occur in the general area	No further consideration required
Chimney Swift	*Chaetura pelagica*	THR	THR	S4B,S4N	The Chimney Swift is a small bird, between 12 and 14 cm, with a brown, cigar-shaped body, slender wings, and an erratic flight pattern. Prior to settlement, the Chimney Swift would mainly nest in cave walls and hollow trees. Now, it is found mostly near urban and suburban areas where the presence of chimneys or other manmade structures provide nesting and roosting habitat. They also tend to stay in habitat close to the water (1).	Yes: adjacent lands only	Known to occur in the general area	No further consideration required
Common Nighthawk	*Chordeiles minor*	THR	SC	S4B	The Common Nighthawk is a medium-sized bird with long, pointed wings, a long tail with a notch, and large eyes. Its plumage of dark brown with black and white specks blends with its roost site. It is typically found in open areas such as gravel beaches, rock outcrops and burned woodlands, that have little to no ground vegetation. This species can also be found in highly disturbed locations such as clear cuts, mine tailing areas, cultivated fields, urban parks, gravel roads, and orchards (1).	No	Known to occur in the general area	No further consideration required
Eastern Meadowlark	*Sturnella magna*	THR	THR	S4B	The Eastern Meadowlark is a medium-sized migratory songbird with a bright yellow throat and belly, a black V shape on its chest, and a pointed bill. It prefers pastures and hayfields, but is also found to breed in orchards, shrubby fields, human-use areas such as airports and roadsides, or other open areas. The Eastern Meadowlark can nest from early May to mid-August, in nests that are built on the ground and well-camouflaged with a roof woven from grasses (1).	No	Known to occur in the general area	No further consideration required
Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	S4B	The Eastern Whip-poor-will is a medium-sized bird with mottled brown and grey feathers to blend in with its surroundings, a large flattened head, and small bill. They are usually found in areas with a mix of open and forested areas such as patchy forests with clearings, forests that are regenerating after major disturbances, savannahs, open woodlands or openings in more mature forests. Breeding habitat is dependent on forest structure rather than composition, although common tree associations are pine and oak, and it nests directly on the forest floor (2). The species prefers to nest in semi-open or patchy forests with clearings as it forages in open areas and uses forested areas for roosting (1).	Yes: on-site and adjacent lands	Known to occur in the general area	Consideration required under the ESA
Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4B	The Eastern Wood-pewee is a species of 'flycatcher', a bird that eats flying insects. It grows to approximately 15 cm, has greyish-olive upper parts and pale bars on its wings. This species lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It prefers intermediate-age forest stands with little understory vegetation (1). It typically creates nests on tree branches 2-12 m in height (2).	Yes: on-site and adjacent lands	Known to occur in the general area	Consideration required under the ESA

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Evening Grosbeak	*Coccothraustes vespertinus*	SC	SC	S4B	The Evening Grosbeak is a large songbird with a thick greenish bill. It is a social bird that is often found in flocks, particularly during the winter months. Their preferred habitat is thick coniferous forest. During their breeding season, they are generally found in open, mature mixed forests dominated by Firs, White Spruce, or Trembling Aspen (1).	Yes: adjacent lands only	Known to occur in the general area	No further consideration required
Golden Winged Warbler	*Vermivora chrysoptera*	THR	SC	S4B	The Golden-winged Warbler is a small songbird with distinctive yellow wing patches and patches behind their eyes. It inhabits early successional habitat of old fields and favour areas where trees are spread out or forest edges to use for perching, singing, and searching for food. They seem to prefer regeneration zones with young shrub growth, surrounded by mature forest, locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas for their breeding sites; often frequenting clusters of herbaceous plants and low bushes (1).	No	Known to occur in the general area	No further consideration required
Grasshopper Sparrow	*Ammodramus savannarum*	SC	SC	S4B	The Grasshopper Sparrow is a small songbird with a streaked back, a white stripe down the center of its crown, a flattish head, and a conical beak. It inhabits open grasslands and prairies with well-drained soil, preferring areas that are sparsely vegetated. It will also nest in hayfields and pastures, as well as alvars and occasionally grain crops such as barley (1).	No	Known to occur in the general area	No further consideration required
King Rail	*Rallus elegans*	END	END	S2B	The King Rail is a large bird, standing at around 40 cm tall, with a long, curved bill, orange chest and neck, and black sides with vertical white bars. This species prefers densely vegetated freshwater marshes with open shallow water and shrub thicket areas. Current records for Ontario suggest that these birds prefer sites within coastal marshes of the Great Lakes. Most breeding pairs left in Ontario are found in wetlands bordering Lake St Clair or coastal marshes along Lakes Erie and Ontario (1).	No	Known to occur in the general area	No further consideration required
Least Bittern	*Ixobrychus exilis*	THR	THR	S4B	The Least Bittern is a small member of the heron family, reaching around 30 cm in length. It has brown and beige plumage with chestnut patches on its wings (1). The species nests in marshes (> 5 - 10 ha) and swamps dominated by emergent vegetation, preferably cattails, interspersed with patches of woody vegetation and open water. They require dense vegetation and open water with stable levels within 10 m for nesting, and access to clear, open water for foraging (4).	Yes: adjacent lands only	Known to occur in the general area	No further consideration required
Loggerhead Shrike	*Lanius ludovicianus*	END	END	S2B	The Loggerhead Shrike is a small bird with a black, hooked bill, grey crown, and white throat and chest. This species has specific habitat requirements that are dependent on active livestock grazing, or grassland areas that have naturally short grass cover (i.e. alvar communities). They also require spiny, multi-branched shrubs, or barbed fencing, to catch prey. They prefer grassland habitats that have sporadic occurrences of low trees and shrubs; particularly hawthorn species, which are used as part of their feeding behaviour (1).	No	Known to occur in the general area	No further consideration required

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Olive-sided Flycatcher	*Contopus cooperi*	THR	SC	S4B	The Olive-sided Flycatcher is a medium-sized songbird with olive colouring, often seen perching on top of tall trees waiting to catch their prey. It prefers open areas along natural mature forest edges, forest edges near natural openings such as rivers or swamps, human-made openings, or burned forest openings with numbers of dead trees. Breeding habitat usually consists of coniferous or mixed forests adjacent to rivers or wetlands, in Ontario often nesting in White and Black Spruce, Jack Pine, and Balsam Fir (1).	No	Known to occur in the general area	No further consideration required
Peregrine Falcon	*Falco peregrinus*	SC	SC	S3B	The Peregrine Falcon is a bird of prey with a slate blue back, cream-coloured chest with dark markings, and pointed wings spanning around 1 m. It also has bright yellow feet and legs. This species can be found nesting on tall, steep cliff ledges close to large bodies of water. They prefer open habitats such as wetlands, tundra, savannah, sea coasts and mountain meadows for hunting , but may also be found above open forests. This species has also adapted well to living and nesting in urban areas, and has been documented using the ledges of tall buildings and other tall man-made structures for perches and nesting (1).	No	Known to occur in the general area	No further consideration required
Piping plover	*Charadrius melodus*	END	END	S1B	The Piping Plover is a small shorebird with light colouring, a stubby orange bill and orange legs. This species almost exclusively nests on dry sandy or gravelly beaches above the high-water mark to avoid waves. It can be found pecking the sand, searching for small pools of water for insects and small crustaceans to consume. Although not particularly common in Ontario, it is found along the shores of the Great Lakes, and in the Lake of the Woods in northwestern Ontario (1).	No	Known to occur in the general area	No further consideration required
Red-headed Woodpecker	*Melanerpes erythrocephalus*	END	END	S4B	The Red-headed Woodpecker is a mid-sized bird, at around 20 cm long, with a vivid red head, neck and breast as well a strong bill. The species can be found in open woodland and woodland edges, often near man-made landscapes such as parks, golf courses and cemeteries. These areas must contain a large number of dead trees for perching and nesting (1).	No	Known to occur in the general area	No further consideration required
Short-eared owl	*Asio flammeus*	SC	SC	S2N,S4B	The Short-eared Owl has a large round head with small tufts of feathers, long wings, a short tail, and cryptic colouring of brown streaks. This species is found in scattered pockets across the province where suitable open habitat, including grasslands, tundra, peat bogs and marsh, can be found in sufficient quantities. Adults build nests on the ground in grassy areas and occasionally agricultural fields (1). The main factor influencing their choice in habitat is believed to be an abundance of their food source, primarily rodents and other small mammals (2).	No	Known to occur in the general area	No further consideration required
Wood Thrush	*Hylocichla mustelina*	THR	SC	S4B	The Wood Thrush is a medium-sized songbird of around 20 cm with rusty brown coloured upper parts and white underparts with large dark spots. It breeds in deciduous and mixed forests with moderate understories, shade and abundant leaf litter where it forages for food, including larval and adult insects as well as plant material. They prefer moist stands of trees with well-developed undergrowth and tall trees for perches (1).	No	Known to occur in the general area	No further consideration required

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Yellow Rail	*Coturnicops noveboracensis*	SC	SC	S4B	The Yellow Rail is a small, quail-like marsh bird with a short yellow or black bill, short tail, with yellowish and black streaks on its back and white wing patches. This species is mainly found in the Hudson Bay Lowlands region, and is only found in localized marshes in southern Ontario. It is a secretive bird that lives deep within the reeds, sedges, and marshes of shallow wetlands which nest on the ground in areas that have an overlying mat of dry vegetation that can be used for nest building (1).	No	Known to occur in the general area	No further consideration required
Fish								
American Eel	*Anguilla rostrata*	No Status	END	S1?	The American Eel is a long, slender bodied fish, with one long fin extending down the back and around the tail, and two small pectoral fins. It has thick lips, and a protruding lower jaw that extends out above the upper jaw. At the juvenile stage, they swim up the St. Lawrence River to reach Lake Ontario and connected tributaries where they will remain for 8 to 23 years before migrating back to their spawning grounds. In Ontario, the American eel prefers mud, sand or gravel substrates during the juvenile stage when they reside primarily in the benthic zone of waterbodies. More mature eels are able to thrive in most environments provided there is available cover during daylight hours, and the habitat is accessible (2).	No	Known to occur in the general area	No further consideration required
Deepwater Sculpin	*Myoxocephalus thompsonii*	SC	-	S1	The Deepwater Sculpin grows tup to 8 cm in length, and has eyes on top of its head, a large mouth, three dark bands on its pectoral fins, and lacks true scales. This species inhabits the bottoms of cold, highly oxygenated lakes (2).	No	Known to occur in the general area	No further consideration required
Grass Pickerel	*Esox americanus*	SC	SC	S3	Like other members of the pike family, the Grass Pickerel has a long, cylindrical body with a long snout and forked tail. Colouration may vary, but often consists of several thin, dark, wavy vertical bars along the sides. The fins are dusky to yellow-green. Adults have a dark bar extending below the eye. Grass Pickerel are foujnd in wetlands, pond, slow moving streams and shallow bays of larger lakes with warm, shallow, clear water and abundant aquatic vegetation. In Ontario, Grass Pickerel is found in coastal wetlands in the Great Lakes and tributaries of Lake St. Clair, Lake Erie, Lake Huron, the Niagara River, Lake Ontario and the St. Lawrence River, and inland in the Severn River system (2).	No	Known to occur in the general area	No further consideration required
Lake Sturgeon	*Acipenser fulvescens*	No Status	END	S2	The Lake Sturgeon, a large freshwater fish, has an extended snout with four whisker-like organs hanging near the mouth and is dark to light brown or grey on its back and sides with a lighter belly. In Ontario, this fish is found in the rivers of the Hudson Bay Basin, the Great Lakes basin, and their connecting waterways. Lake Sturgeon's live almost exclusively in freshwater lakes and rivers with soft bottoms of mud, sand or gravel and are usually found at depths of 5 to 20 m. They spawn in relatively shallow, fast-flowing water or if available deeper water habitat as well (1).	No	Known to occur in the general area	No further consideration required

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Nothern Brook Lamprey	*Ichthyomyzon fossor*	SC	SC	S3	The Northern Brook Lamprey is a small, elongate fish growing up to 16 cm long with a round, jawless mouth, sevel gill openings, and no pectoral or pelvic fins. This species has a larval stage, in which they require soft substrates for burrowing and typically use slow-moving portions of coolwater streams, and an adult stage, in which they are more typically associated with fast flowing ripples in coolwater strams with rock or gravel bottoms (1).	No	Known to occur in the general area	No further consideration required
Northern Sunfish (Great Lakes - Upper St. Lawrence population)	*Lepomis peltastes*	SC	SC	S3	The Northern Sunfish is a small (about 130 mm long), typical looking member of the sunfish family (Centrarchidae). It has a deep, laterally compressed and olive coloured body with bright blue and red markings. In Ontario, the Northern Sunfish lives in shallow vegetated areas of quiet, slow flowing rivers and streams, as well as warm lakes and ponds, with sandy banks or rocky bottoms. Northern Sunfish prefer to be near aquatic vegetation where they can avoid strong currents. The Great Lakes - Upper St. Lawrence Populations are found throughout southern Ontario including waters flowing into Lake Huron, Georgian Bay, Lake St. Clair, Lake Erie and Lake Ontario, as well as rivers and small lakes in eastern Ontario (1).	No	Known to occur in the general area	No further consideration required
Silver Lamprey (Great Lakes - Upper St. Lawrence River population)	*Ichthyomyzon unicuspis*	SC	SC	S3	The Silver Lamprey is an eel-shaped fish growing from 9 to 39 cm long, with a sucking disc mouth and no jaws or paired fins. They can be differed from other lamprey species based on fin shapes and teeth arrangements. Their habitat requirements include clear water, the availability of fish hosts, and relatively clean beds of sand or organic debris (1).	No	Known to occur in the general area	No further consideration required
Herptiles								
Blanding's Turtle	*Emydoidea blandingii*	END	THR	S3	Blanding's Turtles are identifiable by their bright yellow throat and chin and domed shell. They spend the majority of their life cycle in the aquatic environment, usually in large wetlands or shallow lakes with high densities of water plants (1). These turtles prefer shallow, nutrient rich water with organic sediment and dense vegetation. They use terrestrial sites for travel between habitat patches and to lay clutches of eggs, often going hundreds of meters from their nearest water body. Blanding's Turtles nest in dry coniferous and mixed forest habitats, as well as fields and roadsides (2). From late October until the end of April, they hibernate in the mud at the bottom of permanent water bodies (1).	No	Known to occur in the general area	No further consideration required
Eastern Musk Turtle	*Sternotherus odoratus*	SC	SC	S3	The Eastern Musk Turtle is small with a narrow carapace, a dark brown body and two light stripes on each side of their head (5). It is a small freshwater turtle found primarily in slow moving water bodies with abundant emergent vegetation and mucky bottoms along the southern edge of the Canadian Shield within which they burrow into overwinter. Nesting sites vary, but must be close to the water and exposed to direct sunlight (1).	No	Known to occur in the general area	No further consideration required

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Midland Painted Turtle	*Chrysemys picta marginata*	SC	-	S4	The Midland Painted Turtle has a olive to black carapace with red or dark orange markings on the marginal scutes, as well as red and yellow stripes on the head and neck. The species uses a variety of waterbodies including, ponds, marshes, lakes and slow-moving creeks with a soft bottom and an abundance of basking sites and aquatic vegetation. This species usually hibernates on the bottom of waterbodies (5).	Yes: adjacent lands only	Known to occur in the general area	No further consideration required
Northern Map Turtle	*Graptemys geographica*	SC	SC	S3	The Northern Map Turtle is a medium sized turtle identified by its carapace's map contour-like patterning. It lives in larger lakes and rivers, requiring high water quality to support their primary prey species: molluscs. This species can often be seen in large groups basking together on rocks and logs. In the winter, the Northern Map Turtle can be found hibernating on the bottom of slow-moving rivers (1).	No	Known to occur in the general area	No further consideration required
Snapping Turtle	*Chelydra serpentina*	SC	SC	S3	The Snapping Turtle, with its large serrated carapace, small plastron, and spiked tail, is Canada's largest freshwater turtle (5). It spends the majority of its life in water, preferring shallow water with soft mud and leaf litter, and will travel upland to gravel or sandy embankments, roadsides, along railway lines or beaches to lay their eggs (1).	Yes: adjacent lands only	Known to occur in the general area	No further consideration required
Spotted Turtle	*Clemmys guttata*	END	END	S2	The Spotted Turtle is named after the distinct yellow spots on its carapace. The species is semi-aquatic and prefers ponds, marshes, bogs and even ditches with slow-moving, unpolluted water and an abundant supply of aquatic vegetation. This species usually hibernates in wetlands or seasonally wet areas with structures such as overhanging banks, hummocks, tree roots, or aquatic animal burrows (1).	No	Known to occur in the general area	No further consideration required
Wood Turtle	*Glyptemys insculpta*	THR	END	S2	The Wood Turtle has orange coloured front legs, neck and chin and a sculpted carapace with raised, pyramidal scutes (5). They prefer clear rivers and streams that have moderate current, and sandy or gravelly substrates. This species spends more time on land than other turtle species including in meadows, swamps and fields. Wooded areas are an essential habitat component, and the species uses aquatic habitats for hibernation and mating. Nesting occurs in areas with sandy soil and abundant light (1).	No	Known to occur in the general area	No further consideration required
Eastern Fox Snake (Georgian Bay GLSL Population)	*Pantherophis gloydi*	END	THR	S3	The Eastern Foxsnake has a rusty orange head and a golden-brown body with dark blotches. The Georgian Bay population predominantly uses open habitats along shorelines (e.g., coastal rock barrens and meadow marshes) as habitat during the active season. The foxsnakes inhabiting this coastline do not venture far inland, restricting the majority of their activity to within 150 m of the water (4). The females require rotten logs, stumps, compost or decaying leaf piles for incubating their eggs (5).	No	Known to occur in the general area	No further consideration required

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Eastern Hog-nosed Snake	*Heterodon platirhinos*	THR	THR	S3	The Eastern Hog-nosed Snake can be a variety of colours and patterns so is most easily identified by its flattened, upturned nose. They prefer sandy well-drained habitats such as beaches and dry forests because they lay their eggs, hibernate and burrow in these areas. The main diet of this snake is toads and frogs, so they usually stay close to water including marshes and swamps, where they have an increased chance of finding their preferred prey (1).	No	Known to occur in the general area	No further consideration required
Eastern Milksnake	*Lampropeltis triangulum*	SC	NAR	S4	The Eastern Milksnake's colouration is grey or tan with reddish alternating blotches otlines in black along its back and sides (5). It has recently been delisted from being a species at risk in Ontario (1). This species tends to use open habitats such as rocky outcrops, fields and forest edges. The preferred prey of milksnakes are mice, small rodents, and ground nesting birds which are amply found in and surrounding agricultural outbuildings. The milksnake is secretive and is not likely to be encountered during the day or at night while hunting (5).	Yes: on-site and adjacent lands	Known to occur in the general area	No further consideration required
Eastern Ribbonsnake	*Thamnophis sauritus*	SC	SC	S4	The Eastern Ribbonsnake is slender with three bright yellow stripes running down its back and sides and a white crescent in front of each eye. This snake is usually found close to water as they are strong swimmers, often fleeing predators by diving into shallow water. It prefers wetland habitats where its prey species, frogs and small fish, are abundant. Over winter, they congregate in underground burrows or rock crevices to hibernate (1).	No	Known to occur in the general area	No further consideration required
Massasauga Rattlesnake (Great Lakes - St. Lawrence population)	*Sistrurus catenatus*	THR	THR	S3	The Massasauga, Ontario's venomous snake, can be identified by its rattle, vertical pupils, and triangular head. It inhabits a range of different habitats throughout Ontario, including tall grass prairies, marshes, bogs, shorelines, forests, and alvars. Within these habitats they require open areas to warm themselves in the sun (1).	No	Known to occur in the general area	No further consideration required
Common Five-lined Skink (Southern Shield Population)	*Plestiodon fasciatus*	SC	SC	S3	The Common Five-lined Skink is Ontario's only lizard species. Its Southern Shield population can be found underneath rocks on open bedrock in forests and like to bask on sunny rocks and logs. They hibernate in crevices among rocks or buried in the soil (1). They hibernate in groups under rocks and tree stumps or in rotting wood (5).	No	Known to occur in the general area	No further consideration required
Western Chorus Frog	*Pseudacris triseriata*	THR	–	S3	The Western Chorus Frog is small with a dark stripe running through its eye and a light stripe underneath (5). It is primarily a lowland terrestrial species that requires access to terrestrial and aquatic habitats in close proximity to one another. Relying on marshes and wooded wetlands adjacent to forested habitats, this species also requires isolated, predator free pools for breeding. Temporary pools, such as vernal pools in wooded areas, are preferred. This species hibernates terrestrially in a variety of environments, including leaf litter, wood debris, and vacant animal burrows (2).	No	Known to occur in the general area	No further consideration required
Invertebrates								
Monarch Butterfly	*Danaus plexippus*	SC	SC	S2N,S4B	The Monarch is an orange and black butterfly with small white spots and a wingspan of around 10 cm. It relies on milkweed plants as a food source for growing caterpillars, but the adult butterflies forage in diverse habitats for nectar from wildflowers (1).	No	Known to occur in the general area	No further consideration required

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Hine's Emerald	*Somatochlora hineana*	END	END	S1	Hine's Emerald is a medium-sized dragonfly with a dark abdomen, metallic gree thorax with two yellow stripes, and green eyes. Its habitat consists of groundwater-fed wetlands with grassy vegetation (1).	No	Known to occur in the general area	No further consideration required
West Virginia White	*Pieris virginiensis*	No Status	SC	S3	The West Virginia White is a small, dingy white butterfly. This species is found in moist deciduous woods, and requires a supply of toothwort, a small, spring-blooming plant, which provides the only source of food for its larvae. The West Virginia White is found mostly in the central and southern parts of Ontario, but its range extends north to Manitoulin and St. Joseph islands (1).	No	Known to occur in the general area	No further consideration required
Yellow-banded Bumble Bee	*Bombus terricola*	SC	SC	S3S5	The Yellow-banded Bumble Bee is a medium-sized bumble bee with a distinct yellow and black abdominal band pattern found on its queens, males, and workers. This species is a forage and habitat generalist, able to use a variety of nectaring plants and environmental conditions. It can be found in mixed woodlands, particularly for nesting and overwintering, as well as a variety of open habitat such as native grasslands, farmlands and urban areas. The Yellow-banded Bumble Bee ranges from the Mixedwood Plains of southern Ontario to the Hudson Bay Lowlands in the north (1).	Yes: on-site and adjacent lands	Known to occur in the general area	No further consideration required
Mammals								
Tri-colored Bat	*Perimyotis subflavus*	END	END	S3?	The Tri-colored Bat is small, with pale brown with orange-red forearms, muzzle, and ears. It is named for the black, yellow, and brown hairs on its back. It is considered rare in this region of Ontario which is at the northernmost limit of the natural range. These bats prefer to nest in foliage, tree cavities and woodpecker holes, but are occasionally found in buildings; though this is not their preferred habitat. Winter hibernation takes place in caves, mines and deep crevices. Tri-colored Bats prefer an open forest habitat type in proximity to water (6).	Yes: on-site and adjacent lands	Known to occur in the general area	Potential habitat for endangered or threatened species on-site
Eastern Small-footed Myotis	*Myotis leibii*	No Status	END	S2S3	The Eastern Small-footed Myotis has fur with black roots and shiny brown tips as well as very small feet. In the spring and summer, the Eastern Small-footed Myotis will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. They change their roosting locations daily and hunt at night for insects. They hibernate in winter, often in caves and abandoned mines choosing colder and drier sites than other similar bats (1).	Yes: on-site and adjacent lands	Known to occur in the general area	Potential habitat for endangered or threatened species on-site
Little Brown Myotis	*Myotis lucifugus*	END	END	S4	The Little Brown Myotis has glossy brown fur and a fleshy projection covering the entrance to its ears. This species roosts in trees and buildings, often selecting attics, abandoned buildings and barns for summer colonies where they can raise their young. Little Brown Bats hibernate from October/November to March/April, most often in caves or abandoned mines that are humid and remain above freezing (1).	Yes: on-site and adjacent lands	Known to occur in the general area	Potential habitat for endangered or threatened species on-site

APPENDIX: Species of Conservation Concern - Simcoe County

COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Northern Myotis	*Myotis septentrionalis*	END	END	S3	The Northern Myotis has dull yellow-brown fur with pale bellies and long, rounded ears. This species is found in boreal forests, roosting under loose bark and in the cavities of trees. These bats hibernate from October/November to March/April, most often in caves or abandoned mines (1).	Yes: on-site and adjacent lands	Known to occur in the general area	Potential habitat for endangered or threatened species on-site
Algonquin Wolf	*Canis lycaon*	SC	THR	S4	Formerly called the Eastern Wolf, this canine was recently renamed the Algonquin Wolf. In the southern portion of the province, this species prefers deciduous and mixed forest landscapes while their northern range include mixed and coniferous forests. It is most prevalent in areas with abundant prey species which include Beaver, White-tailed Deer and Moose. Dens sites are usually found in coniferous forests with easily excavated soil types like sand and close to a permanent water source (1).	No	Known to occur in the general area	No further consideration required
Trees, plants, fungi and lichens								
American Ginseng	*Panax quinquefolius*	END	END	S2	American Ginseng is a perennial plant which grows up to 60 centimetres in height. The leaves typically have five leaflets arranged in a whorl at the end of the leaf stem. The root looks like a gnarly parsnip. The flowers are an inconspicuous green-white in colour, but the berries are bright red and arranged in a cluster. In Ontario, the American Ginseng typically grows in rich, moist, and mature deciduous woods dominated by Sugar Maple, White Ash, and American Basswood. It typically grows in deep, nutrient rich soil over limestone or marble bedrock (1).	No	Confirmed absent through targeted surveys	No further consideration required
American Hart's-tongue Fern	*Asplenium scolopendrium*	SC	SC	S3	American Hart's Tongue Fern is a perennial evergreen fern with fronds growing from a short underground stem. Its blades are strap-shaped with a heart-shaped base and pointed tip. The species grows on calcareous rocks on slopes in deciduous forests, preferring deep shade. In Ontario, most occurences are in maple-beech forests (1).	No	Confirmed absent through targeted surveys	No further consideration required
Black Ash	*Fraxinus nigra*	No status	END	S4	The Black Ash is a smaller-sized tree with a narrow crown, light grey and scaly bark, and green, oval leaflets on a central stalk. It grows everywhere in Ontario except for the far north, preferring moist climates and soils such as swampy woodlands or bogs (1).	No	Confirmed absent through targeted surveys	No further consideration required
Broad Beech Fern	*Phegopteris hexagonoptera*	SC	SC	S3	The Broad Beech Fern can grow to a height of 50 cm or more and has a creeping, scaly root (2). The fern has large divided leaves called fronds which grow from 25 to 75 cm long and triagular leaf blades. The Broad Beech Fern perfers rich, moist soils in deciduous forests, usually in full shade and often dominated by Maple and Beech trees. In Ontario, it is found in southern Muskoka, along Lake Erie, and in the eastern Lake Ontario - St Lawrence River region (1).	No	Confirmed absent through targeted surveys	No further consideration required
Butternut	*Juglans cinerea*	END	END	S2?	The Butternut is a medium sized tree reaching 30 m in height. It has large compound leaves with 11 to 17 leaflets. The fruit is oval, fuzzy and sticky. In Ontario, the Butternut prefers moist, well-drained soil, often along streams, or occasionally well-drained gravel sites. It grows alone or in small groups in deciduous forests (1).	Yes: on-site and adjacent lands	Confirmed absent through targeted surveys	No further consideration required

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COMMON NAME	SCIENTIFIC NAME	Federal SARA	Provincial SARO	Provincial S-RANK	SPECIES DESCRIPTION AND HABITAT REQUIREMENTS	SUITABLE HABITAT	SPECIES OBSERVATIONS	ASSESSMENT
Eastern Prairie Fringed-orchid	*Platanthera leucophaea*	END	END	S2	The Eastern Prairie Fringed-Orchid has distinctive fringed white flowers with a deep "nectar spur" containing nectar and a flat, fringed "lip" serving as a platform for pollinating insects. It may lie dormant for years before flowering. It can be found in areas of tallgrass prairie or fen throughout the province and in some tamarack swamps of the Bruce Peninsula and Ottawa Area (1).	No	Confirmed absent through targeted surveys	No further consideration required
Purple Twayblade	*Liparis liliifolia*	THR	THR	S2	The Purple Twayblade is a small orchid with two broad, shiny leaves at the base of the plant and a single stem from which mauve-purple flowers cluster. It can be found in a variety of habitats including open woodlands, mixed deciduous forests, shrub thickets, deciduous swamps, and coniferous plantations. It requires partial, but can not tolerate full, shade and therefore depends on natural disturbances to keep its habitat relatively open (1).	No	Confirmed absent through targeted surveys	No further consideration required

References

1. Ministry of Environment, Conservation and Parks. (2022). Species at Risk in Ontario. Retrieved from https://www.ontario.ca/page/species-risk-ontario
2. Government of Canada. (2021). Species at Risk Public Registry. Retrieved from https://species-registry.canada.ca/index-en.html#/species?ranges=5&sortBy=commonNameSort&sortDirection=asc&pageSize=10
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6. University of Michigan Museum of Zoology. (2004).

Appendix C

Photographic Log

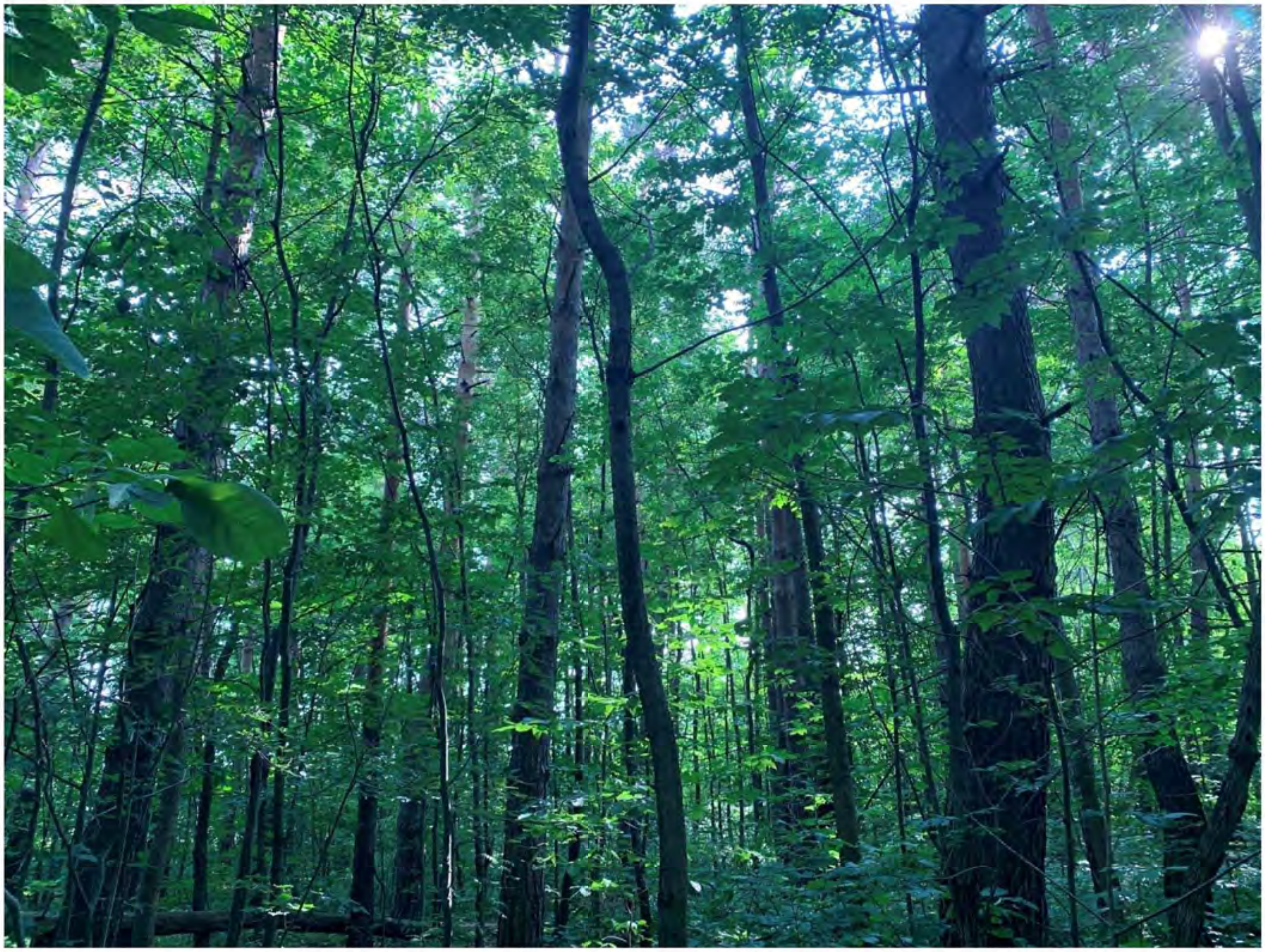

Photo 1 ELC Community 1 (CUP3-3), July 2023.

Photo 2 ELC Community 1 (CUP3-3), July 2023.

Photo 3 ELC Community 2 (FOC5), July 2023.

Photo 4 ELC Community 2 (FOC5), July 2023.

Photo 5 ELC Community 3 (CVR), July 2023.

Photo 6 ELC Community 4 (CUM), July 2023.

Photo 7 ELC Community 5 (FOC2-2), July 2023.

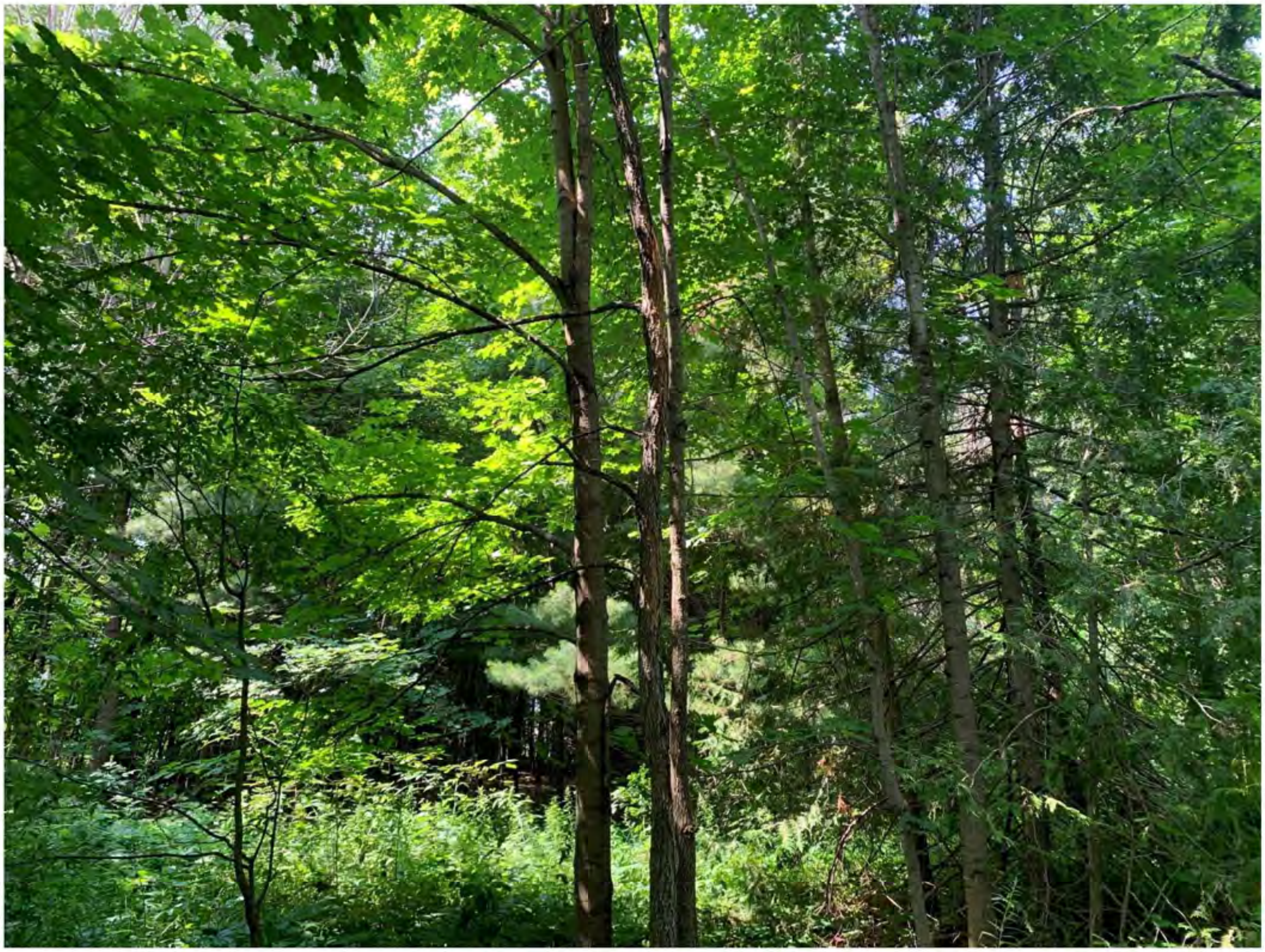

Photo 8 ELC Community 6 (FOD5-8), July 2023.

Photo 9 ELC Community 7 (Agriculture), July 2023.

Appendix D:
Stage 1 Archeological Assessment for Warminster Drainage Improvements

ARCHEOWORKS INC.

Stage 1 Archaeological Assessment for Warminster Drainage Improvements Within Part of Lot 5-5, Concession 14 And Part of the Road Allowance Between Lots 5 and 6 And Part of the Town Line Road Allowance In the Geographic Township of Medonte Historic County of Simcoe Now in the Township of Oro-Medonte County of Simcoe Ontario

Project #: 235-OM9406-23
Licensee (#): Kassandra Aldridge (P439)
PIF #: P439-0167-2023

Original Report

October 23, 2023

Presented to:
Tatham Engineering
115 Sandford Fleming Drive
Suite 200
Collingwood, Ontario
L9Y 5A6

Prepared by:
Archeoworks Inc.
16715-12 Yonge Street, Suite 1029
Newmarket, Ontario
L3X 1X4
T: 416.676.5597
F: 647.436.1938

EXECUTIVE SUMMARY

Archeoworks Inc. was retained to conduct a Stage 1 Archaeological Assessment (AA) of six drainage improvement alternatives (Alternatives 1 to 6), in the community of Warminster, in the Township of Oro-Medonte (the "study area"), County of Simcoe, Ontario.

Per the 2011 *Standards and Guidelines for Consultant Archaeologists ('2011 S&G')* published by the *Ministry of Citizenship and Multiculturalism (MCM)*, a detailed background study was undertaken to provide a record of the study area's archaeological and land use history and present condition. An optional property inspection was also completed.

Background research established archaeological potential within the study area due to the proximity of documented pre-1900 Euro-Canadian settlement (structures and roadways), two registered sites, including one (BdGv-36) located within 50 metres, and a water source (the North River wetland). Additionally, the County of Simcoe Archaeological Management Plan (AMP) identified archaeological potential across most of the study area.

A further review of current and historical air photographs, satellite imagery and orthophotographs was undertaken to determine if the established archaeological potential identification remained relevant; this review revealed deep and extensive land alterations from previous construction grading activities within parts of the study area. These disturbances were further highlighted during the property inspection. Owing to the deep and extensive disturbances, portions of the study area (Alternatives 1, 2 and 6) are considered free of archaeological concern and do not require further archaeological assessment.

Outside of those areas, the remaining balance of the subject lands (Alternatives 3, 4 and 5) comprises an active agricultural field, manicured lawns dotted with trees and shrubbery of several residential properties, and a wooded area. These sections are considered to retain the established archaeological potential and require a Stage 2 pedestrian or test pit survey at five-metre intervals in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.

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PROJECT PERSONNEL

Project Director .... Kassandra Aldridge – MCM licence P439

Field Director (Property Inspection) .... Lee Templeton– MCM licence R454

Field Archaeologists .... Cassandra Lamoureux

Report Preparation and Research .... Lee Templeton

Graphics .... Lee Templeton

Report Review .... Kim Slocki – MCM licence P029

1.0 PROJECT CONTEXT

1.1 Objectives

The objectives of a Stage 1 Archaeological Assessment (AA), as outlined by the 2011 *Standards and Guidelines for Consultant Archaeologists* (‘*2011 S&G*’) published by the *Ministry Citizenship and Multiculturalism* (*MCM*) (2011), are as follows:

- To provide information about the property’s geography, history, previous archaeological fieldwork, and current land condition.
- To evaluate in detail, the property’s archaeological potential, which will support recommendations for Stage 2 survey for all or parts of the property.
- To recommend appropriate strategies for a Stage 2 survey.

1.2 Development Context

The Township of Oro-Medonte is undertaking a Municipal Class Environmental Assessment (Class EA) to resolve drainage issues in the community of Warminster. To address the drainage issues, six improvement alternatives (Alternatives 1, 2, 3, 4, 5 and 6) have been selected for review. A description of each improvement alternative is provided below:

<u>Alternative 1</u>: “Do Nothing.”
Confined to the existing drainage conditions along Warminster Sideroad.

<u>Alternative 2</u>: Increase Conveyance Capacity of North Roadside Ditching.
Includes proposed improvements along the north side of Warminster Road that involves increasing the conveyance capacity of north roadside ditching to the greatest extent possible within the municipal right-of-way (ROW) while maintaining a gravel shoulder and improved ditch side slopes.

<u>Alternative 3</u>: Increase Conveyance Capacity of South Roadside Ditching.
Includes proposed improvements along the south side of Warminster Road that involves increasing the conveyance capacity of south roadside ditching to the greatest extent possible within the municipal ROW while maintaining a gravel shoulder and safe ditch side slopes.

<u>Alternative 4</u>: Dry Pond SWMF Attenuation in Park Block.
Includes proposed improvements that involve the construction of a new dry pond within the park block municipality recognized as 1884 Warminster Sideroad with a 0.7-hectare footprint, new storm sewer inlet, inlet/outlet swale and culverts leading to and from the dry pond.

Alternative 5: Conveyance Channel.
Includes proposed improvements that involve constructing a north conveyance channel along the rear of property municipality recognized as 1926 to 2058 Warminster Sideroad and 3320 Town Line to discharge at the Town Line roadside ditch. The channel would be trapezoidal, 1.0 metre in depth with side slopes and a 4.0 metre bottom width.

Alternative 6: Storm Sewer.
Includes proposed improvements that involve installing a storm sewer from property municipality recognized as 1944 to 2058 Warminster Sideroad to discharge at Town Line roadside ditch with a 1:100-year conveyance capacity. The north roadside ditch would be regraded to convey local flows to catch basin inlets with 600mm diameter driveway culverts.

To facilitate this study, *Archeoworks Inc*. was retained by *Tatham Engineering* to conduct a Stage 1 AA of the six proposed drainage improvements along Warminster Sideroad – the "study area", in the community of Warminster, in the Township of Oro-Medonte. The study area includes the Warminster Sideroad right-of-way (ROW) from Richelieu Road to Town Line, as well as the frontages of 1884, 1922 and 1926 Warminster Sideroad and 3320 Town Line and the rear sections of 1944 to 2058 Warminster Sideroad. Further, a five metre review buffer was applied to those properties outside of the Warminster Sideroad ROW, to accommodate any proposed temporary easements and potential construction staging areas. The study area is in part of Lots 5 and 6, Concession 14, in part of the road allowance between Lots 5 and 6, and in part of the Town Line road allowance, in the Geographic Township of Medonte, historic County of Simcoe, now in the Township of Oro-Medonte, Simcoe County, Ontario (***see Appendix A – Map 1***).

This study was triggered by the *Environmental Assessment Act* in support Schedule B of the Municipal Class Environmental Assessment regulatory process. It was conducted under the project direction of Ms. Kassandra Aldridge, under the archaeological consultant licence number P439, in accordance with the *Ontario Heritage Act* (1990; amended 2022) and the *2011 S&G*. Permission to investigate the study area was granted by *Tatham Engineering* on June 6th, 2023.

1.3 Historical Context

To establish the historical context and archaeological potential of the study area, *Archeoworks Inc.* conducted a comprehensive review of Indigenous and Euro-Canadian settlement history, and a review of available historical mapping, topographic mapping, air photographs, satellite imagery and orthophotographs. The results of this background research are documented below and summarized in **Appendix B – Summary of Background Research**.

1.3.1 Pre-Contact Period

The pre-contact period of Southern Ontario includes numerous Indigenous groups that continually progressed and developed within the environment they inhabited (Ferris, 2013, p.13).

Table 1 includes a brief overview and summary of the pre-contact Indigenous history of Southern Ontario.

Table 1: Pre-Contact Period

Periods	Date Range	Overview and Attributes
PALEO-INDIAN (Early)		
Early	ca. 11000 to 8500 BC	Small groups of nomadic hunter-gatherers who utilized seasonal and naturally available resources; sites are rare; hunted in small family groups who periodically gathered into larger groups/bands during favourable periods in the hunting cycle; campsites used during travel episodes and found in well-drained soils in elevated situations; sites also found along glacial features (e.g., glacial lake shorelines/strandlines) due to current understanding of regional geological history; artifacts include fluted and lanceolate stone points, scrapers and dart heads. - Gainey, Barnes, Crowfield Fluted Points (Early Paleo-Indian) - Holcombe, Hi-Lo, Lanceolates (Late Paleo-Indian) (Ellis and Deller, 1990, pp.37-64; Ellis, 2013, p.37; Wright, 1994, p.25).
Late	ca. 8500 to 7500 BC	
ARCHAIC (Middle)		
Early	ca. 7800 to 6000 BC	Descendants of Paleo-Indian ancestors; lithic scatters are the most commonly encountered site type; trade networks appear; artifacts include reformed fluted and lanceolate stone points with notched bases to attach to wooden shaft; ground-stone tools shaped by grinding and polishing; stone axes, adzes and bow and arrow; Shield Archaic in Northern Ontario introduced copper tools. - Side-notched, corner-notched, bifurcate projectile points (Early Archaic) - Stemmed, Otter Creek/Other Side-notched, Brewerton side and corner-notched projectile points (Middle Archaic) - Narrow Point, Broad Point, Small Point projectile points (Late Archaic) (Dawson, 1983, pp.8-14; Ellis et al., 1990, pp.65-124; Ellis, 2013, pp.41-46; Wright, 1994, pp.26-28). *Oral Traditions* Oral traditions of the Algonquian-speaking *Michi Saagiig* (Mississauga Anishinaabeg) assert that they, "are the descendants of the ancient peoples who lived in Ontario during the Archaic and Paleo-Indian periods" (Gitiga Migizi and Kapyrka, 2015, p.1).
Middle	ca. 6000 to 2000 BC	
Late	ca. 2500 to 500 BC	
WOODLAND (Late)		
Early	ca. 800 BC to AD 1	Evolved out of the Late Archaic Period; introduction of pottery (ceramic) where the earliest were coil-formed, under fired and likely utility usage; two primary cultural complexes: Meadowood (broad extent of occupation in Southern Ontario) and Middlesex (restricted to Eastern Ontario); poorly understood settlement-subsistence patterns; artifacts include cache blades, and side-notched points that were often recycled into other tool forms; primarily Onondaga chert; intensive exploitation of quarries in southeastern Ontario; commonly associated with Saugeen and Point Peninsula complexes. - Meadowood side-notched projectile points (Dawson, 1983, pp.15-19; Ferris and Spence, 1995, pp.89-97; Gagné, 2015; Spence et al., 1990, pp.125-142; Williamson, 2013, pp.48-61; Wright, 1994, pp.29-30).
Middle	ca. 200 BC to AD 700	Three primary cultural complexes in Southern Ontario: Point Peninsula (generally located throughout south-central and eastern Southern Ontario), Saugeen (generally located southwestern Southern Ontario), and Couture (generally located in southwestern-most part of Ontario); "given the dynamics of hunter-gatherer societies,

Periods	Date Range	Overview and Attributes
		with high levels of interaction and intermarriage among neighbouring groups, one would not expect the existence of discrete cultures" and the "homogeneity of these complexes have been challenged" (Ferris and Spence, 1995, p.98); introduction of large "house" structures and substantial middens; settlements have dense debris cover indicating increased degree of sedentism; incipient horticulture; burial mounds present; shared preference for stamped, scallop-edged or tooth-like decoration, but each cultural complex had distinct pottery forms; Laurel Culture (ca. 500 BC to AD 1000) established in boreal forests of Northern Ontario. - Saugeen Point projectile points (Saugeen) - Vanport Point projectile points (Couture) - Snyder Point projectile points - Laurel stemmed and corner-notched projectile points (Dawson, 1983, pp.15-19; Ferris and Spence, 1995, pp.97-102; Gagné, 2015; Hessel, 1993, pp.8-9; Spence et al., 1990, pp.142-170; Williamson, 2013, pp.48-61; Wright, 1994, pp.28-33; Wright, 1999, pp.629-649).
Late Woodland		
Late (Transitional)	ca. AD 600 to 1000	Earliest Iroquoian development in Southern Ontario is Princess Point which exhibits few continuities from earlier developments with no apparent predecessors; hypothesized to have migrated into Ontario, but more recent research of ceramic data from the Rice Lake-Trent River region determined early Iroquoian development to be an in situ cultural development (Curtis, 2014, p.190); the settlement data is limited, but oval houses are present; introduction of maize/corn horticulture; artifacts include 'Princess Point Ware' vessels that are cord roughened, with horizontal lines and exterior punctation; smoking pipes and ground stone tools are rare; continuity of Princess Point and Late Woodland Iroquoian groups. - Triangular projectile points (Ferris and Spence, 1995, pp.102-106; Fox, 1990, pp.171-188; Gitiga Migizi and Kapyrka, 2015, pp.1-3). *Oral Traditions* According to their oral traditions, to the south of the study area along the north shore of Lake Ontario in Southern Ontario was occupied throughout the entire Late Woodland Period by the *Michi Saagiig* (Mississauga Anishinaabeg); their traditional territory extended north where they would hunt and trap during the winter months, followed by a return to Lake Ontario in the spring and summer; "the traditional territories of the Michi Saagiig span from Gananoque in the east, all along the north shore of Lake Ontario, west to the north shore of Lake Erie at Long Point. The territory spreads as far north as the tributaries that flow into these lakes, from Bancroft and north of the Haliburton highlands" (Gitiga Migizi and Kapyrka, 2015, p.1); oral traditions speak of people (the Iroquois) coming into their territory between AD 500-1000 who wished to establish villages and grow corn; treaties were made allowing the Iroquois to stay in their traditional territories (Gitiga Migizi and Kapyrka, 2015, pp.1-3). This oral tradition is contrary to other First Nation communities based on both archaeological evidence and their oral traditions (***see Appendix C***).
Early	ca. AD 900 to 1300	Two Iroquoian cultures in Southern Ontario: Glen Meyer (located primarily in southwestern Ontario from Long Point on Lake Erie to southwestern shore of Lake Huron) and Pickering (encompassed north of Lake Ontario to Georgian Bay and Lake Nipissing); the abandonment of these two phases "were expressed early on, with the recognition that local site sequences were more or less continuous through what has

Periods	Date Range	Overview and Attributes
		been classified as distinct phases" (Birch, 2015, p.271); early houses were small and elliptical; developed into multi-family longhouses and some small, semi-permanent palisade villages; adoption of greater variety of harvest goods; increase in corn-yielding sites; well-made and thin-walled clay vessels with stamping, incising and punctation; crudely made smoking pipes, and worked bone/antler present; evolution of ossuary burials; grave goods are rare and not usually associated with a specific individual. - Triangular-shaped, basally concave projectile points with downward projecting corners or spurs (Ferris and Spence, 1995, pp.106-109; Williamson, 1990, pp.291-320).
Middle	ca. AD 1300 to 1400	Two Iroquoian cultures in Southern Ontario: Uren and Middleport; increase in village sizes (0.5 to 1.7 hectares) and campsites (0.1 to 0.6 hectares) appear; some with palisades; classic longhouse takes form; increasing reliance on maize and other cultigens such as beans and squash; intensive exploitation of locally available land and water resources; decorated clay vessels decrease; well-developed clay pipe complex that includes effigy pipes; from Middleport emerged the Huron-Wendat, Petun, Neutral Natives and the Erie. - Triangular and (side of corner or corner removed) notched projectile points - Middleport Triangular and Middleport Notched projectile points (Dodd et al., 1990, pp.321-360; Ferris and Spence, 1995, pp.109-115).
Late	ca. AD 1400 to 1600	Two major Iroquoian groups: the Neutral Natives to the west of the Niagara Escarpment and the Huron-Wendat to the east; traditionally, the Huron-Wendat territory stretched "from the Gaspé Peninsula in the Gulf of Saint Lawrence and up along the Saint Lawrence Valley on both sides of the Saint Lawrence River all the way up to the Great Lakes. Huronia, included in Wendake South, represents a part of the ancestral territory of the Huron-Wendat Nation in Ontario. It extends from Lake Nipissing in the North to Lake Ontario in the south and Île Perrot in the East and Owend [sic] Sound in the West" and they "formed alliances and traded goods with other First Nations among the networks that stretched across the continent" (per.comm. R.Gaudreau-Couture, 21 June 2022); within this area, Huron-Wendat "concentrations of sites occur in the areas of the Humber River valley, the Rouge and Duffin Creek valleys, the lower Trent valley, Lake Scugog, the upper Trent River and Simcoe County" (Ramsden, 1990, p.363); longhouses; villages enlarged to 100 longhouses clustered together as horticulture (maize, squash and beans) gained importance in subsistence patterns; villages chosen for proximity to water, arable soils, available fire wood and defendable position; diet supplemented with fish; ossuaries; tribe/band formation; gradual relocation to north of Lake Simcoe. - Huron-Wendat points are limited but change from predominantly side-notched to unnotched triangular. (Ferris and Spence, 1995, pp.115-122; Heidenreich, 1978, pp.368-388; Ramsden, 1990, pp.361-384; Warrick, 2000, p.446; Warrick, 2008, p.15). *Oral Traditions* During this time, the Algonquian-speaking groups of the Anishinaabeg (e.g., Ojibway/Chippewa, Odawa, Mississaugas, Algonquin, and others) maintained stable relations with Iroquoian-speaking groups (e.g., Huron-Wendat, Neutral, Petun) who continued to establish settlements in Southern Ontario, according to *Michi Saagig* oral tradition (Gitiga Migizi and Kapyrka, 2015, p.1).

1.3.2 Contact Period

The contact period of Southern Ontario is defined by European arrival, interaction and influence with the established Indigenous communities of Southern Ontario. **Table 2** includes an overview of some of the main developments that occurred during the contact period of Southern Ontario.

Table 2: Contact Period

Periods	Date Range	Overview and Attributes
European Contact	ca. AD 1600s	The Anishinaabeg (e.g., Mississauga, Ojibway, Chippewa, Odawa, Algonquin, and others) continued to inhabit Ontario, alongside Iroquoian-speaking groups such as the Huron-Wendat north of Lake Simcoe; inter-marriage between Algonquian- and Iroquoian-speaking groups; French arrival into Ontario; numerous Huron-Wendat villages in the Lake Simcoe region in and around the City of Barrie ("Huronia"), such as Cahiagué; Samuel de Champlain is believed to have traveled through the Township of Medonte on his way to Lake Simcoe in 1615; he stayed at Cahiagué, a Huron-Wendat village located in the vicinity of Warminster; this village (registered as BdGv-1, and excavated in 1947), is located approximately three kilometres north of the study area and contained approximately 200 longhouses inside a protective palisade (Manning, et al, 2019, pp.690, 702); an alternative theory suggests that another nearby site, BdGv-3, located approximately 2.5 kilometres from the study area, may represent the Huron-Wendat village of Cahiagué (Fitzgerald, 1986, p.6); trade relationship with Huron-Wendat and French established; trade goods begin to replace traditional tools/items; Jesuit and Récollets missionaries; epidemics (Fox and Garrad, 2004, p.124; Gitiga Migizi and Kapyrka, 2015, pp.1-3; Heidenreich, 1978, pp.368-388; Trigger, 1994, pp.47-55; Warrick, 2008, pp.12, 245). *Oral Traditions* Mississauga Anishinaabeg oral traditions tell of Algonquian-speaking groups wintering with Iroquoian neighbours, resulting in a complex archaeological record; oral traditions also speak of Anishinaabeg "paddling away" to their northern hunting territories to escape disease and warfare in southern Ontario at this time (Gitiga Migizi and Kapyrka, 2015, pp.1-3).
Five Nations of Iroquois (Haudenosaunee)	ca. AD 1650s	The Five (later Six) Nations (Cayuga, Oneida, Onondaga, Mohawk and Seneca; later included the Tuscarora) of Iroquois (or Haudenosaunee), originally located south of the Great Lakes, engaged in warfare with Huron-Wendat neighbours as their territory no longer yielded enough furs; the Five Nations, armed with Dutch firearms, attacked and destroyed numerous Huron-Wendat villages in 1649-50; the groups that remained became widely dispersed throughout the Great Lakes region but remained an independent Nation; the Huron-Wendat ultimately resettled near Quebec City (forming the oldest First Nations community in Canada), in southwestern Ontario and in America; the Five Nations established settlements along the northern shoreline of Lake Ontario at strategic locations along canoe-and-portage routes and used territory for extensive fur trade; Five Nations believed to have established a settlement near Orillia after driving out the Huron-Wendat, but this is unconfirmed; European fur trade and exploration continues (Abler and Tooker, 1978, p.506; Hunter, 1909a, p.10; Robinson, 1965, pp.15-16; Schmalz, 1991, pp.12-34; Trigger, 1994, pp.53-59; Warrick, 2008, p.208; Williamson, 2013, p.60).
Anishinaabeg Return (and Arrival)	ca. AD 1650s	Some narratives tell of Anishinaabeg groups either returning (Gitiga Migizi and Kapyrka, 2015, p.2) or moving by military conquest (MCFN, 2017) to southern Ontario in the 1690s; "some writers have asserted that these Algonquin [sic] tribes

Periods	Date Range	Overview and Attributes
	to 1700s	came from the north shore of Georgian Bay and spread over the abandoned country of the Hurons' but one should not forget the populous tribes of Algonquins who, in the time of the early Jesuits had a mission among them, lived in the Townships of North and South Orillia" (Hunter, 1909, p.10); "there are no existing records to show that these tribes were ever completely displaced from their ancient possessions, although it is natural to suppose the massacres perpetrated by the Iroquois in their neighbourhood would inspire them to fear and cause them to retreat for at least a brief period" (Hunter, 1909a, p.10); an alternative oral tradition states communities within the Anishinaabe, particularly the Mississaugas, had migrated from north of Lake Superior and Georgian Bay area during this time and had arrived following the dispersal of the Huron-Wendat people (MCFN, 2017); battles fought throughout Southern Ontario, ultimately resulting in most of the Five Nations being driven out of Southern Ontario and returning to their lands south of the Great Lakes (and some remained in parts of Southern Ontario); the English referred to those Algonquian-speaking groups that settled in the area bounded by Lakes Ontario, Erie, and Huron as Chippewas or Ojibwas (Smith, 2002, p.107); '*Mississauga'* term applied to Anishinaabeg bands living on the north shore of Lake Ontario; the Ojibway/Chippewa settled in the County of Simcoe by the 18th century (Gibson, 2006, pp.35-41; Hathaway, 1930, p.433; Hunter, 1909a, p.10; Johnston, 2004, pp.9-10; Smith, 2013, pp.16-20; Trigger, 1994, pp.57-5; Williamson, 2013, p.60).
Trade, Peace and Conflict	ca. AD 1700 to 1770s	Great Peace negotiations of 1701 in Montreal established peace around the Great Lakes; collectively referred to the Anishinaabeg and Five Nations of Iroquois as the First Nations; European commerce and exploration resumed; the Anishinaabeg continued to trade with both the English and the French; beginnings of the Métis and their communities; skirmishes between France and Britain as well as their respective First Nations allies erupt in 1754 ("French and Indian Wars") and forms part of the larger Seven Years' War; French defeat transferred the territory of New France to British control; Treaty of Paris (1763); Royal Proclamation of 1763 "states explicitly that Indigenous people reserved all land not ceded by or purchased from them" (Hall, 2019a); the Proclamation established framework for how treaties were negotiated (by only the King or an assigned representative of the King, and only at a public meeting called for this specific purpose) and established the "constitutional basis for the future negotiations of Indigenous treaties in British North America" (Hall, 2019a); the Proclamation established the British administration of North American territories ceded by France to Britain; uprising by several First Nations groups against British ("Pontiac's War"); fur trade continued until Euro-Canadian settlement (Hall, 2019a; Jaenen, 2013; Johnston, 2004, pp.13-14; Schmalz, 1991, pp.35-62, 81; Surtees, 1994, pp.92-97; Tooker, 1978, pp.418-441).
Early British Administration and Euro-Canadian Settlement	ca. AD 1770s to 1790s	American Revolutionary War (1775-1783) drove large numbers of United Empire Loyalists (those who were loyal to the British Crown), military petitioners, and groups who faced persecution in the United States to re-settle in Upper Canada; Treaty of Paris (1783) formally recognized the independence of the United States; Province of Quebec divided in 1791 into sparsely populated Upper Canada (now southern Ontario) and culturally French Lower Canada (now southern Quebec); Jay's Treaty of 1795 establishes American/Canadian border along the Great Lakes; large parts of Upper Canada opened to settlement from the British Isles and continental Europe after land cession treaties were negotiated by the British

Periods	Date Range	Overview and Attributes
		Crown with various First Nations groups (Government of Ontario, 2021; Hall, 2019b; Jaenen, 2014; Surtees, 1994, p.110; Sutherland, 2014).

1.3.3 Euro-Canadian Settlement Period (A.D. 1800s to present)

1.3.3.1 Land Treaties

In 1785, "John Collins investigated the route from the mouth of the Humber River, known as the 'Toronto Carrying Place,' to Lake Simcoe as a possible alternative means of communication with the interior" (Surtees, 1994, p.106). John Collins is believed to have made a provisional agreement to purchase from the Mississaugas and Chippewa a route measuring, "one mile (1.6km) on each side of the foot path from the Narrows at Lake Simcoe to Matchidash Bay, with three Miles and a half (5.6km) square, at each end of the road" (Boileau, 2021). No formal documents exist of this cession and the surviving description of land transferred is contradictory (Boileau, 2021; Surtees, 1994, p.106). The lack of formal documentation was not resolved until the Williams Treaties of 1923 was signed (Boileau, 2021).

In 1810, the North West Company, a fur trading company, complained about the American interference along the trade route from Lake Ontario, to the Niagara River, to Lake Erie and into the Detroit River. A proposed route utilizing existing native trails was suggested and would require the construction of a road from Lake Simcoe to Fort Penetanguishene. In 1811, an agreement was made with the Lake Simcoe Ojibway; however, the War of 1812 broke out and the agreement was not finalized until 1815. This treaty was known as Treaty 16 or the Lake Simcoe Treaty and encompassed the Township of Medonte (Department of Indian Affairs, 1891, pp.xxxviii, 42-45; Hunter, 1909a, pp.13-14; Government of Ontario, 2021; Surtees, 1994, pp.111-112).

1.3.3.2 Township of Medonte

The first survey within the Township of Medonte occurred along Penetanguishene Road, while the remainder of the Township was surveyed in 1820 (Belden, 1881, p.14). The first Euro-Canadian settler in the township was Thomas Craig who arrived in 1818, but it would take another decade before any general settlement began (Belden, 1881, p.14). Along the township line between the Townships of Oro and Medonte, a group of Irish men settled and became the first Euro-Canadian settlers (Hunter, 1909b, p.184). Milling villages, such as Coldwater, were established near sawmills so settlers could provide material for building their homes (Garbutt, 2003, p.47). Much of the Township of Medonte is tied to the development of the village of Coldwater, which supplied rural settlers with goods and essentials. A portage route existed where items "landed at Orillia were carried to Coldwater to be there again transferred to boats, which took them down the river and round by the bay to Penetanguishene. The portage was afterwards extended to the shore of Sturgeon Bay, and the whole line of land transportation us yet known as the Coldwater Road" (Belden, 1881, p.15). Present-day Highway 12 (part of the TransCanada Highway) follows much of this original portage route. Prior to 1830, Coldwater, named *Gis-si-nau-se-bing* by the Ojibwa meaning Cold River or Cold Water, had been a prominent Ojibway settlement and home of Ojibway Chief Aisance, but the Ojibway were removed to Beausoliel and Christian Island in 1836 (Belden, 1881, p.14; Village of Coldwater, 2020).

By 1846, 17,516 acres were owned by Euro-Canadian settlers and 2,465 acres were under cultivation. Approximately 2,100 acres of Crown land was still available for purchase and only 548 individuals resided in the township (Smith 1846, p.113). In 1850, it was described as, "containing land of almost every variety: there is some very good land in it, but a considerable portion is hilly and stoney" (Smith, 1851, p.57). By 1850, the Township of Medonte (which was combined with the Township of Matchadash) contained 939 inhabitants and had one grist mill and two sawmills (Smith, 1851, p.58). During the 1860s, a few new settlers arrived in the Township of Medonte from other parts of the province and were experienced farmers (Garbutt, 2003, p.37) The Township of Medonte "always was, and continues to be, an agricultural township" (Garbutt, 2003, p.52).

1.3.3.3 Village of Warminster

The study area is located in the village of Warminster. "The first person to make the beginning of a village at Warminster was Walter Barr, who built a tavern here on Coldwater Road, and for some time it was the nearest stopping place to Coldwater" (Hunter, 1909b, p.184). By 1873, it was described as "a post village in Simcoe co., Ont. 8 miles from Orillia. It contains 2 stores and a saw mill. Pop. 120" (Crossby, 1873, p.351). In 1881, Warminster was recognized as a post village located "near the eastern boundary, with saw and shingle mill" (Belden, 1881, p.15). In 1884, it was described as a village in the Township of Medonte located seven miles from Orillia and by 1895, was home to 210 individuals (Irwin, 1884, p.130; Union Publishing Co., 1895, p.71).

1.3.4 Study Area Land Use History (AD 1800s to present)

1.3.4.1 Pre-1900 Land Use

Several documents, *J. Hogg's* 1871 *Map of the County of Simcoe* and J *H. Belden's* 1881 *Simcoe Supplement in Illustrated Atlas of the Dominion of Canada*, were reviewed to gain an understanding of the land use history and determine the study area's potential for the recovery of historic pre-1900 remains (***see Maps 2-3; Table 3***).

Table 3: Summary of Structures and Property Owners/Occupants Documented in the 1871 *Hogg's Map* and the 1881 *Illustrated Historical Atlas* in the Study Area

Con.	Lot	Part	Owner/Occupant		Structure(s) in the Study Area	
			1871	1881	1871	1881
14	5	W½	Wm. Barr	B. Teskey	-	-
		E½			-	-
	6	W½	W. Deacon	Unlisted	-	-
		E½	Unlisted	Unlisted	-	-

The study area primarily travels along the open road allowance of Warminster Sideroad; however, this road was not depicted with its north-south jog midway through the lot in Hogg's 1871 *Map*. Where the study area extends beyond the open road allowance, it encompassed land owned by Wm. Barr, W. Deacon and an unlisted individual. No historic structures (e.g., homesteads, stores, schools, etc.) are depicted in the study area, while the Warminster Post Office is depicted within 300 metres of the study area, fronting on Highway 12.

According to the 1881 *Simcoe Supplement in the Illustrated Atlas*, the study area was owned by B. Teskey and two unlisted individuals. No historic structures are depicted in the study area, while a homestead, a post office and the village lots of Warminster are depicted within 300 metres of the study area. It should be kept in mind, however, that not all historic features would have been depicted in the map, as the *Illustrated Atlas* required a paid subscription from the residents in the *County of Simcoe*, many of whom did not subscribe (Benson, 1944, p.4).

The study area is located along Warminster Sideroad and intersects Town Line, early historic transportation routes established during to the survey of the Township of Medonte. In Ontario, the *2011 S&G* considers areas of early Euro-Canadian settlements (e.g., pioneer homesteads, isolated cabins, farmstead complexes, early wharf or dock complexes, pioneer churches, and early cemeteries), early historic transportation routes (e.g., trails, passes, roads, railways, portage routes), and properties that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations, as features or characteristics that indicate archaeological potential (per *Section 1.3.1* of the *2011 S&G*). Therefore, based on the proximity of early Euro-Canadian settlements and early historic transportation routes, this feature contributes to establishing the archaeological potential of the study area.

1.3.4.2 Post-1900 Land Use

To facilitate further evaluation of the established archaeological potential within the study area, a detailed review of 1950 topographic map (***see Map 4***), an air photograph from 1954 (***see Map 4***), orthophotographs from 1978, 1989, 1997, 2002, 2013, 2016, 2018 and 2022 (***see Maps 5-8***) and a 2019 satellite image (Google Earth, 2023) was undertaken.

The only available 20th century topographic map identified the study area encompassing land that had been primarily cleared of overgrown vegetation and along the open road allowance of Warminster Sideroad and Town Line. These roads were depicted as two-lane, loose surface, graded and drained roadways. One house was depicted in the study area, and several additional houses were depicted within 300 metres of the study area.

The 1954 air photograph depicted the study area traveling along Warminster Sideroad and within open agricultural fields. Two hedgerows dividing the fields from one another also intersected the study area. One house is located within the study area, while several are depicted within 300 metres. By 1997, the community of Warminster had grown to include residential houses with frontages along the north side of Warminster Sideroad to the jog in the road, then along the south side of Warminster Sideroad to Town Line. At this time, the study area encompassed the open road allowance of Warminster Sideroad, manicured residential frontages, agricultural fields, a woodlot, a baseball diamond, a gravel parking area and several gravel/paved driveways.

The study area remained unchanged until 2016 when residential houses with frontages along the north side of Warminster Sideroad east of the jog were constructed. Furthermore, south of the study area, a large residential subdivision was constructed and included a paved walking path through part of the study area. In 2018, additional residential houses were constructed east of those houses constructed in 2016 and extended to Town Line. After this time, the study area remained unchanged.

1.3.5 Present Land Use

The present land use of the study area is categorized as Agricultural and Rural Settlement Area (Township of Oro-Medonte, 2023).

1.4 Archaeological Context

To establish the archaeological context and further establish the archaeological potential of the study area, *Archeoworks Inc*. conducted a comprehensive review of the municipal archaeological management plan, designated, and listed cultural heritage resources, heritage conservation districts, commemorative markers, and pioneer churches and early cemeteries in relation to the study area. Furthermore, an examination of registered archaeological sites and previous AAs within proximity to the study area limits, and a review of the physiography of the study area were performed. The results of this background research are documented below and summarized in **Appendix B – Summary of Background Research**.

1.4.1 Archaeological Management Plan

Per *Section 1.1, Standard 1* of the *2011 S&G*, when available, an archaeological management plan (AMP) or other archaeological potential mapping must be reviewed. The County of Simcoe has an AMP that identifies archaeological potential across most of the study area (ASI, 2019; County of Simcoe Interactive Maps, 2023; ***see Map 9***).

1.4.2 Designated and Listed Cultural Heritage Resources

Per *Section 1.3.1* of the *2011 S&G*, properties listed on a municipal register or designated under the *Ontario Heritage Act*, or that is a federal, provincial, or municipal historic landmark or site are considered features or characteristics that indicate archaeological potential. The study area does not encompass nor is it within 300 metres of a cultural heritage resource (Township of Oro-Medonte, 2022a). Therefore, this feature does not contribute to establishing the archaeological potential of the study area.

1.4.3 Heritage Conservation Districts

Per *Section 1.3.1* of the *2011 S&G*, heritage resources listed on a municipal register or designated under the *Ontario Heritage Act*, are considered features or characteristics that indicate archaeological potential. The study area is not located in or within 300 metres of a Heritage Conservation District (OHT, 2020). Therefore, this feature does not contribute to establishing the archaeological potential of the study area.

1.4.4 Commemorative Plaques or Monuments

Per *Section 1.3.1* of the *2011 S&G,* commemorative markers of Indigenous and Euro-Canadian settlements and history, which may include local, provincial, or federal monuments, cairns or plaques, or heritage parks, are considered features or characteristics that indicate archaeological potential. One marker commemorating the Danny McHugh Memorial Ball Park is located within the study area. Danny McHugh was a life-long resident of Warminster who was a fastball pitcher and baseball player in Warminster in the 20th and 21st century. However, this marker does not commemorate Indigenous and/or Euro-Canadian settlement or history, and therefore, this feature does not contribute to establishing the archaeological potential of the study area.

No additional commemorative plaques or monuments were located in or within 300 metres of the study area (Read the Plaque, 2023). Therefore, this feature does not contribute to establishing the archaeological potential of the study area.

1.4.5 Pioneer/Historic Cemeteries

Per *Section 1.3.1* of the *2011 S&G,* pioneer churches and early cemeteries are considered features or characteristics that indicate archaeological potential. The study area is not located in or within 300 metres of a pioneer church and/or early cemetery (BAO, 2017; Township of Oro-Medonte, 2022b; OGS, 2023). Therefore, this feature does not contribute to establishing the archaeological potential of the study area.

1.4.6 Registered Archaeological Sites

Per *Section 1.1, Standard 1* and *Section 7.5.8, Standard 1* of the *2011 S&G*, the *Ontario Archaeological Sites Database* (OASD) maintained by the *MCM* was consulted in order to provide a summary of registered or known archaeological sites within a minimum one-kilometre distance of the study area limits. Three (3) archaeological sites have been registered within one kilometre of the study area (MCM, 2023; ***see Table 4***).

Table 4: Registered Archaeological Sites within One Kilometre of the Study Area

Borden #	Name	Cultural Affiliation	Type
Registered sites within a 50-metre radius of the study area			
BdGv-36	Bylow	Middle to Late Iroquoian	Campsite/cabin
Other registered sites within 300 metre radii of the study area			
BdGv-44	Teskey II	Post-Contact (Euro-Canadian)	Homestead
Other registered sites within one-kilometre radii of the study area			
BdGv-37	Teskey	Late Woodland	Camp/campsite; scatter

"-" denotes detail not provided in OASD.

Per *Section 1.3.1* of the *2011 S&G*, previously registered archaeological sites near the study area are considered to be features or characteristics that indicate archaeological potential. Therefore, given that two registered archaeological sites are located within 300 metres, this feature contributes to establishing the archaeological potential of the study area.

Additionally, the *MCM* noted two site leads, both named HunterMedonteN/A, located within one kilometre of the study area; one site lead was depicted on the east side of Highway 12 in Lot 6, Concession 14 and the other on the west side of Highway 12, in Lot 4, Concession 14. Review of the associated document by Andrew F. Hunter 1902 entitled, "Sites of Huron Villages in the Township of Medonte (Simcoe Co.)" does not describe any sites within those lots. Further clarification from the Archaeological Site Coordinator at the *MCM* noted the site leads are accurate to the quarter lot (or 50 acres) (Templeton, 2023). The mapping provided by the Archaeological Site Coordinator depicting sites found by Andrew F. Hunter in the Township of Medonte does not clearly depict the relevant data that would identify and describe the site leads including their location, affiliation and site type.

According to Andrew F. Hunter document, the nearest Huron site to the study area is located within west half of Lot 3, Concession 14 and south of the study area. It was initially discovered in 1865 by Michael Braden and consisted of a large bonepit. In 1900, in addition to a bonepit, a single grave and relics (pottery fragments, etc.) was found 250 yards from the pit (pp.92-93). The east half of Lot 3, Concession 14, and south of the study area, was noted to contain a considerable quantity of Indigenous relics (Hunter, 1902, p.97).

1.4.7 Previous Archaeological Assessments

Per *Section 1.1, Standard 1* and *Section 7.5.8, Standards 4-5* of the *2011 S&G*, to further establish the archaeological context of the study area, a review of previous AAs carried out within the limits of, or immediately adjacent (i.e., within 50 metres) to the study area (as documented by all available reports) was undertaken. Three reports were identified (***see Table 5***).

Table 5: Previous Archaeological Assessments

Company, Year	Stage of Work	Relation to Study Area	Details + Recommendations
Archaeological Assessment Ltd., 2008	1-2 AA	Within 50 metres of the study area	Located at 9733 Highway No. 12, south of the study area. During the AA, one site, the Bylow site (BdGv-36) was discovered. The site was a small Middle to Late Iroquoian campsite occupied ca. AD. 1300-1650 and was located along the northern edge of the property on Lot 8 of the proposed subdivision, within 50 metres of the study area limits. The finds consisted of two native ceramic artifacts. Stage 3 AA test excavations and Stage 4 mitigation were recommended.
Archaeological Assessment Ltd., 2011a	3-4 excavation	Within 50 metres of the study area	Associated with the Stage 3 AA and Stage 4 mitigation of the Bylow site (BdGv-36). Thirteen (13) one-metre test units were excavated during the Stage 3 yielding 50 artifacts. Stage 4 block excavation occurred around the high-count unit, 205N-110E, and included the excavation of nine units. 48 artifacts were recovered during the Stage 4 mitigation. Following the block excavation, mechanical topsoil removal of a surface area of 25 metres by 30 metres occurred and four features (a hearth, a refuse-filled depression, a general pit, and an animal burial) and 15 post moulds (possibly a temporary structure or outdoor activity area) were encountered. It was also noted that tree root and root burn disturbance may have prevent

Company, Year	Stage of Work	Relation to Study Area	Details + Recommendations
			additional identification of post moulds. A total of 378 artifacts were recovered from the combined Stage 2, 3 and 4 excavations which determined the site was a relatively short term Late Iroquoian cabin site occupied ca. A.D. 1500-1650. The Stage 4 excavation was completed and no longer a planning concern. It was recommended that the archaeological conditions of draft plan approval be cleared in order that the development may proceed.
Archaeological Assessment Ltd., 2011b	1-2 AA	Encompassing part of the study area	Located at 1922 Warminster Sideroad. The 2.7-hectare property was subjected to pedestrian survey at five-metre intervals. No archaeological material or sites were encountered. No further AA is recommended.

1.4.8 Physical Features

An investigation of the study area's physical features was conducted to aid in the development of an argument for archaeological potential. Environmental factors such as close proximity to water, soil type, and nature of the terrain, for example, can be used as predictors to determine where human occupation may have occurred in the past.

1.4.8.1 Physiographic Region

The study area is located within the Simcoe Uplands physiographic regions of Southern Ontario. The Simcoe Uplands is characterized by broad and rolling till plains that are separated by steep-sided and flat-floored valleys. These till plains and valleys are "encircled by numerous shorelines, indicating they were islands in Lake Algonquin" (Chapman and Putnam, 1984, p.181). The till is comprised primarily of Pre-Cambrian rock instead of limestone, providing a gritty loam texture that becomes sandier toward the north. Heavier, more calcareous till occurs near Lake Simcoe and Midland. The original forests of the land included hardwoods, mainly sugar maple and beech with white pine. Other common trees include yellow birch, basswood and hemlock. The agriculture can be classified as mixed farming based on a variety of products such as milk, cream, beef, veal, hogs, eggs and poultry. Over the years, the region generally saw a "moving away" from agriculture, as fewer farms existed within the area, however, those that did remain saw a great increase in size and improvement. Although the uplands did not develop any market centres, it is connected by good highways to Barrie and Orillia, the major urban centres of the Lake Simcoe Basin, and in proximity to small ports by the Georgian Bay shore (Chapman and Putnam, 1984, pp.182-184).

1.4.8.2 Soil Type and Topography

One native soil type is found within the study area: Vasey sandy loam. A description of its characteristics may be found in **Table 6** (Ontario Agricultural College, 1959).

Table 6: Study Area Soil Types

Soil Series and Type	Great Group	Soil Materials	Drainage	Topography. Stoniness
Vasey sandy loam	Brown Podzolic and Grey-Brown Podzolic	Light grey, calcareous and non-calcareous, sandy loam till	Good	Smooth, moderately to steeply sloping. Moderate to very stony.

The topography is gently rolling where the elevation increases from west to east. The elevation measures between of 264 and 281 metres above sea level.

1.4.8.3 Water Sources

Hydrological features such as primary water sources (e.g., lakes, rivers, creeks, streams) and secondary water sources (e.g., intermittent streams and creeks, springs, marshes, swamps) would have helped supply plant and food resources to the surrounding area and are indicators of archaeological potential (per *Section 1.3.1* of the *2011 S&G*). The study area is located within 300 metres of the North River wetland area. Therefore, this feature contributes to establishing the archaeological potential of the study area.

1.4.9 Current Land Conditions

The study area is situated at along Warminster Sideroad extending from Richelieu Road to Town Line, and encompassing land in 1884, 1922 and 1926 Warminster Sideroad and 3320 Town Line, and along the rear of property municipality recognized as 1944 to 2058 Warminster Sideroad, in a community of Warminster, in the Township of Oro-Medonte. The study area encompasses the open road allowance of Warminster Sideroad, its roadbed, gravel shoulder and roadside ditching, part of a baseball diamond in Danny McHugh Memorial Park, manicure yards across both residential properties and recreational facilities, an active agricultural field, and a woodlot.

1.4.10 Date of Desktop Review and Field Review

A desktop review of field conditions using past historical air photographs and, past and current orthophotographs was undertaken on August 14th-15th, 2023.

A property inspection was undertaken on July 31st, 2023. Details the inspection of the study area are presented in **Section 2.0**.

1.5 Confirmation of Archaeological Potential

Based on the information gathered from the background research documented in the preceding sections, elevated archaeological potential has been established within the study area limits. Features contributing to archaeological potential are summarized in **Appendix B**. However, it must be noted that post-ca.1900 developments can negate the possibility of encountering intact archaeological deposits due to deep and extensive soil disturbances. Further assessment of conditions within the study area will be addressed in **Section 3.0**.

2.0 PROPERTY INSPECTION

The property inspection was carried out on July 31st, 2023, and was conducted in compliance with the standards set forth in *Section 1.2* of the *2011 S&G*. In accordance with *Section 1.2, Standard 2* of the *2011 S&G*, weather and lighting conditions (22°C and sunny) during the Stage 1 property inspection permitted good visibility of all parts of the study area and were conducive to the identification of features of archaeological potential.

The property inspection involved a visual inspection only and did not include excavation or collection of archaeological resources. The inspection was carried out by spot-checking the entire study area to gain first-hand knowledge of the property's geography, topography, and current condition, and to evaluate and map archaeological potential (per *Section 1.2, Standard 1* of the *2011 S&G*). In accordance with *Section 1.2, Standards 3-6* of the *2011 S&G*, the property inspection involved visual confirmation of the presence/absence of previously identified features of archaeological potential, identification of additional features of archaeological potential not visible on mapping, and the identification and documentation of features that would affect archaeological assessment strategies (e.g., recent land disturbances, overgrown vegetation, wet areas, steep slope, heavy soils, structures and built features, etc.).

The results of the property inspection are illustrated within **Maps 10-11** and will be further discussed in **Section 3.0**. A selection of photographic images documenting field conditions within the study area are presented within **Appendix D – Images 1-28**, and location and orientation information are provided within **Maps 12-13***.* An inventory of the documentary record generated in the field can be found within **Appendix E***.*

3.0 ANALYSIS AND CONCLUSIONS

In combination with data gathered from the background research (***see Sections 1.3 and 1.4***), a desktop review of air photographs, satellite imagery and orthophotographs, and the property inspection, an evaluation of the established archaeological potential of the study area was performed. The results of this evaluation are presented in **Maps 10-13**.

3.1 Analysis

3.1.1 Previous Archaeological Assessments

Lands encompassed within the study area which have already been subjected to an archaeological assessment (Stage 1-2 AA) and deemed free of further archaeological concern (***see Section 1.4.7, Table 5***), with the report accepted into the *MCM*'s *Ontario Public Register of Archaeological Reports*, are recommended to be exempt from further assessment. No additional archaeological assessment is required in that portion of the study area.

3.1.2 Identified Deep and Extensive Disturbances

An evaluation of deep and extensive land alterations – commonly referred to as disturbances – that have severely impacted the integrity of any archaeological resources that may be present within the study area was conducted. Per *Section 1.3.2* of the *2011 S&G*, these include, but are not limited to: quarrying, major landscaping involving grading below topsoil, building footprints, or sewage and infrastructure development.

Disturbances documented within the study area include but are not limited to: paved roadways, gravel shoulders, roadside ditching, buried utilities (hydro, gas main, watermain and catch basins, telecommunication lines), gravel and paved driveways/parking areas, a paved walking pathway and a gravel baseball diamond (***see Images 1-19***). The construction of these features would have resulted in severe damage to the integrity of any archaeological resources which may have been present within their footprints and, as such, are exempt from Stage 2 survey.

3.1.3 Identified Areas of Archaeological Potential

Portions of the study area that were not previously assessed and not cleared of further archaeological concern nor exhibited obvious extensively disturbed conditions, are therefore considered to retain the established archaeological potential. These areas include, but are not limited to: an active agricultural field, manicured lawns dotted with trees and shrubbery of several residential properties, and a wooded area.

Actively or recently cultivated agricultural land must be subjected to pedestrian survey at five-metre intervals, in accordance with the standards outlined in *Section 2.1.1* of the *2011 S&G*. In areas where ploughing is not possible or viable due to the presence of wooded areas, pasture with high rock content, abandoned farmland with heavy brush and weed growth, gardens parklands or lawns which will remain in use for several years after the survey, narrow linear survey corridors (ten metres wide or less) or properties where existing landscaping or infrastructure would be damaged, a Stage 2 test pit survey at five-metre intervals must be performed, in accordance with the standards outlined in *Section 2.1.2* of the *2011 S&G* (***see Images 21-28***).

3.1.4 Improvement Alternatives

Within the study area, six (6) alternatives have been suggested. Each improvement alternative has been evaluated for extensive and deep land alterations which have severely impacted the integrity of archaeological resources and for areas retaining archaeological potential (***see Table 7; Maps 14-19***).

Table 7: Improvement Alternatives

Alternative & Description	Details of Alternative	Recommendations
Alternative 1: "Do Nothing" Existing Conditions	Alternative involves: 1.) conveyance capacity <1:5-year (0.9m^3/s). 2.) insufficient cover over driveway culverts. 3.) steep ditch side slopes pose safety hazards. 4.) erosion in ditch evident.	Refer to **Map 14**. As no construction impacts are to occur, there are no archaeological concerns associated with Alternative 1.
Alternative 2: Increase Conveyance Capacity of North Roadside Ditching to the Greatest Extent Possible within the Municipal R.O.W. while Maintaining a Gravel Shoulder and Improved Ditch Side Slopes.	Alternative involves: 1.) regrade ditch from property line down at 2:1 (H:V) to 1.12m depth; regrade ditch bottom to 0.90m width; regrade ditch up at 2:1 (H:V); maintain 0.5m gravel shoulder. 2.) conveyance capacity improved but remains <1:5-year (1.4m^3/s). 3.) severity of 1:100-year flooding reduced. 4.) maximum culvert height achievable approx. 900mm with 0.30m cover; Boss HDPE 750 (outside dia. 895mm). 5.) will lose mature trees on north side of road. 6.) slope improved from a safety perspective; depth of north roadside ditch not improved from a safety perspective. 7.) existing hydrants, transformers, hydro poles, signs, services, must be relocated on the north side of road.	Refer to **Map 15**. Stage 2 AA is not required for this Alternative (along north side of Warminster Sideroad from 1944 to 2058 Warminster Sideroad); all disturbed.
Alternative 3: Increase Conveyance Capacity of South Roadside Ditch to the Greatest Extent Possible within the Municipal R.O.W. while Maintaining a Gravel Shoulder and Safe Ditch Side Slopes.	Alternative involves: 1.) regrade ditch from property line down at 2:1 (H:V) to 1.05m depth; regrade ditch bottom to 1.1m width; regrade ditch up at 2:1 (H:V); maintain 1.5m gravel shoulder. 2.) peak flows to north roadside ditch reduced. 3.) conveyance capacity remains <1:5-year on north side. 4.) conveyance capacity increased to 0.7m^2/s on south side. 5.) severity of 1:100-year flooding on north side reduced. 6.) shoulder, slope and depth of north roadside ditch not improved from a safety perspective.	Refer to **Map 16**. Stage 2 AA is required (along south side of Warminster Sideroad from 1944 to 2058 Warminster Sideroad).

Alternative & Description	Details of Alternative	Recommendations
	7.) maximum culvert height achievable approx. 800mm with 0.30m cover (equivalent 900mm DIA – 1030 X 740mm) 8.) will lose mature trees on south side of road. 9.) existing hydrants, transformers, hydro poles, signs, services, etc. must be relocated on the south side of road.	
Alternative 4: Dry Pond SWMF Attenuation in Park Block	Alternative involves: 1.) approx. 0.70-hectare footprint required. 2.) conveyance channel realignment from Highway 12 crossing adjacent to legion to dry pond required. 3.) storm sewer to convey Warminster Sideroad flows to pond. 4.) will lose mature trees in park. 5.) new conveyance channel from pond to Warminster Sideroad required. 6.) peak flows rates to north roadside ditch required. 7.) shoulder, slope and depth of north roadside ditch not improved from a safety perspective. 8.) north roadside ditch capacity remains. 9.) if CSP culverts replaced with boss 2000 HDPE conveyance capacity increased to 1:5-year. 10.) severity of 1:100-year flooding reduced.	Refer to **Map 17**. Stage 2 AA is required.
Alternative 5: Conveyance Channel	Alternative involves: 1.) require land acquisition along conveyance channel. 2.) new crossing required at Warminster Sideroad 3.) possible utilities to be relocated. 4.) peak flow rates to north roadside ditch reduced. 5.) farm runoff intercepted from draining towards rear lots #1926-#2058. 6.) shoulder, slope and depth of north roadside ditch not improved from a safety perspective. 7.) north roadside ditch capacity increased to 1:25-year storm. 8.) if CSP culverts replaced with Boss 2000 HDPE conveyance capacity increased to 1:50-year.	Refer to **Map 18**. Stage 2 AA is required.
Alternative 6: Storm Sewer	Alternative involves: 1.) large storm sewer (1350mm – 1500mm). 2.) road reconstruction (major works). 3.) possible utility conflicts. 4.) north roadside ditch capacity increased to 1:100-year storm for local runoff. 5.) will lose mature trees on north side. 6.) existing hydrants, transformers, hydro poles, signs, services, etc. must be relocated on north side.	Refer to **Map 19**. Stage 2 AA is not required for this Alternative (along north side of Warminster Sideroad from 1944 to 2058 Warminster Sideroad); all disturbed.

3.2 Conclusions

Archeoworks Inc. was retained to conduct a Stage 1 Archaeological Assessment (AA) in support of the six drainage improvement alternatives (Alternatives 1 to 6), in the community of Warminster, in the Township of Oro-Medonte (the "study area").

Background research established archaeological potential within the study area due to the proximity of documented pre-1900 Euro-Canadian settlement (structures and roadways), two registered sites, including one (BdGv-36) located within 50 metres, and a water source (the North River wetland). Additionally, the County of Simcoe Archaeological Management Plan (AMP) identified archaeological potential across most of the study area.

For those lands where archaeological potential had been established, further review of air photographs, satellite imagery and orthophotographs from the mid-20th century to present-day was undertaken to determine if the established archaeological potential identification remained relevant. The review of these photographs and images revealed deep and extensive land alterations from previous construction activities within the study area. These disturbances were further highlighted during the property inspection. Owing to the deep and extensive disturbances, portions of the study area (Alternatives 1, 2 and 6) are considered free of archaeological concern and do not require further archaeological assessment.

Outside of those areas, the remaining balance of the subject lands (Alternatives 3, 4 and 5) comprises an active agricultural field, manicured lawns dotted with trees and shrubbery of several residential properties, and a wooded area. These sections are considered to retain the established archaeological potential and require a Stage 2 pedestrian or test pit survey at five-metre intervals in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.

4.0 RECOMMENDATIONS

Considering the findings outlined within this report, the following recommendations are presented:

1. Parts of the study area that were identified as having archaeological potential removed due to previous deep and extensive land alterations (entirety of Alternatives 1, 2 and 6), per *Section 1.3.2* of the *2011 S&G* and *Section 1.4.1, Standard 1.f.,* no further archaeological concerns exist. Further, parts of the study area that were identified as having no or low archaeological potential are exempt from requiring Stage 2 AA. No further work is recommended in these areas.

2. Parts of the study area that were identified as retaining archaeological potential (parts of Alternatives 3, 4 and 5) must be subjected to a Stage 2 AA. These areas must be subjected to pedestrian or test pit survey at five-metre intervals in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.

3. Should construction activities extend beyond the assessed limits of the study area, further archaeological investigation will be required to assess the archaeological potential of these lands.

Notwithstanding the above: No construction activities shall take place within the study area prior to the *MCM* (Archaeology Programs Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

1. This report is submitted to the *MCM* as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c. 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the *MCM*, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

2. It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

3. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.

4. The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar at the *Ministry of Government and Consumer Services*.

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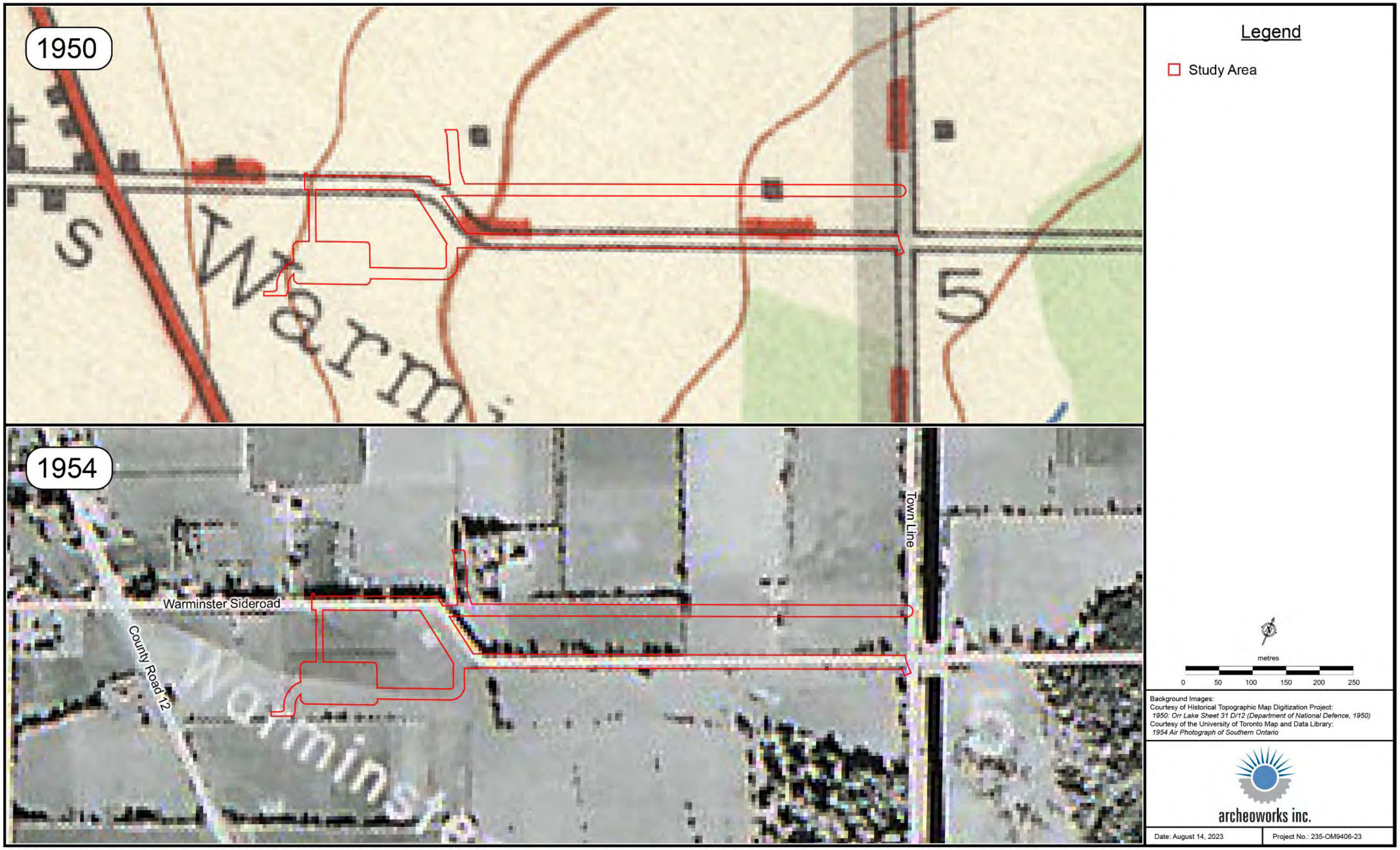
APPENDICES

APPENDIX A: MAPS

Map 1: National Topographic Map, 1:30,000, Elmvale 031D12 and Orillia 031D11 identifying the Stage 1 AA study area.

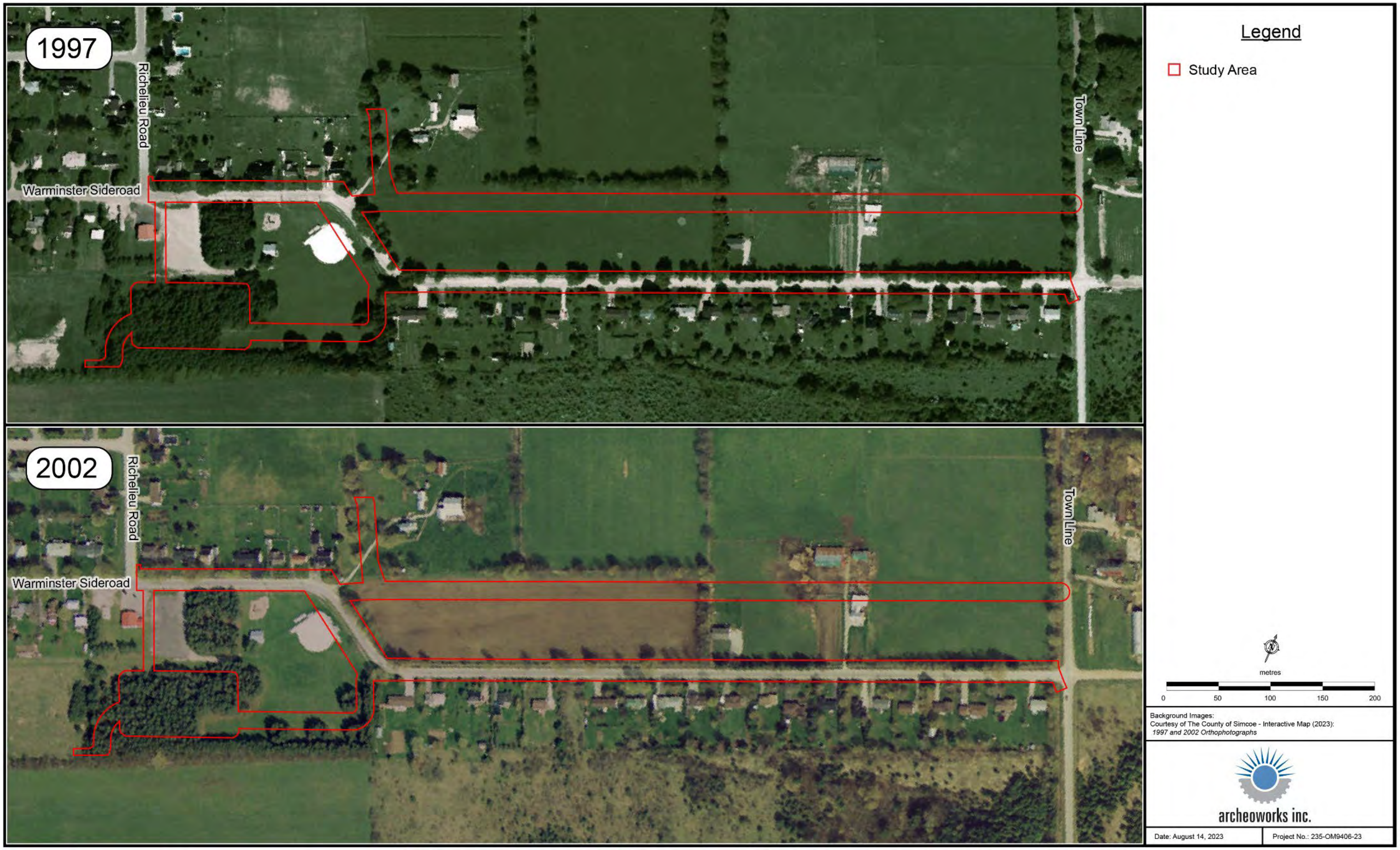
Map 2: Stage 1 AA study area within J. Hogg's 1871 *Map of the County of County of Simcoe* – Townships of Medonte.

Map 3: Stage 1 AA study area within the H. Belden's 1881 *Simcoe Supplement in Illustrated Atlas of the Dominion of Canada* – Townships of Medonte.



Map 4: Stage 1 AA study area within 1950 topographic map and a 1954 air photograph.

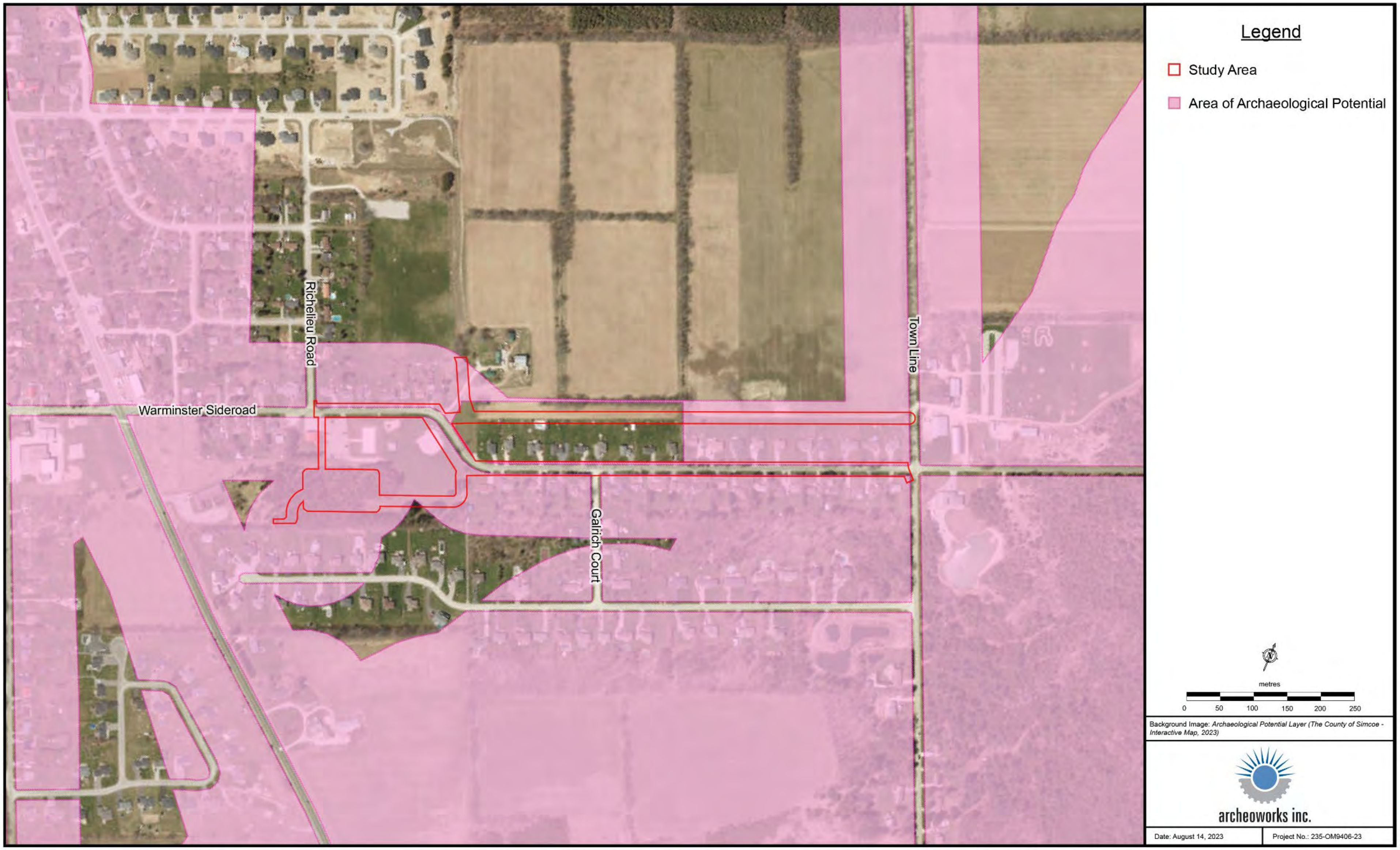
Map 5: Stage 1 AA study area within a 1978 and 1989 orthophotograph.



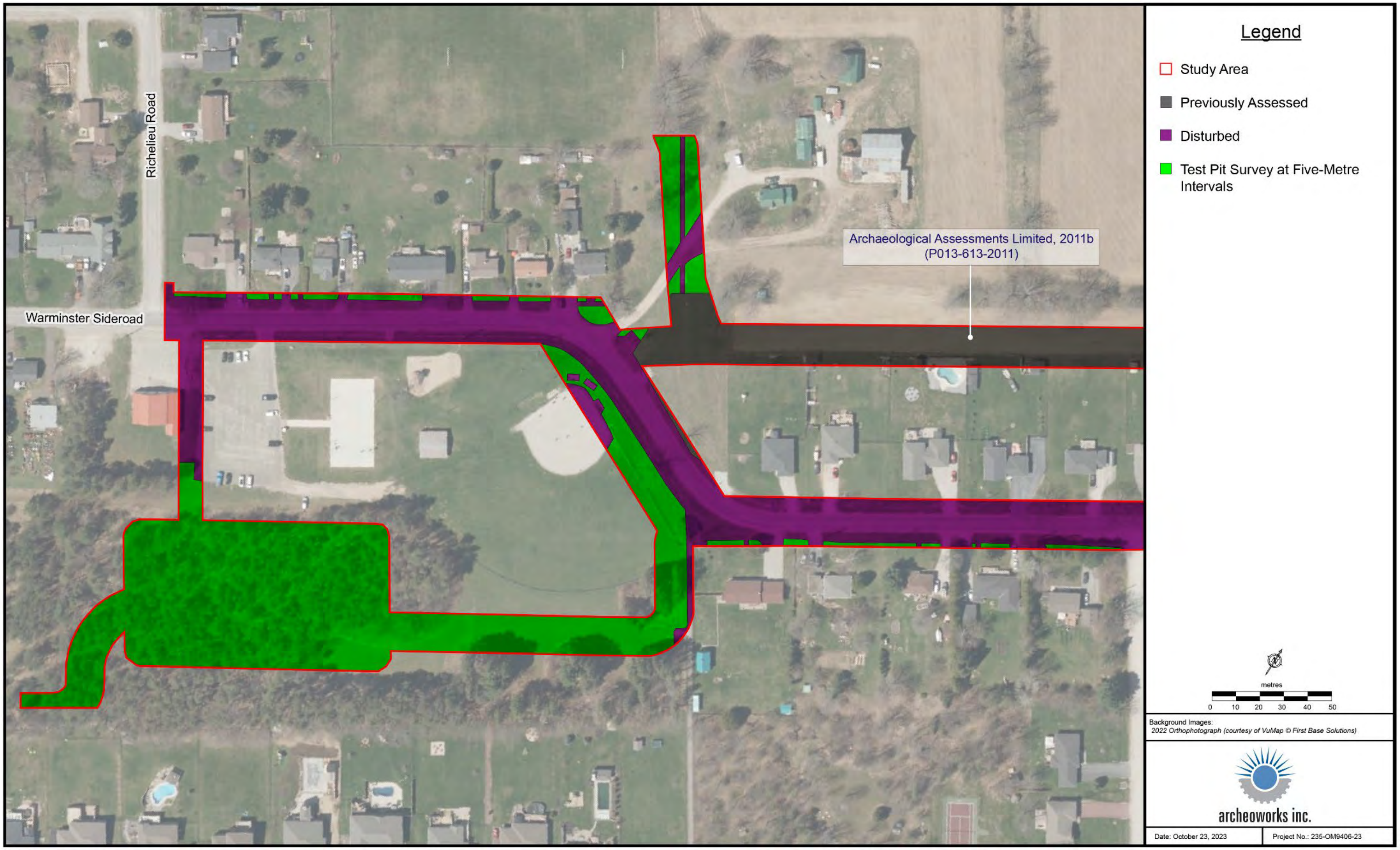
Map 6: Stage 1 AA study area within a 1997 and 2002 orthophotograph.

Map 7: Stage 1 AA study area within a 2013 and 2016 orthophotograph.

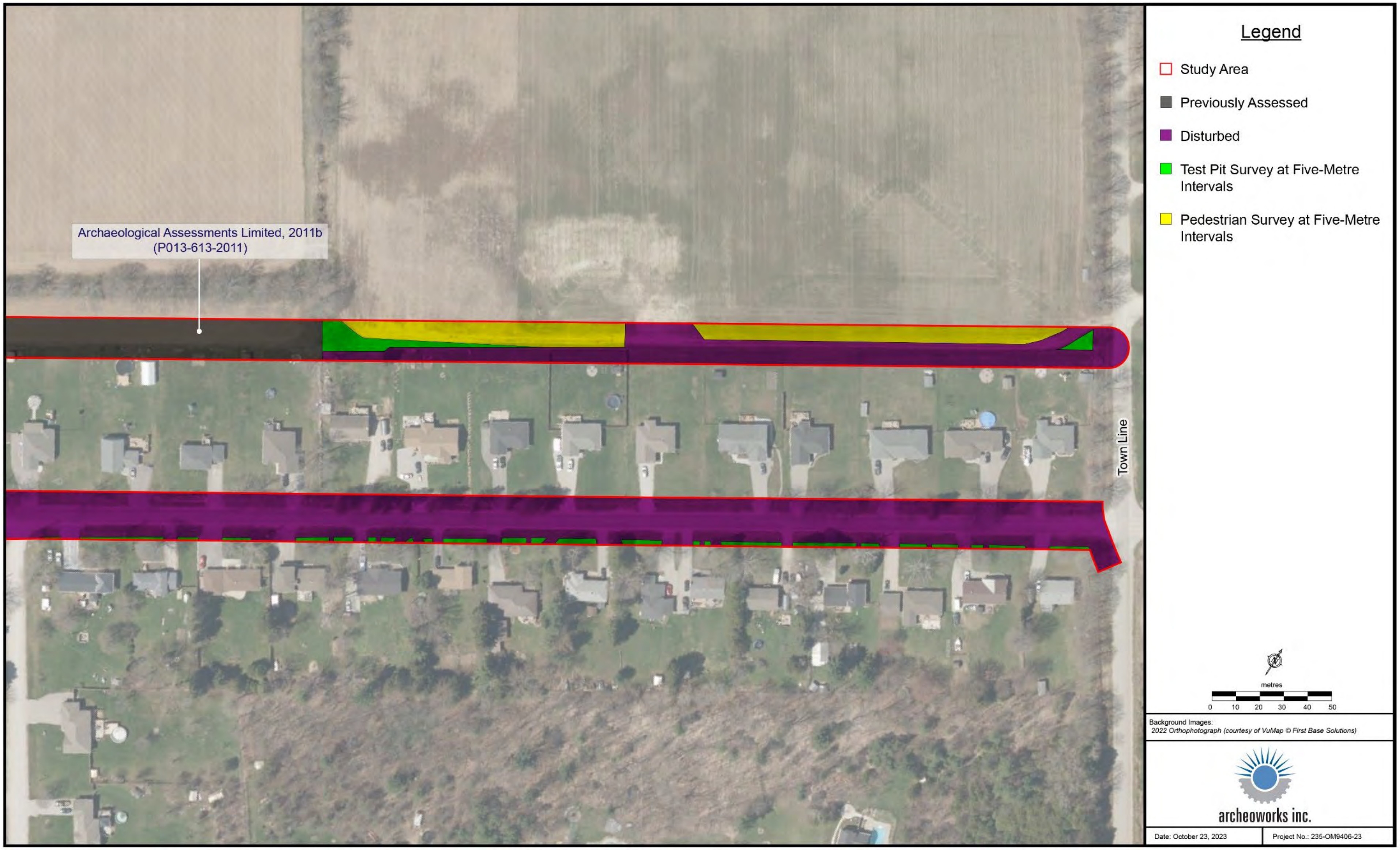
Map 8: Stage 1 AA study area within a 2018 and 2022 orthophotograph.



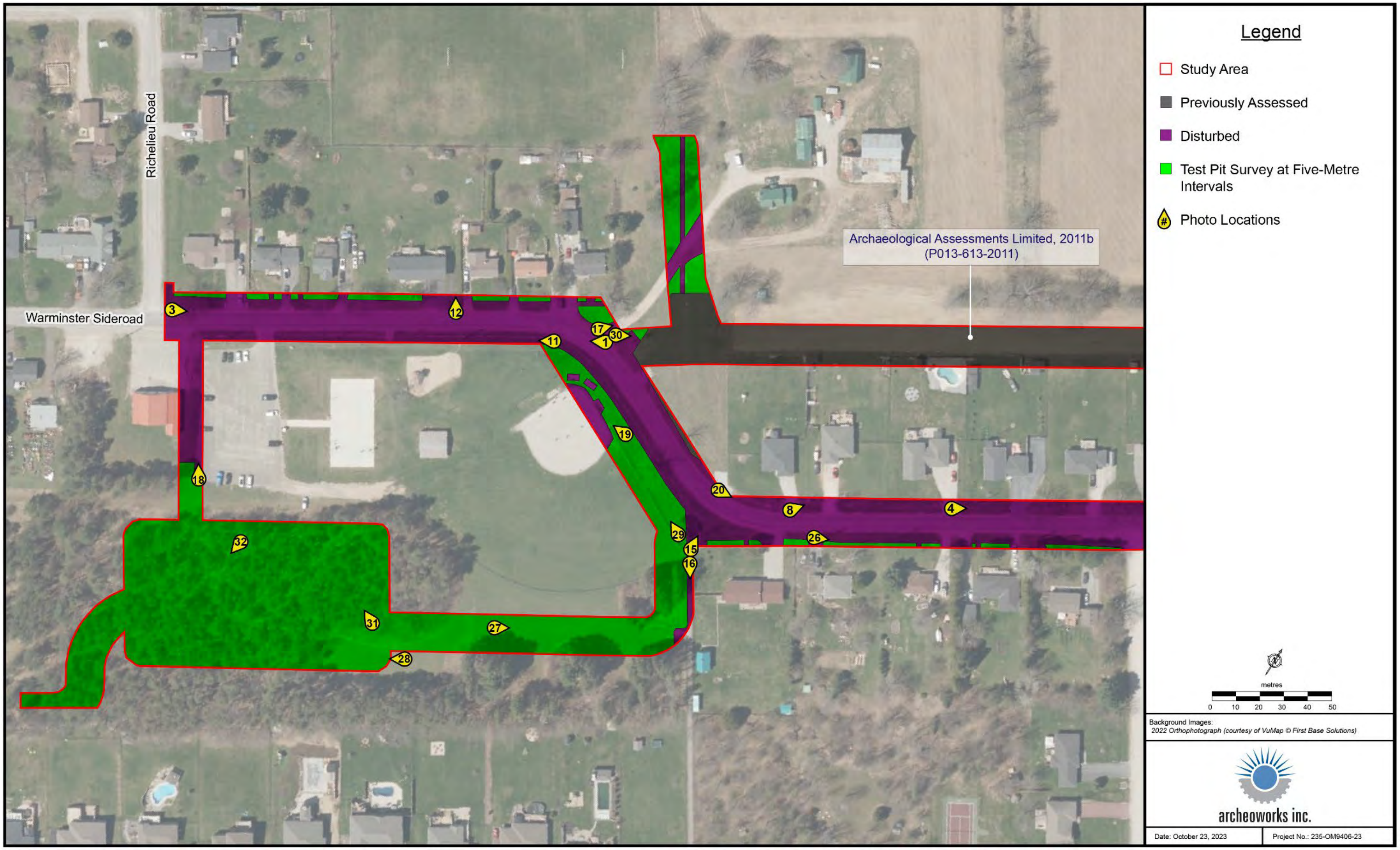
Map 9: Areas of Archaeological Potential within the Stage 1 AA study area.



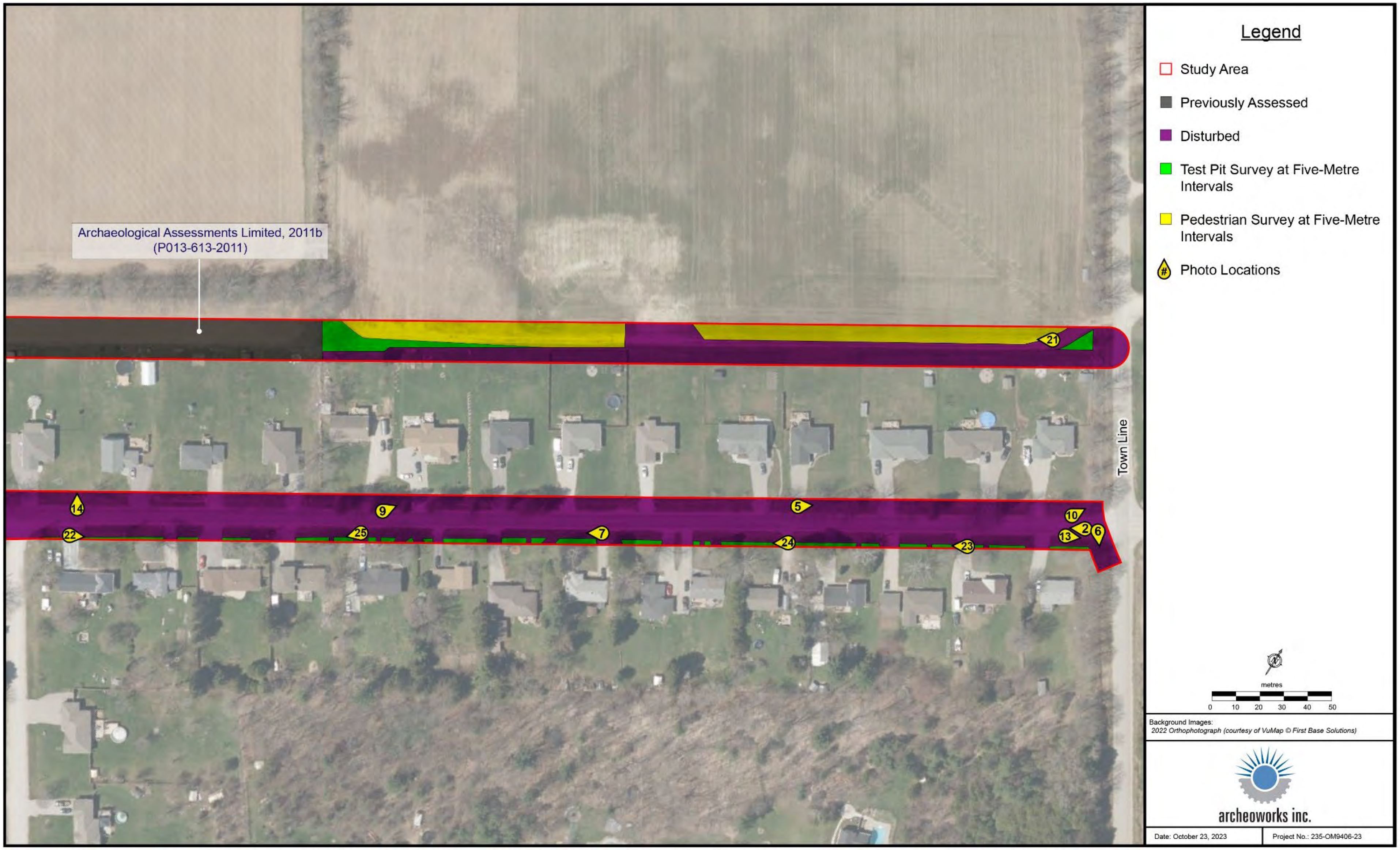
Map 10: Stage 1 AA results of the west half of the study area.



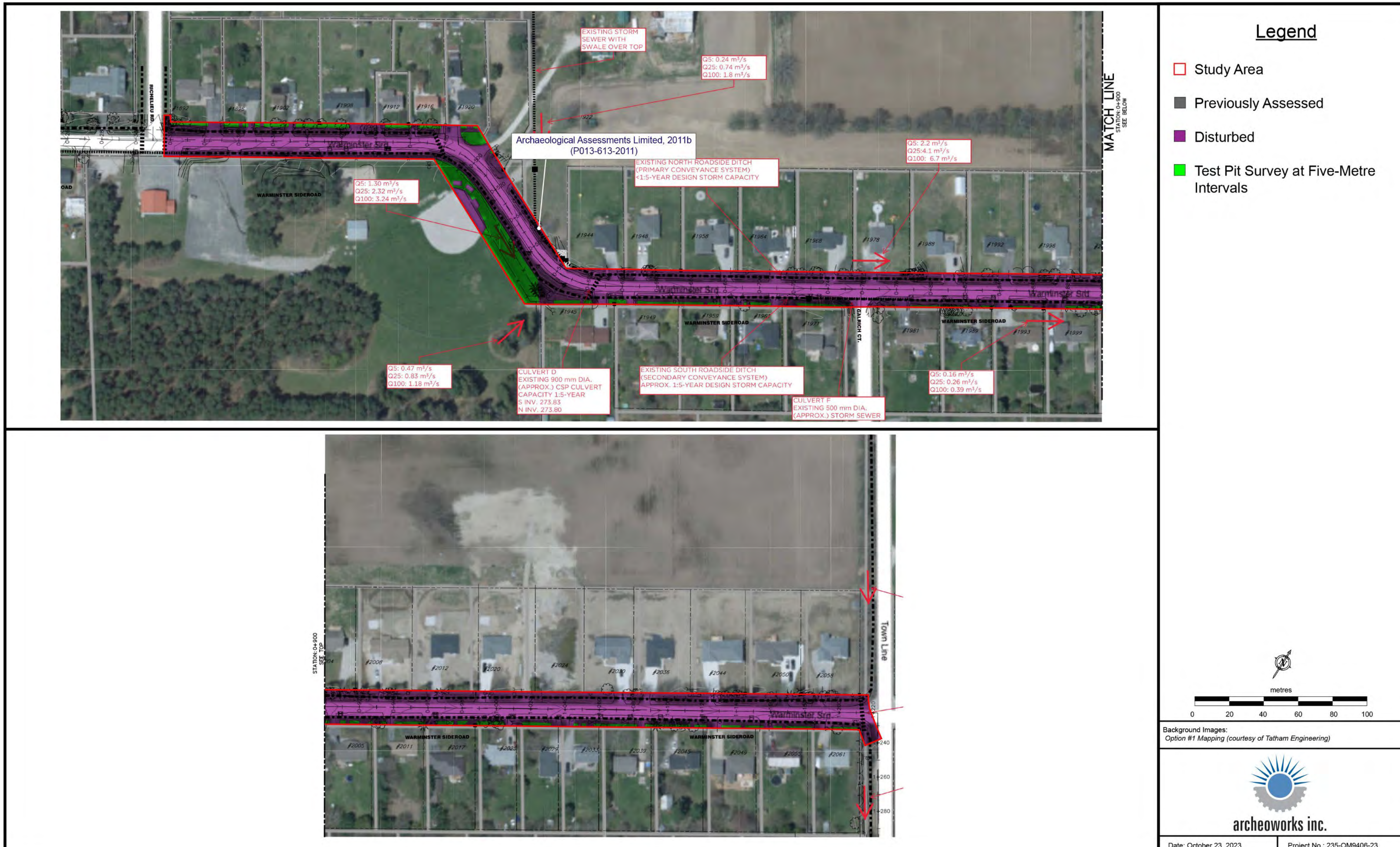
Map 11: Stage 1 AA results of the east half of the study area.



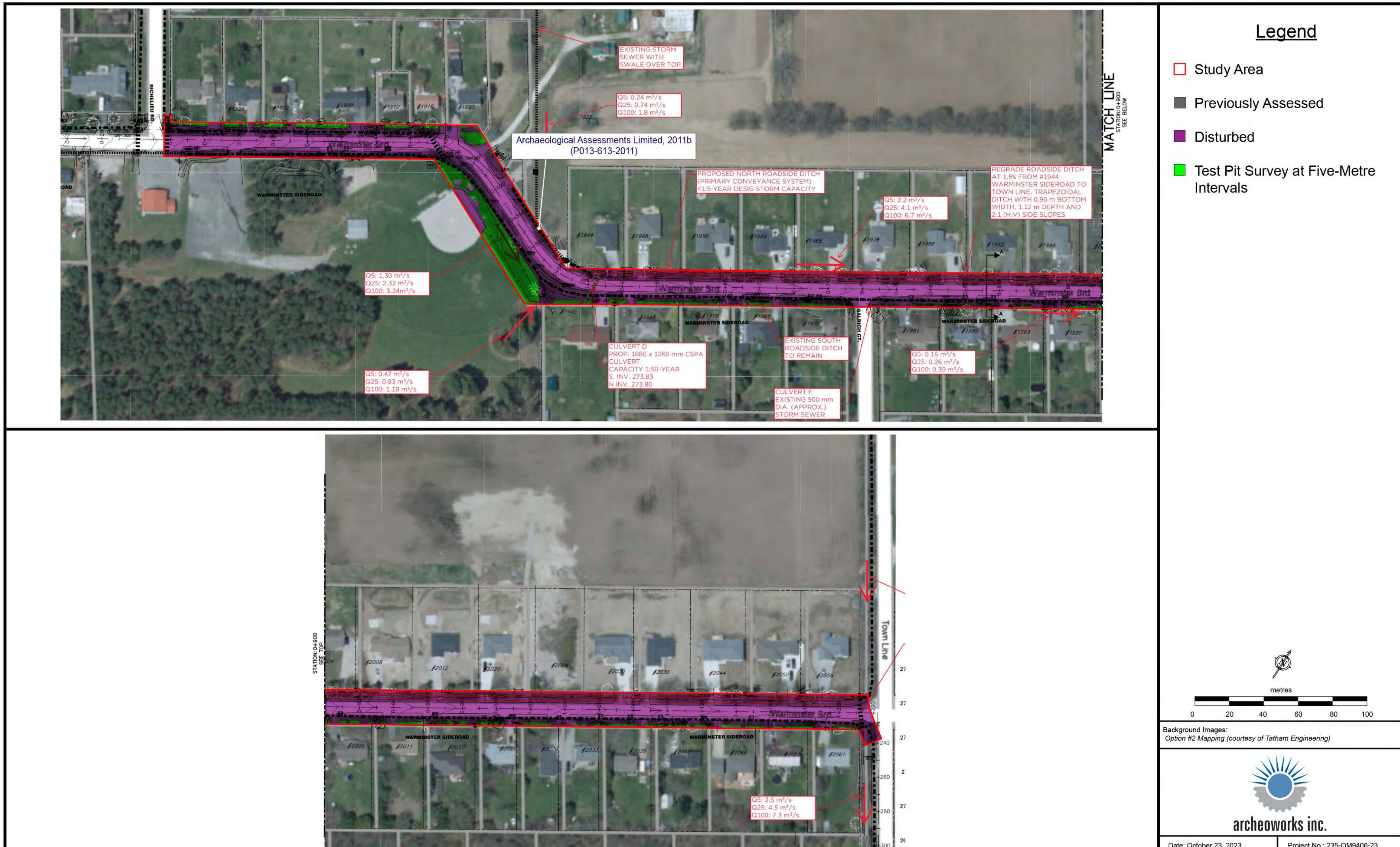
Map 12: Stage 1 AA results of the west half of the study area with photo locations.



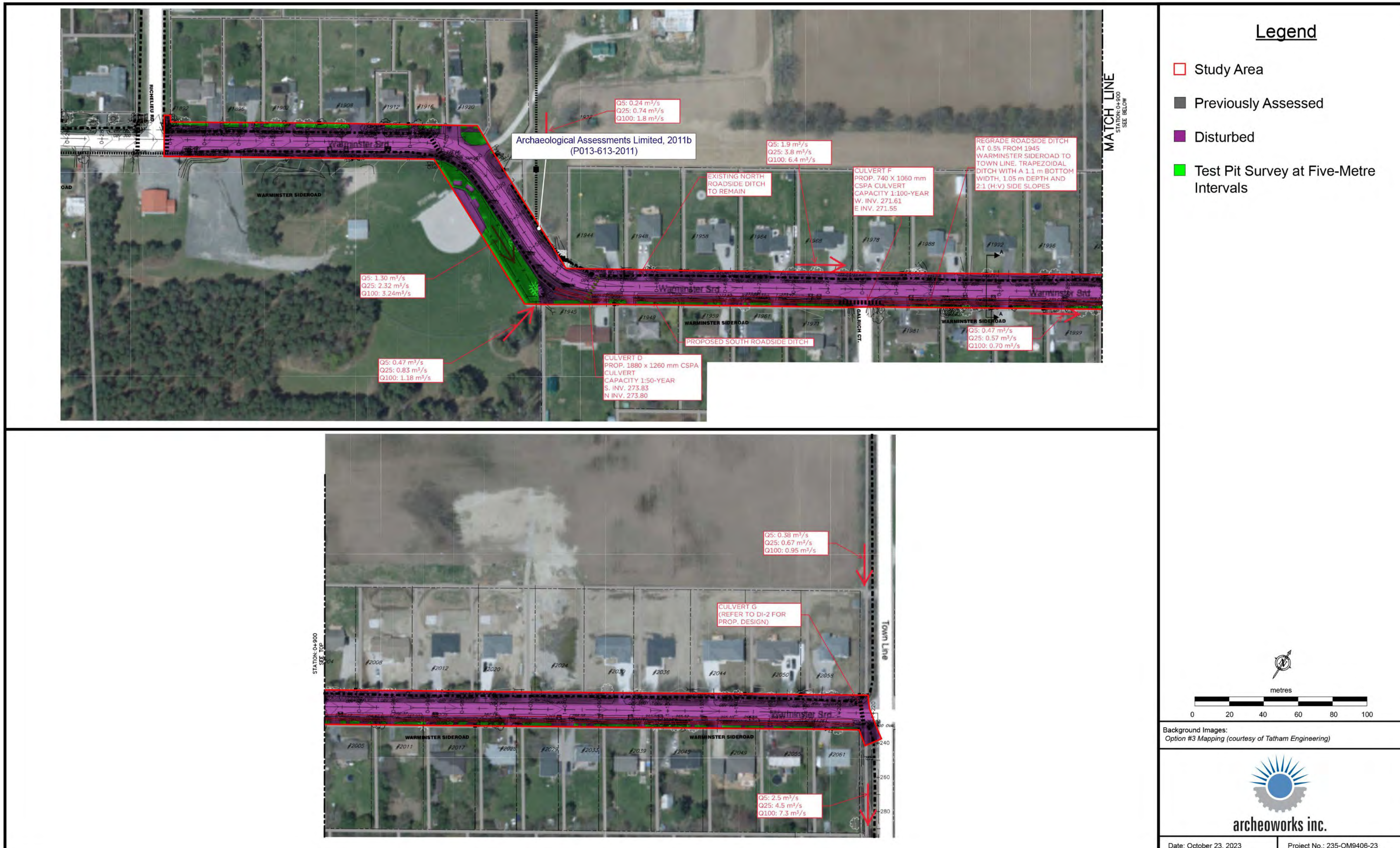
Map 13: Stage 1 AA results of the east half of the study area with photo locations



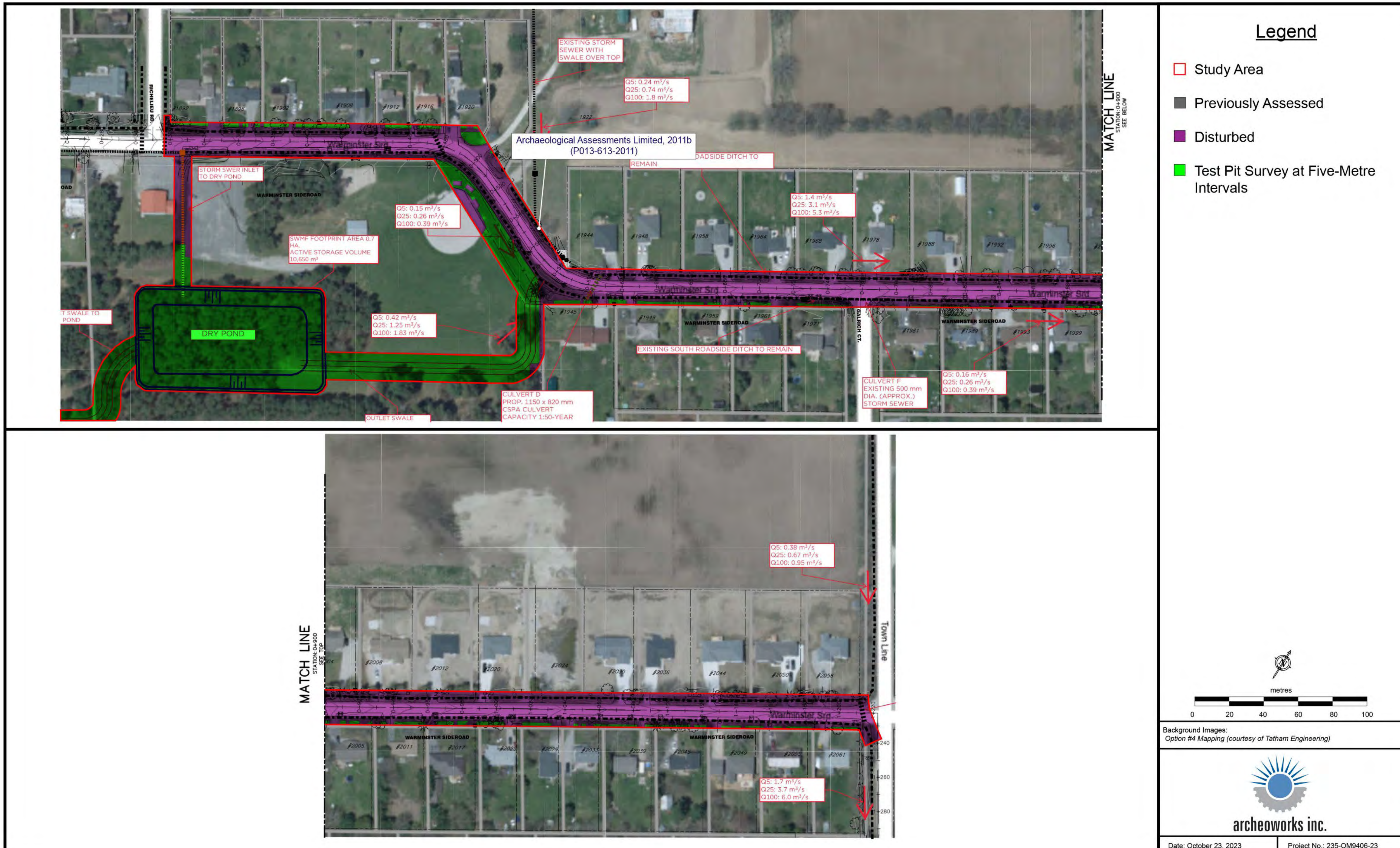
Map 14: Stage 1 AA results of Alternative 1: Do nothing



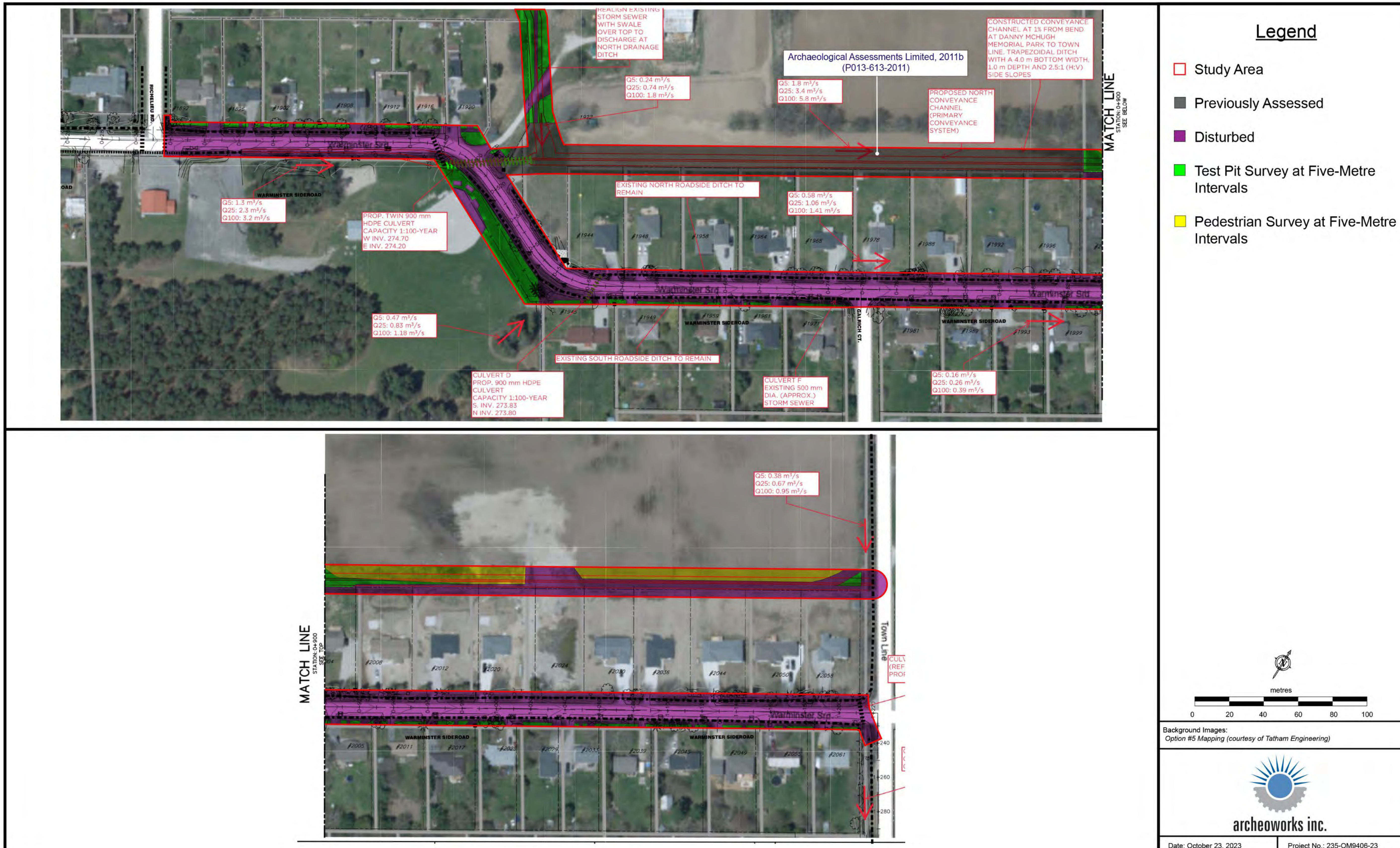
Map 15: Stage 1 AA results of Alternative 2: Increase Conveyance Capacity of North Roadside Ditching within the Municipal R.O.W. while Maintaining a Gravel Shoulder and Improved Ditch Side Slopes.



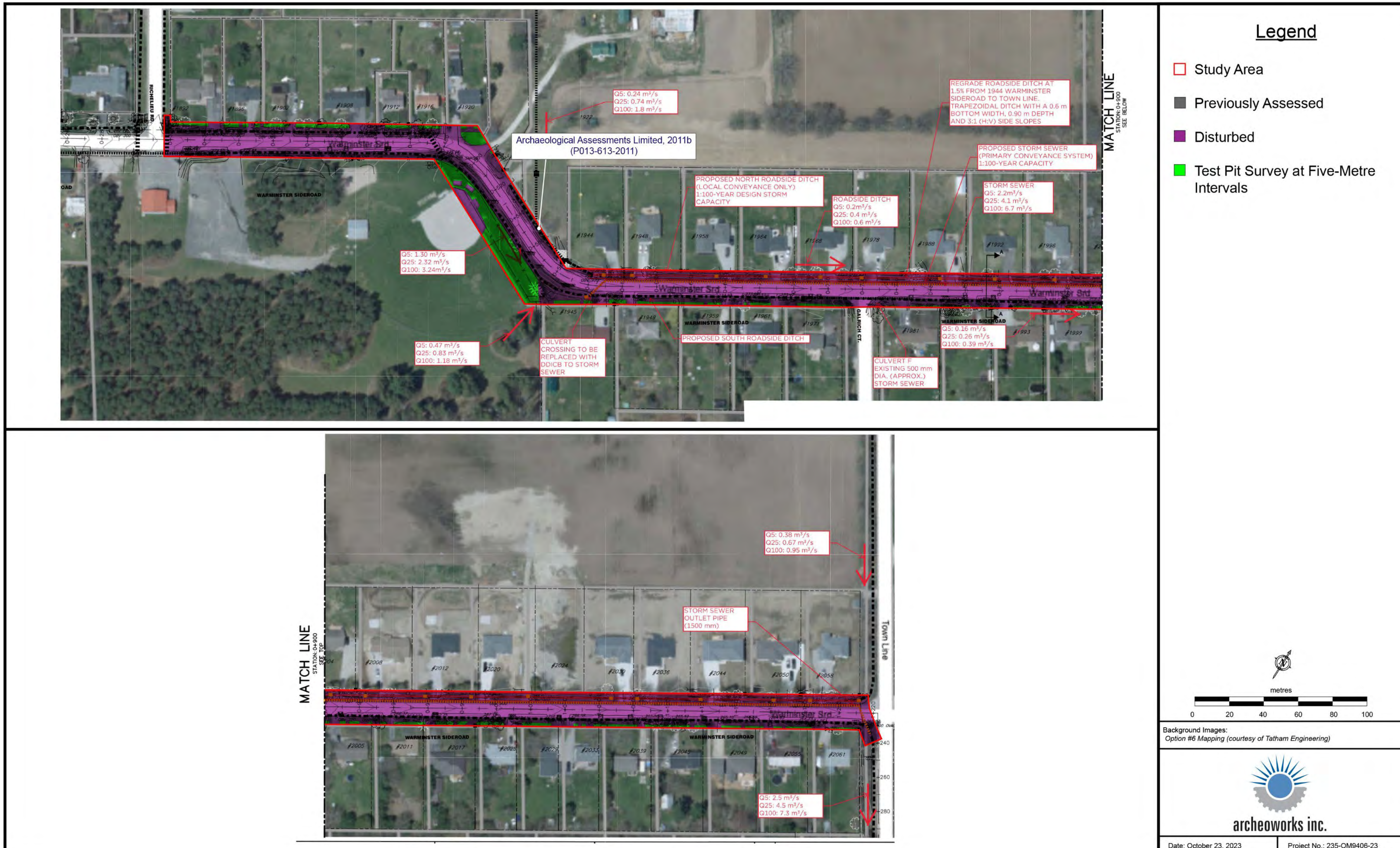
Map 16: Stage 1 AA results of Alternative 3: Increase Conveyance Capacity of South Roadside Ditch within the Municipal R.O.W. while Maintaining a Gravel Shoulder and Safe Ditch Side Slopes.



Map 17: Stage 1 AA results of Alternative 4: Dry Pond SWMF Attenuation in Park Block



Map 18: Stage 1 AA results of Alternative 5: Conveyance Channel



Map 19: Stage 1 AA results of Alternative 6: Storm Sewer following North side of Warminster Sideroad

APPENDIX B: SUMMARY OF BACKGROUND RESEARCH

Feature of Archaeological Potential		Results			
Physical Features		Yes	No	Unknown	Comment
1	Water on or adjacent to the study area		X		If Yes, potential confirmed
1a	Presence of primary water source within 300 metres of the study area (lakes, rivers, streams, creeks)		X		If Yes, potential confirmed
1b	Presence of secondary water source within 300 metres (intermittent creeks and streams, springs, marshes, swamps)	X			If Yes, potential confirmed
1c	Features indicating past presence of water source within 300 metres (former shorelines, relic water channels, beach ridges, etc.)		X		If Yes, potential confirmed
1d	Accessible or inaccessible shoreline within 300 metres (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.)		X		If Yes, potential confirmed
2	Elevated topography (eskers, drumlins, knolls, plateaus, etc.)		X		If Yes to two or more of 2-4 or 7-10, potential confirmed
3	Pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground		X		If Yes to two or more of 2-4 or 7-10, potential confirmed
4	Distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.)		X		If Yes to two or more of 2-4 or 7-10, potential confirmed
Cultural Features		Yes	No	Unknown	Comment
5	Previously identified archaeological site(s) within 300 metres	X			If Yes, potential confirmed
6	Known burial site or cemetery on or directly adjacent to the property		X		If Yes, potential confirmed
7	Associated with resource areas related to food or medicinal plants, scarce raw materials, early Euro-Canadian industry		X		If Yes to two or more of 2-4 or 7-10, potential confirmed
8	Indications of early Euro-Canadian settlement (monuments, cemeteries, structures, etc.) within 300 metres	X			If Yes to two or more of 2-4 or 7-10, potential confirmed
9	Historic transportation route (historic road, trail, portage, rail area, etc.) within 100 metres	X			If Yes to two or more of 2-4 or 7-10, potential confirmed
10	Property listed on a municipal register or designated under the *Ontario Heritage Act* or that is a federal, provincial or municipal historic landmark or site within 300 metres		X		If Yes to two or more of 2-4 or 7-10, potential confirmed
Property-specific Information		Yes	No	Unknown	Comment
11	Contains property listed or designated (under the *Ontario Heritage Act*) by the municipality		X		If Yes, potential confirmed
12	Local knowledge (Indigenous communities, heritage organizations, municipal heritage committees, etc.)		X		If Yes, potential confirmed
13	Archaeological Management Plan (AMP) illustrating archaeological potential for all or parts of the study area	X - parts			If Yes, potential confirmed
14	Recent ground disturbance, not including agricultural cultivation (post-1960, extensive and deep land alterations)		X – all		If Yes, low archaeological potential is determined

APPENDIX C: HURON-WENDAT NATION HISTORY

ANNEX

History of the Nation Huronne-Wendat

As an ancient people, traditionally, the Huron-Wendat, a great Iroquoian civilization of farmers and fishermen-hunter-gatherers and also the masters of trade and diplomacy, represented several thousand individuals. They lived in a territory stretching from the Gaspé Peninsula in the Gulf of Saint Lawrence and up along the Saint Lawrence Valley on both sides of the Saint Lawrence River all the way to the Great Lakes. Huronia, included in Wendake South, represents a part of the ancestral territory of the Huron-Wendat Nation in Ontario. It extends from Lake Nipissing in the North to Lake Ontario in the South and Île Perrot in the East to around Owend Sound in the West. This territory is today marked by several hundred archaeological sites, listed to date, testifying to this strong occupation of the territory by the Nation. It is an invaluable heritage for the Huron-Wendat Nation and the largest archaeological heritage related to a First Nation in Canada.

According to our own traditions and customs, the Huron-Wendat are intimately linked to the Saint Lawrence River and its estuary, which is the main route of its activities and way of life. The Huron-Wendat formed alliances and traded goods with other First Nations among the networks that stretched across the continent.

Today, the population of the Huron-Wendat Nation is composed of more than 4000 members distributed on-reserve and off-reserve.

The Huron-Wendat Nation band council (CNHW) is headquartered in Wendake, the oldest First Nations community in Canada, located on the outskirts of Quebec City (20 km north of the city) on the banks of the Saint Charles River. There is only one Huron-Wendat community, whose ancestral territory is called the Nionwentsïo, which translates to "our beautiful land" in the Wendat language.

The Huron-Wendat Nation is also the only authority that have the authority and rights to protect and take care of her ancestral sites in Wendake South.

APPENDIX D: IMAGES

Image 1: View of disturbances associated with the paved roadway of Warminster Sideroad, gravel shoulders, buried utilities (hydro, watermain and gas main) and paved driveways.

Image 2: View of disturbances associated with the paved roadway of Warminster Sideroad, gravel shoulders, buried utilities (hydro, watermain and gas main) and paved driveways.

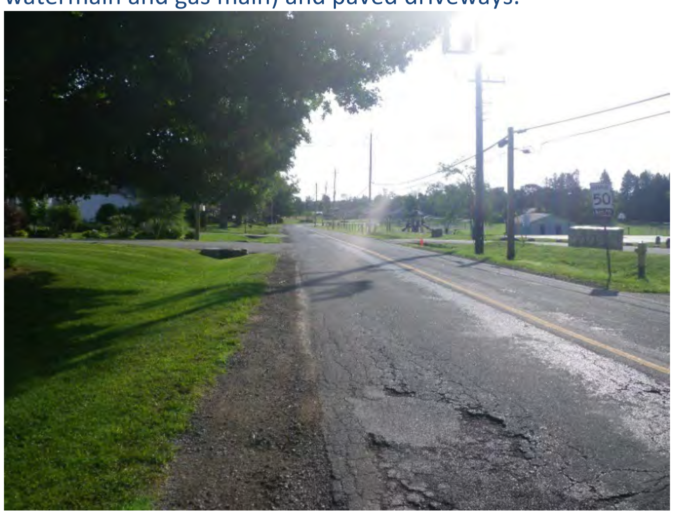


Image 3: View of disturbances associated with the paved roadway of Warminster Sideroad, gravel shoulders, buried utilities (hydro, watermain and gas main) and paved driveways.

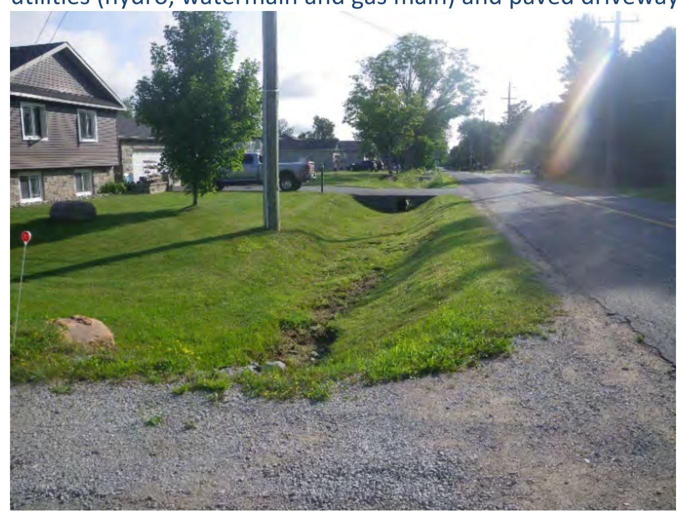


Image 4: View of disturbances associated with roadside ditching, paved roadway, and gravel driveway.

Image 5: View of disturbances associated with deep roadside ditching.

Image 6: View of disturbances associated with roadside ditching.

Image 7: View of disturbances associated with roadside ditching and buried utilities (gas main and hydro).


Image 8: View of disturbances associated with buried utilities (hydro and watermain), roadside ditching and paved driveway.

Image 9: View of disturbances associated with buried utilities (watermain) and roadside ditching.

Image 10: View of disturbances associated with buried utilities (watermain).

Image 11: View of disturbances associated with buried utilities (hydro, watermain and gas main), roadside ditching and paved roadway.

Image 12: View of disturbances associated with buried utilities (gas main and gas service line).

Image 13: View of disturbances associated with buried utilities (gas main and gas service line).


Image 14: View of disturbances associated with buried utilities (telecommunication wires).


Image 15: View of disturbances associated with buried utilities (telecommunication wires, hydro and gas main).


Image 16: View disturbances associated with paved walking pathway.

Image 17: View of disturbances associated with gravel driveway.

Image 18: View of disturbances associated with paved parking area.

Image 19: View of disturbances associated with baseball diamond.

Image 20: View of large granular material around drainage catch basin (associated with the extant watermain).

Image 21: View of agricultural field retaining archaeological potential.

Image 22: View of manicured yard retaining archaeological potential.

Image 23: View of manicured yard retaining archaeological potential.

Image 24: View of manicured yard retaining archaeological potential.

Image 25: View of manicured yard retaining archaeological potential.

Image 26: View of manicured yard retaining archaeological potential.

Image 27: View of manicured yard retaining archaeological potential.

Image 28: View of manicured yard retaining archaeological potential.

Image 29: View of manicured yard retaining archaeological potential.

Image 30: View of manicured yard retaining archaeological potential.

Image 31: View of wooded area retaining archaeological potential.

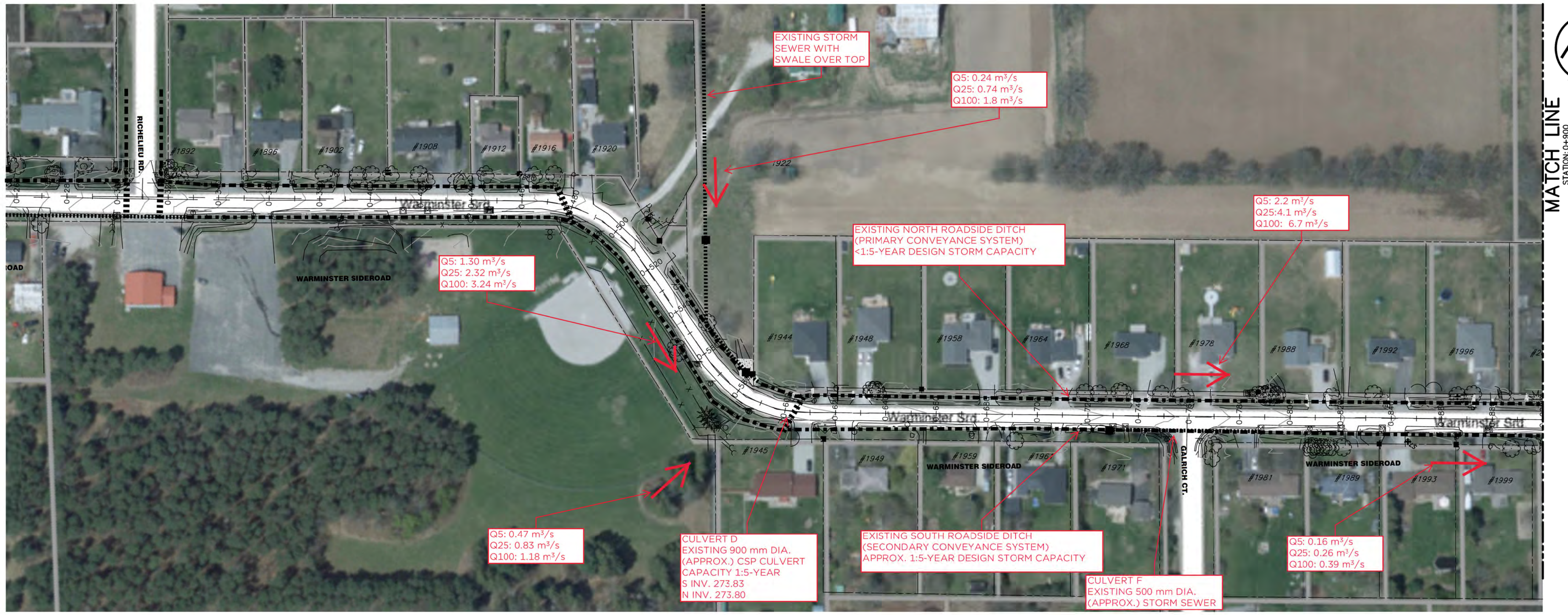
Image 32: View of wooded area retaining archaeological potential.

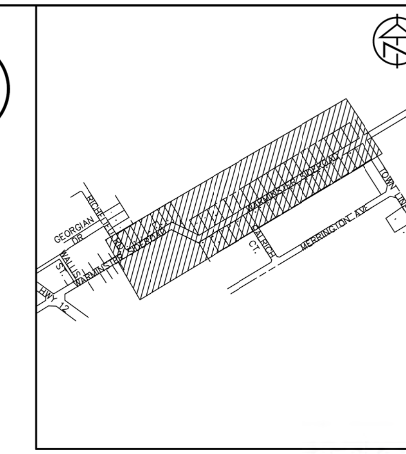
APPENDIX E: INVENTORY OF DOCUMENTARY AND MATERIAL RECORD

Project Information:				
Project Number:		235-OM9406-23		
Licensee:		Kassandra Aldridge (P439)		
MCM PIF:		P439-0167-2023		
Document/ Material		**Details**	**Location**	
1.	Research/ Analysis/ Reporting Material	Digital files stored in: /2023/ 235-OM9406-23 - Warminster Sideroad Improvements /Stage 1	Archeoworks Inc., 16715-12 Yonge Street, Suite 1029, Newmarket, ON, Canada, L3X 1X4	Stored on Archeoworks network servers
2.	Written Field Notes/Annotated Field Maps	Field Maps/Field Notes: five (5) pages	Archeoworks Inc., 16715-12 Yonge Street, Suite 1029, Newmarket, ON, Canada, L3X 1X4	Stored on Archeoworks network servers: 5 digital file
3.	Images	Digital Images: 152 digital photos	Archeoworks Inc., 16715-12 Yonge Street, Suite 1029, Newmarket, ON, Canada, L3X 1X4	Stored on Archeoworks network servers: 152 digital files

Under Section 14 of the Terms and Conditions for Archaeological Licences issued under the *Ontario Heritage Act*, "the licensee shall hold in safekeeping all artifacts and records of archaeological fieldwork carried out under this licence, except where those artifacts and records are transferred by the licensee to His Majesty the King in right of Ontario or the licensee is directed to deposit them in a public institution in accordance with subsection 66(1) of the Act." The collections are being stored at *Archeoworks Inc.* on the licensee's behalf.

Appendix E: Drainage Improvement Alternatives





ALTERNATIVE 1: "DO NOTHING" EXISTING CONDITIONS:

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 2.2 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 4.1 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.7 m³/s

1) CONVEYANCE CAPACITY <1:5-YEAR (0.9 m³/s);

2) INSUFFICIENT COVER OVER DRIVEWAY CULVERTS;

3) STEEP DITCH SIDE SLOPES POSE SAFETY HAZARDS; AND

4) EROSION IN DITCH EVIDENT.

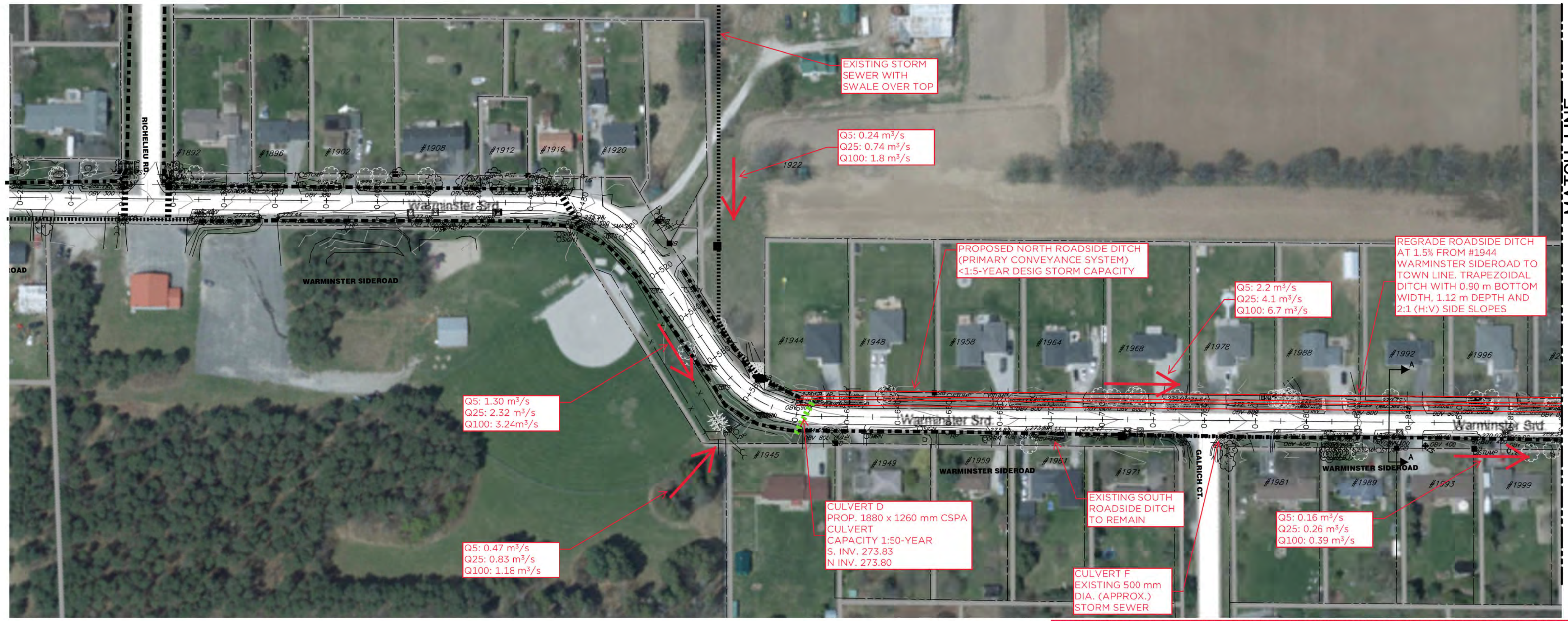
LEGEND

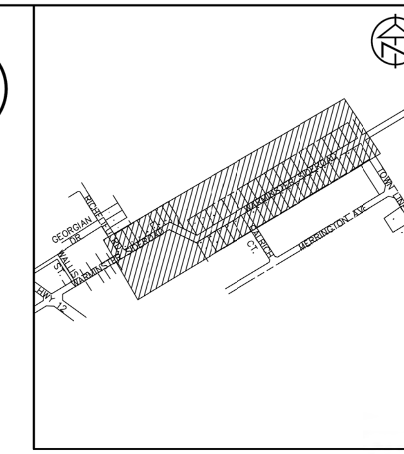
- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 1 - DO NOTHING

Drawing Name: 322863-DI01.dwg, Plotted: Sep 06, 2022





KEY PLAN
N.T.S.

ALTERNATIVE 2: INCREASE THE CAPACITY OF THE NORTH ROADSIDE DITCH TO THE GREATEST EXTENT POSSIBLE WITHIN THE MUNICIPAL R.O.W. WHILE MAINTAINING A GRAVEL SHOULDER AND IMPROVED DITCH SIDE SLOPES

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 2.2 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 4.1 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.7 m³/s

1) REGRADE DITCH FROM PROPERTY LINE DOWN AT 2:1 (H:V) TO 1.12 m DEPTH, REGRADE DITCH BOTTOM TO 0.90 m WIDTH, REGRADE DITCH UP AT 2:1 (H:V), MAINTAIN 0.5 m GRAVEL SHOULDER;

2) CONVEYANCE CAPACITY IMPROVED BUT REMAINS <1:5-YEAR (1.4 m³/s);

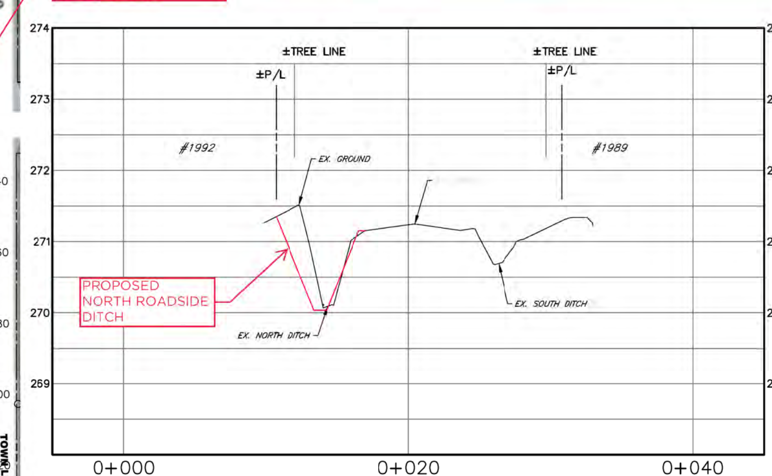
3) SEVERITY OF 1:100-YEAR FLOODING REDUCED (MINOR REDUCTION);

4) MAXIMUM CULVERT HEIGHT ACHIEVABLE APPROX. 900 mm WITH 0.30 m COVER; 1150 x 820 mm CSPA (1000 mm DIA EQUIV.);

5) WILL LOSE MATURE TREES ON NORTHSIDE OF ROAD;

6) SLOPE IMPROVED FROM A SAFETY PERSPECTIVE, DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE; AND

7) EXISTING HYDRANTS, TRANSFORMERS, HYDROPOLES, SIGNS, SERVICES, ETC. MUST BE RELOCATED ON NORTH SIDE OF ROAD.



SECTION A–A
SCALE: H 1:250
V 1:50

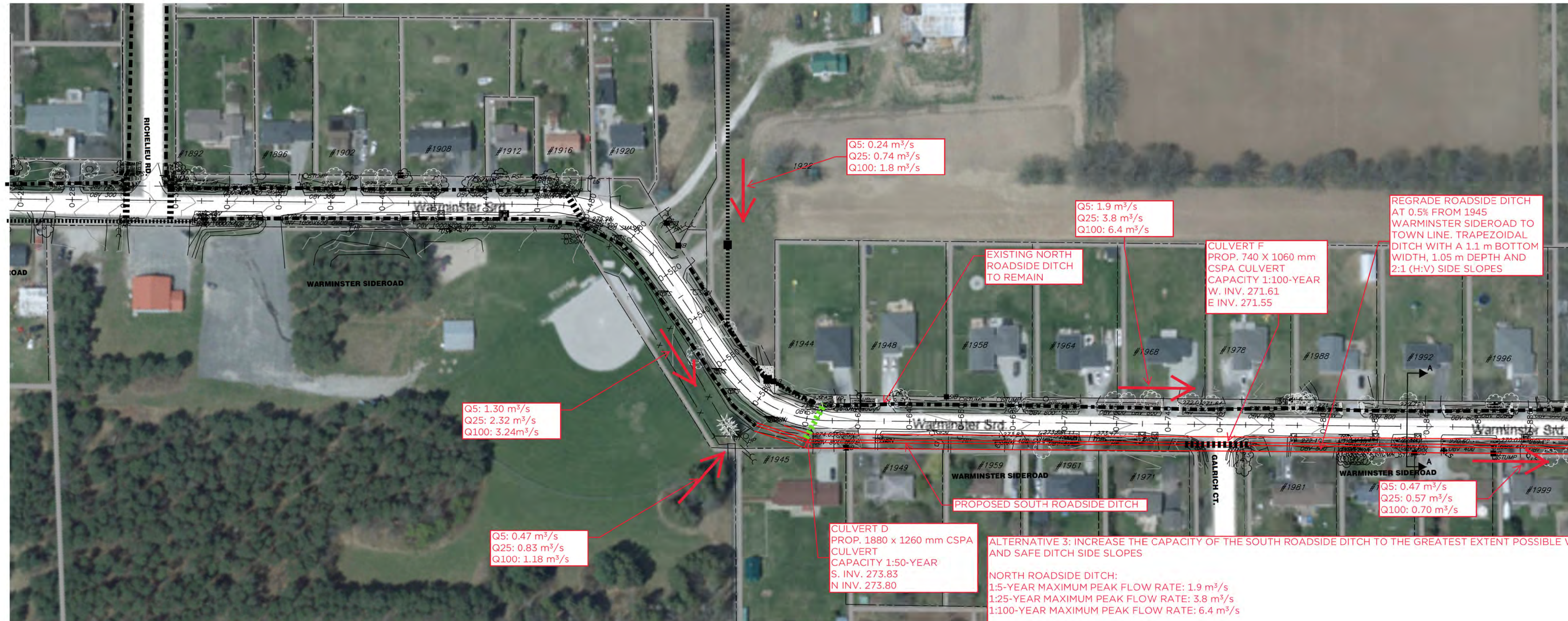
LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 2 - INCREASE CONVEYANCE CAPACITY OF NORTH ROADSIDE DITCH

Drawing Name: 322863-DI01.dwg, Plotted: Sep 16, 2022



ALTERNATIVE 3: INCREASE THE CAPACITY OF THE SOUTH ROADSIDE DITCH TO THE GREATEST EXTENT POSSIBLE WITHIN THE MUNICIPAL R.O.W. WHILE MAINTAINING A GRAVEL SHOULDER AND SAFE DITCH SIDE SLOPES

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 1.9 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 3.8 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.4 m^3/s

SOUTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 0.47 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 0.57 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 0.70 m^3/s

1) REGRADE DITCH FROM PROPERTY LINE DOWN AT 2:1 (H:V) TO 1.05 m DEPTH, REGRADE DITCH BOTTOM TO 1.1 m WIDTH, REGRADE DITCH UP AT 2:1 (H:V), MAINTAIN 1.5 m GRAVEL SHOULDER;

2) PEAK FLOWS TO NORTH ROADSIDE DITCH REDUCED;

3) CONVEYANCE CAPACITY REMAINS <1:5-YEAR ON NORTH SIDE;

4) CONVEYANCE CAPACITY INCREASED TO 0.7 m^3/s ON SOUTH SIDE;

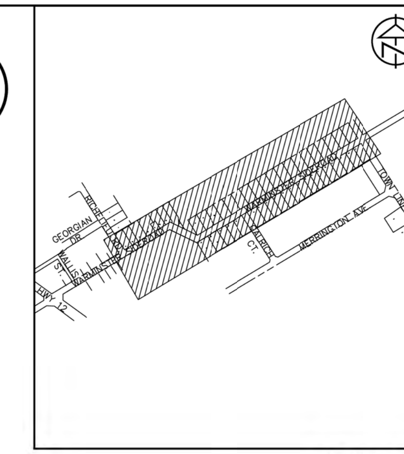
5) SEVERITY OF 1:100-YEAR FLOODING ON NORTH SIDE REDUCED;

6) SHOULDER, SLOPE AND DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE;

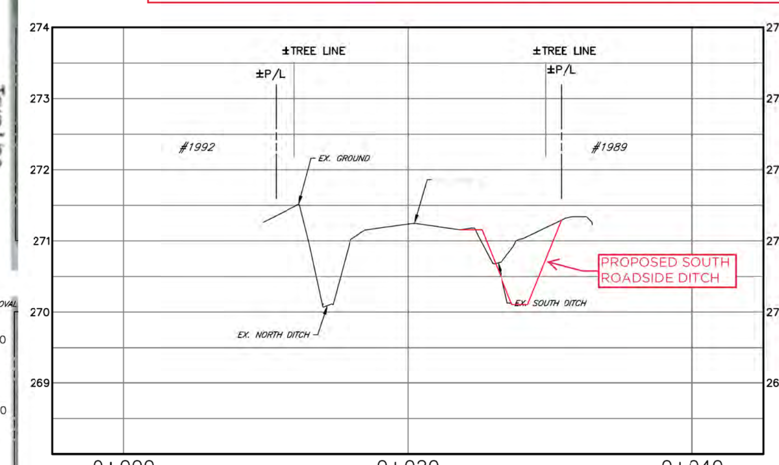
7) MAXIMUM CULVERT HEIGHT ACHIEVABLE APPROX. 800 mm WITH 0.30 m COVER 1030 x 740 mm CSPA (900 mm DIA EQUIV.) ;

8) WILL LOSE MATURE TREES ON SOUTH SIDE OF ROAD; AND

9) EXISTING HYDRANTS, TRANSFORMERS, HYDROPOLES, SIGNS, SERVICES, ETC. MUST BE RELOCATED ON SOUTH SIDE OF ROAD.



KEY PLAN
N.T.S.



SECTION A–A
SCALE: H 1:250
V 1:50

LEGEND

EXISTING ROADSIDE DITCH

EXISTING STORM SEWER

EXISTING STORM STRUCTURE
(CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)

EXISTING CULVERT

PROPOSED ROADSIDE DITCH
(TOP OF BANK/BOTTOM OF BANK)

PROPOSED STORM SEWER

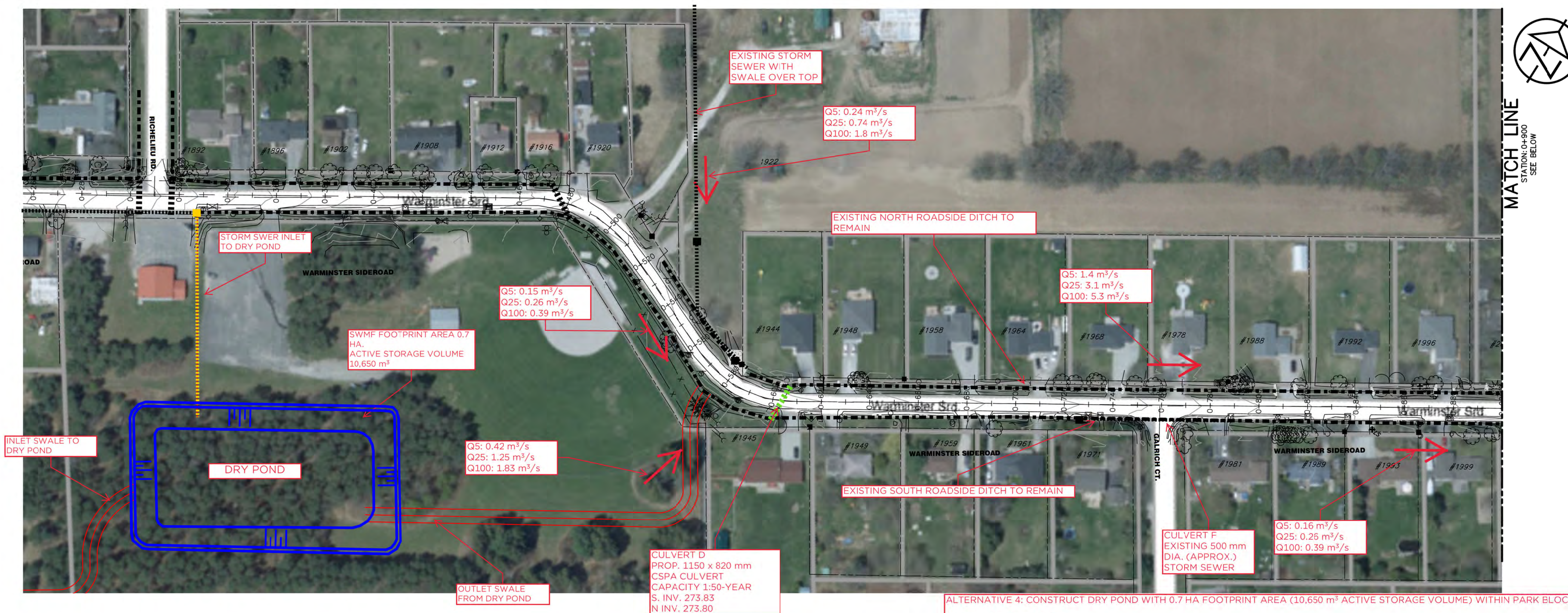
PROPOSED STORM STRUCTURE
(CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)

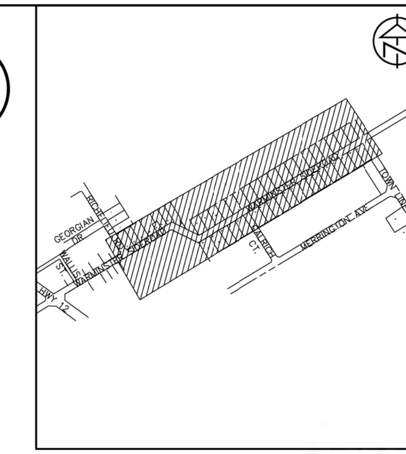
PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 3 - INCREASE CONVEYANCE CAPACITY OF SOUTH ROADSIDE DITCH

Drawing Name: 322863-0I01.dwg, Plotted: Sep 16, 2022





ALTERNATIVE 4: CONSTRUCT DRY POND WITH 0.7 HA FOOTPRINT AREA (10,650 m³ ACTIVE STORAGE VOLUME) WITHIN PARK BLOCK

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 1.4 m³/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 3.1 m³/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 5.3 m³/s

1) APPROX. 0.70 HA FOOTPRINT REQUIRED;
2) CONVEYANCE CHANNEL REALIGNMENT FROM HIGHWAY 12 CROSSING ADJACENT TO LEGION TO DRY POND REQUIRED
3) STORM SEWER TO CONVEY WARMINSTER SR. FLOWS TO POND
4) WILL LOSE MATURE TREES IN PARK;
5) NEW CONEYANCE CHANNEL FROM POND TO WARMINSTER SR. REQUIRED;
6) PEAK FLOW RATES TO NORTH ROADSIDE DITCH REDUCED;
7) SHOULDER, SLOPE AND DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE;
8) NORTH ROADSIE DITCH CAPACITY REMAINS <1:5-YEAR STORM (0.9 m³/s);
9) IF CSP CULVERTS REPLACED WITH BOSS 2000 HDPE CONVEYANCE CAPACITY INCREASED TO 1:5-YEAR; AND
10) SEVERITY OF 1:100-YEAR FLOODING REDUCED.

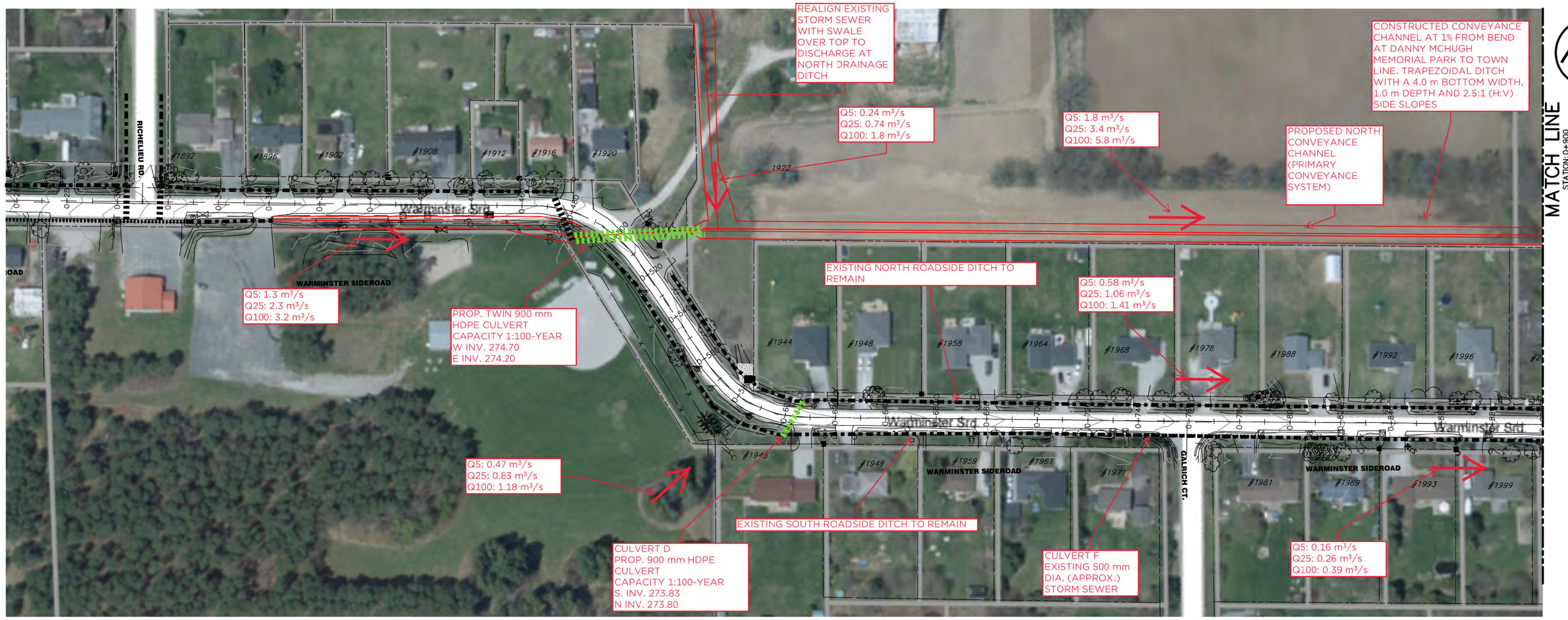
LEGEND

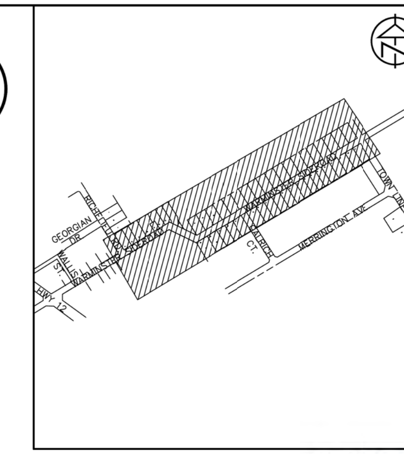
- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT
- PROPOSED SWM FACILITY

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 4 - DRY POND SWMFATTENUATION IN PARK BLOCK

Drawing Name: 322863-DI01.dwg, Plotted: Sep 06, 2022





KEY PLAN

N.T.S.

ALTERNATIVE 5: CONSTRUCT NORTH CONVEYANCE CHANNEL ALONG REAR LOTS 1944 - 2058 WARMINSTER SR. TO DISCHARGE TO TOWN LINE ROADSIDE DITCH. TRAPEZOIDAL CHANNEL TO BE GRADED 1.0 m DEEP WITH 2.5:1 (H:V) SIDE SLOPES AND 4.0 m BOTTOM WIDTH (0.30 m FREEBOARD IN CHANNEL PROVIDED)

WARMINSTER SR NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 0.6 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 1.1 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 1.4 m^3/s

NORTH CONVEYANCE CHANNEL CAPACITY: 6.0 m^3/s

1) REQUIRE LAND ACQUISITION ALONG CONVEYANCE CHANNEL;

2) NEW CROSSING REQUIRED AT WARMINSTER SR;

3) POSSIBLE UTILITIES TO BE RELOCATED;

4) PEAK FLOW RATES TO NORTH ROADSIDE DITCH REDUCED;

5) FARM RUNOFF INTERCEPTED FROM DRAINING TOWARD REAR LOTS #1944 - #2058

6) SHOULDER, SLOPE AND DEPTH OF NORTH ROADSIDE DITCH NOT IMPROVED FROM A SAFETY PERSPECTIVE;

7) NORTH ROADSIDE DITCH CAPACITY INCREASED TO 1:25-YEAR STORM; AND

8) IF CSP CULVERTS REPLACED WITH BOSS 2000 HDPE CONVEYANCE CAPACITY INCREASED TO 1:50-YEAR.

LEGEND

EXISTING ROADSIDE DITCH

EXISTING STORM SEWER

EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)

EXISTING CULVERT

PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)

PROPOSED STORM SEWER

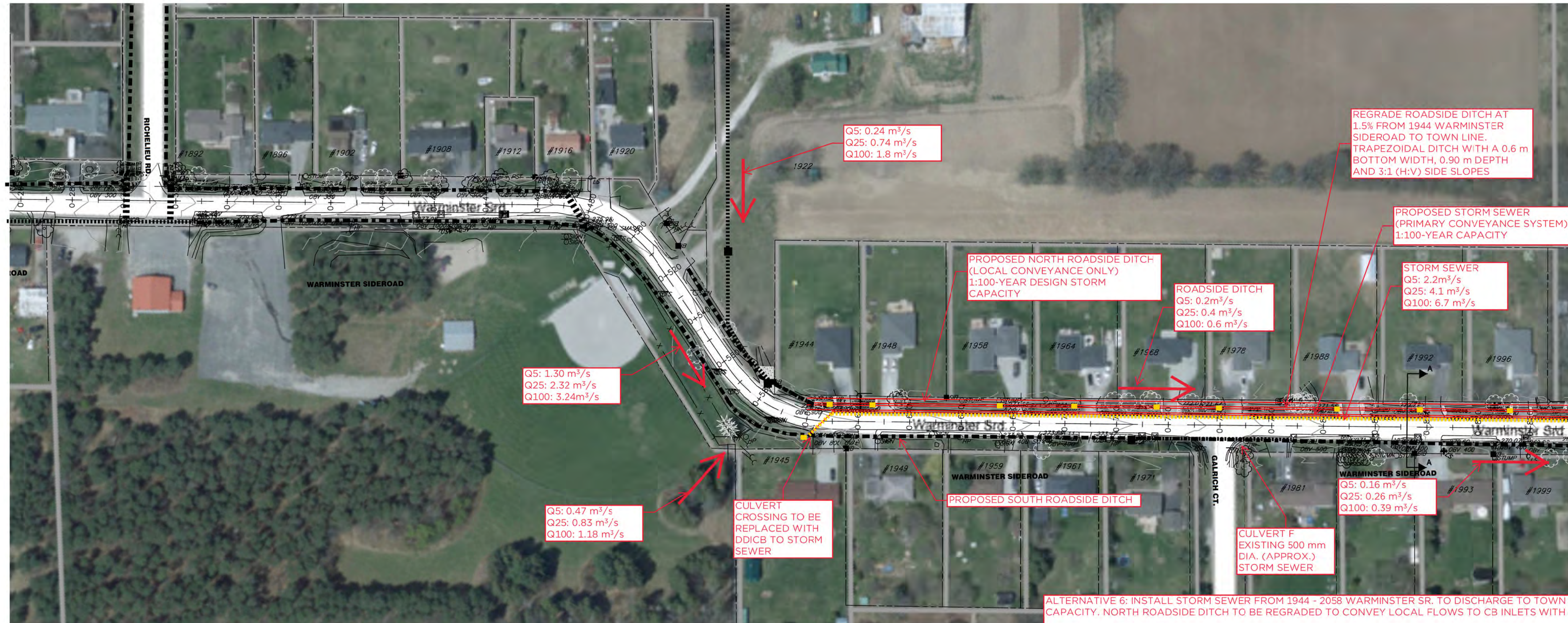
PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)

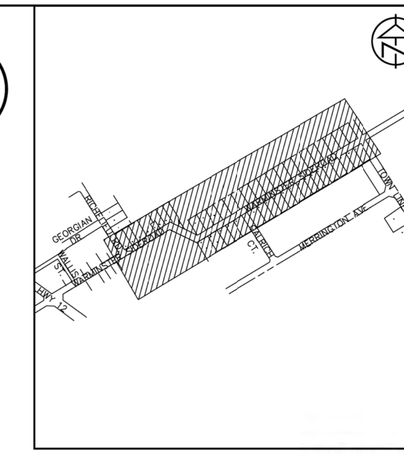
PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 5 - CONVEYANCE CHANNEL

Drawing Name: 322863-DI01.dwg, Plotted: Sep 06, 2022





KEY PLAN
N.T.S.

ALTERNATIVE 6: INSTALL STORM SEWER FROM 1944 - 2058 WARMINSTER SR. TO DISCHARGE TO TOWN LINE ROADSIDE DITCH WITH 1:100-YEAR CONVEYANCE CAPACITY. NORTH ROADSIDE DITCH TO BE REGRADED TO CONVEY LOCAL FLOWS TO CB INLETS WITH 600 mm DIA DRIVEWAY CULVERTS.

NORTH ROADSIDE DITCH:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 0.2 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 0.4 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 0.6 m^3/s

STORM SEWER:
1:5-YEAR MAXIMUM PEAK FLOW RATE: 2.2 m^3/s
1:25-YEAR MAXIMUM PEAK FLOW RATE: 4.1 m^3/s
1:100-YEAR MAXIMUM PEAK FLOW RATE: 6.7 m^3/s

1) LARGE STORM SEWER (1350 mm - 1500 mm DIA)

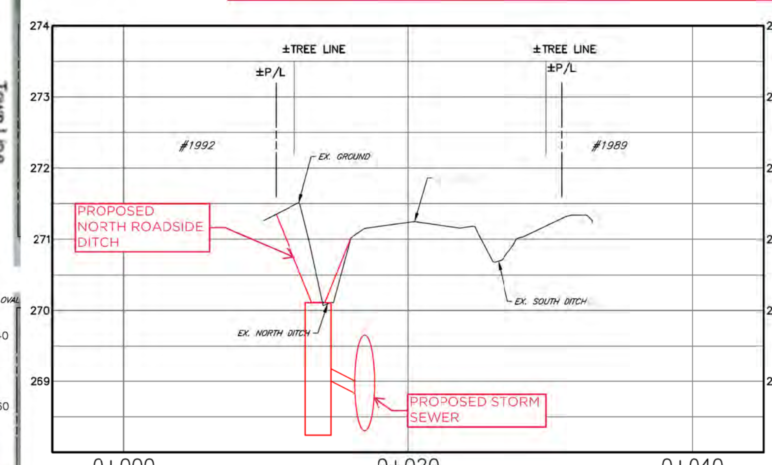
2) ROAD RECONSTRUCTION (MAJOR WORKS);

3) POSSIBLE UTILITY CONFLICTS;

4) NORTH ROADSIDE DITCH CAPACITY INCREASED TO 1:100-YEAR STORM FOR LOCAL RUNOFF;

5) WILL LOSE MATURE TREES ON NORTH SIDE; AND

6) EXISTING HYDRANTS, TRANSFORMERS, HYDROPOLES, SIGNS, SERVICES ETC. MUST BE RELOCATED ON NORTH SIDE.



SECTION A–A
SCALE: H 1:250
V 1:50

LEGEND

- EXISTING ROADSIDE DITCH
- EXISTING STORM SEWER
- EXISTING STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- EXISTING CULVERT
- PROPOSED ROADSIDE DITCH (TOP OF BANK/BOTTOM OF BANK)
- PROPOSED STORM SEWER
- PROPOSED STORM STRUCTURE (CATCHBASIN/ CATCHBASIN MAINTENANCE HOLE)
- PROPOSED CULVERT

Warminster Sideroad Drainage Improvements Municipal Class EA Study

ALTERNATIVE 6 - STORM SEWER

Drawing Name: 322863-0101.dwg, Plotted: Sep 16, 2022

Appendix F: Supporting Calculations

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Existing Condition/Alternative 1, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	403	**219.3%**
Section B	NASHYD 1052					5							0.116	0.024	115.6	2.8%	**300**	1.24	0.088	1.24	1.55	333	**132.3%**
Section C	NASHYD 1053					5							0.071	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	285	87.5%
Section E	ADDHYD 908					5							1.787	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	1048	**205.8%**
Section F	ADDHYD 915					5							1.961	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	1085	**225.8%**
Section G	ADDHYD 917					5							2.101	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	1114	**176.7%**
Section H	ADDHYD 919					5							2.247	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	1142	**189.0%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.024	75.0	1.4%	900	1.82	1.160	1.51	0.83	582	31.3%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Existing Condition/Alternative 1, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information	
Warminster Sideroad Drainage Improvements	322863

Drawing Reference	
Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By	
ARO	Aug 2022

Reviewed By	
DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					5							0.416	0.024	180.0	2.7%	900	2.53	1.611	2.00	1.50	541	25.8%
Section C	ADDHYD 906					5							1.232	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	832	81.1%
Section E	STANDHYD 1091					5							0.073	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	387	91.5%
Section F	ADDHYD 912					5							0.109	0.024	9.4	0.5%	**400**	0.63	0.080	0.63	0.25	450	**136.6%**
Sectoin G	ADDHYD 921					5							0.143	0.024	14.2	1.0%	**400**	0.90	0.113	0.90	0.26	437	**126.8%**
Section H	ADDHYD 922					5							0.162	0.024	7.8	2.0%	**400**	1.27	0.160	1.27	0.10	402	**101.5%**
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.024	3.0	1.0%	**985**	1.64	1.247	1.64	0.03	1291	**206.0%**

Driveway Culvert Conveyance Analysis
Existing Condition/Alternative 1, 1:25-Year Storm

TATHAM ENGINEERING

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	486	**362.9%**
Section B	NASHYD 1052					25							0.192	0.024	115.6	2.8%	**300**	1.24	0.088	1.24	1.55	402	**219.1%**
Section C	NASHYD 1053					25							0.118	0.024	12.1	2.4%	**300**	1.15	0.081	1.15	0.18	345	**145.4%**
Section E	ADDHYD 908					25							3.206	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	1305	**369.2%**
Section F	ADDHYD 915					25							3.538	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	1354	**407.4%**
Section G	ADDHYD 917					25							3.84	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	1396	**323.0%**
Section H	ADDHYD 919					25							4.107	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	1432	**345.4%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.024	75.0	1.4%	900	1.82	1.160	1.74	0.72	708	52.8%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Existing Condition/Alternative 1, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					25							0.747	0.024	180.0	2.7%	900	2.53	1.611	2.34	1.28	674	46.4%
Section C	ADDHYD 906					25							2.214	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	1036	145.7%
Section E	STANDHYD 1091					25							0.117	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	462	146.7%
Section F	ADDHYD 912					25							0.174	0.024	9.4	0.5%	400	0.63	0.080	0.63	0.25	536	218.1%
Sectoin G	ADDHYD 921					25							0.229	0.024	14.2	1.0%	400	0.90	0.113	0.90	0.26	521	203.0%
Section H	ADDHYD 922					25							0.259	0.024	7.8	2.0%	400	1.27	0.160	1.27	0.10	480	162.4%
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.024	3.0	1.0%	985	1.64	1.247	1.64	0.03	1613	372.7%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Existing Condition/Alternative 1, 1:100Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.024	37.2	1.0%	300	0.75	0.053	0.75	0.83	548	499.0%
Section B	NASHYD 1052					100							0.264	0.024	115.6	2.8%	300	1.24	0.088	1.24	1.55	453	301.2%
Section C	NASHYD 1053					100							0.183	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	407	225.5%
Section E	ADDHYD 908					100							5.371	0.024	7.8	1.5%	800	1.73	0.868	1.73	0.08	1584	618.5%
Section F	ADDHYD 915					100							5.938	0.024	9.6	1.5%	800	1.73	0.868	1.73	0.09	1644	683.8%
Section G	ADDHYD 917					100							6.353	0.024	9.0	1.5%	900	1.87	1.189	1.87	0.08	1687	534.4%
Section H	ADDHYD 919					100							6.717	0.024	7.5	1.5%	900	1.87	1.189	1.87	0.07	1722	565.0%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.024	75.0	1.4%	900	1.82	1.160	1.82	0.69	801	73.3%

Driveway Culvert Conveyance Analysis
Existing Condition/Alternative 1, 1:100Year Storm

Version Number: 1 Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					100							1.033	0.024	180.0	2.7%	900	2.53	1.611	2.53	1.18	762	64.1%
Section C	ADDHYD 906					100							3.074	0.024	8.7	2.4%	**900**	2.39	1.519	2.39	0.06	1172	**202.4%**
Section E	STANDHYD 1091					100							0.174	0.024	15.9	0.5%	**400**	0.63	0.080	0.63	0.42	536	**218.1%**
Section F	ADDHYD 912					100							0.259	0.024	9.4	0.5%	**400**	0.63	0.080	0.63	0.25	622	**324.7%**
Sectoin G	ADDHYD 921					100							0.342	0.024	14.2	1.0%	**400**	0.90	0.113	0.90	0.26	606	**303.2%**
Section H	ADDHYD 922					100							0.386	0.024	7.8	2.0%	**400**	1.27	0.160	1.27	0.10	557	**242.0%**
West Side of Town Line																							
Section J	ADDHYD 911					100							7.533	0.024	3.0	1.0%	**985**	1.64	1.247	1.64	0.03	1933	**603.9%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 2, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	320	**118.8%**
Section B	NASHYD 1052					5							0.116	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	265	71.7%
Section C	NASHYD 1053					5							0.071	0.013	12.1	2.4%	375	2.46	0.272	1.94	0.10	227	26.1%
Section E	ADDHYD 908					5							1.787	0.024	7.8	1.5%	**1000**	2.00	1.575	2.00	0.06	1048	**113.5%**
Section F	ADDHYD 915					5							1.961	0.024	9.6	1.5%	**1000**	2.00	1.575	2.00	0.08	1085	**124.5%**
Section G	ADDHYD 917					5							2.101	0.024	9.0	1.5%	**1000**	2.00	1.575	2.00	0.07	1114	**133.4%**
Section H	ADDHYD 919					5							2.247	0.024	7.5	1.5%	**1000**	2.00	1.575	2.00	0.06	1142	**142.7%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.024	75.0	1.4%	900	1.82	1.160	1.51	0.83	582	31.3%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 2, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					5							0.416	0.024	180.0	2.7%	900	2.53	1.611	2.00	1.50	541	25.8%
Section C	ADDHYD 906					5							1.232	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	832	81.1%
Section E	STANDHYD 1091					5							0.073	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	387	91.5%
Section F	ADDHYD 912					5							0.109	0.024	9.4	0.5%	400	0.63	0.080	0.63	0.25	450	136.6%
Sectoin G	ADDHYD 921					5							0.143	0.024	14.2	1.0%	400	0.90	0.113	0.90	0.26	437	126.8%
Section H	ADDHYD 922					5							0.162	0.024	7.8	2.0%	400	1.27	0.160	1.27	0.10	402	101.5%
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.024	3.0	1.0%	985	1.64	1.247	1.64	0.03	1291	**206.0%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 2, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	386	**196.6%**
Section B	NASHYD 1052					25							0.192	0.013	115.6	2.8%	**300**	2.29	0.162	2.29	0.84	320	**118.7%**
Section C	NASHYD 1053					25							0.118	0.013	12.1	2.4%	375	2.46	0.272	2.23	0.09	274	43.4%
Section E	ADDHYD 908					25							3.206	0.024	7.8	1.5%	**1000**	2.00	1.575	2.00	0.06	1305	**203.6%**
Section F	ADDHYD 915					25							3.538	0.024	9.6	1.5%	**1000**	2.00	1.575	2.00	0.08	1354	**224.7%**
Section G	ADDHYD 917					25							3.84	0.024	9.0	1.5%	**1000**	2.00	1.575	2.00	0.07	1396	**243.9%**
Section H	ADDHYD 919					25							4.107	0.024	7.5	1.5%	**1000**	2.00	1.575	2.00	0.06	1432	**260.8%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.024	75.0	1.4%	900	1.82	1.160	1.74	0.72	708	52.8%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 2, 1:25-Year Storm

Version Number: 1   Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					25							0.747	0.024	180.0	2.7%	900	2.53	1.611	2.34	1.28	674	46.4%
Section C	ADDHYD 906					25							2.214	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	1036	145.7%
Section E	STANDHYD 1091					25							0.117	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	462	146.7%
Section F	ADDHYD 912					25							0.174	0.024	9.4	0.5%	400	0.63	0.080	0.63	0.25	536	218.1%
Sectoin G	ADDHYD 921					25							0.229	0.024	14.2	1.0%	400	0.90	0.113	0.90	0.26	521	203.0%
Section H	ADDHYD 922					25							0.259	0.024	7.8	2.0%	400	1.27	0.160	1.27	0.10	480	162.4%
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.024	3.0	1.0%	985	1.64	1.247	1.64	0.03	1613	372.7%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 2, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.264	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	435	**270.3%**
Section B	NASHYD 1052					25							0.264	0.013	115.6	2.8%	**300**	2.29	0.162	2.29	0.84	360	**163.2%**
Section C	NASHYD 1053					25							0.183	0.013	12.1	2.4%	375	2.46	0.272	2.46	0.08	323	67.4%
Section E	ADDHYD 908					25							5.371	0.024	7.8	1.5%	**1000**	2.00	1.575	2.00	0.06	1584	**341.1%**
Section F	ADDHYD 915					25							5.938	0.024	9.6	1.5%	**1000**	2.00	1.575	2.00	0.08	1644	**377.1%**
Section G	ADDHYD 917					25							6.353	0.024	9.0	1.5%	**1000**	2.00	1.575	2.00	0.07	1687	**403.5%**
Section H	ADDHYD 919					25							6.717	0.024	7.5	1.5%	**1000**	2.00	1.575	2.00	0.06	1722	**426.6%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.85	0.024	75.0	1.4%	900	1.82	1.160	1.82	0.69	801	73.3%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 2, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					25							1.033	0.024	180.0	2.7%	900	2.53	1.611	2.53	1.18	762	64.1%
Section C	ADDHYD 906					25							3.074	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	1172	202.4%
Section E	STANDHYD 1091					25							0.174	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	536	218.1%
Section F	ADDHYD 912					25							0.259	0.024	9.4	0.5%	400	0.63	0.080	0.63	0.25	622	324.7%
Sectoin G	ADDHYD 921					25							0.342	0.024	14.2	1.0%	400	0.90	0.113	0.90	0.26	606	303.2%
Section H	ADDHYD 922					25							0.386	0.024	7.8	2.0%	400	1.27	0.160	1.27	0.10	557	242.0%
West Side of Town Line																							
Section J	ADDHYD 911					25							7.533	0.024	3.0	1.0%	985	1.64	1.247	1.64	0.03	1933	603.9%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 3, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.013	37.2	1.0%	**300**	1.38	0.098	1.38	0.45	320	**118.8%**
Section B	NASHYD 1052					5							0.116	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	265	71.7%
Section C	NASHYD 1053					5							0.071	0.013	12.1	2.4%	**300**	2.12	0.150	1.96	0.10	227	47.4%
Section E	ADDHYD 908					5							1.477	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	976	**170.1%**
Section F	ADDHYD 915					5							1.651	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	1018	**190.1%**
Section G	ADDHYD 917					5							1.791	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	1049	**150.6%**
Section H	ADDHYD 919					5							1.937	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	1080	**162.9%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.013	75.0	1.4%	900	3.37	2.142	2.36	0.53	462	16.9%

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TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 3, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					5							0.416	0.013	180.0	2.7%	900	4.68	2.975	3.13	0.96	430	14.0%
Section C	ADDHYD 906					5							1.232	0.013	8.7	2.4%	1050	4.89	4.230	3.98	0.04	661	29.1%
Section E	ADDHYD 913					5							0.383	0.024	15.9	0.5%	900	1.09	0.693	1.05	0.25	720	55.2%
Section F	ADDHYD 912					5							0.419	0.024	9.4	0.5%	900	1.09	0.693	1.07	0.15	745	60.4%
Sectoin G	ADDHYD 921					5							0.453	0.024	14.2	0.5%	900	1.09	0.693	1.09	0.22	767	65.3%
Section H	ADDHYD 922					5							0.472	0.024	7.8	0.5%	900	1.09	0.693	1.09	0.12	779	68.1%
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.024	3.0	1.0%	**985**	1.64	1.247	1.64	0.03	1291	**206.0%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 3, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	386	196.6%
Section B	NASHYD 1052					25							0.192	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	320	118.7%
Section C	NASHYD 1053					25							0.118	0.013	12.1	2.4%	300	2.12	0.150	2.12	0.10	274	78.8%
Section E	ADDHYD 908					25							2.896	0.024	7.8	1.5%	800	1.73	0.868	1.73	0.08	1256	333.5%
Section F	ADDHYD 915					25							3.226	0.024	9.6	1.5%	800	1.73	0.868	1.73	0.09	1308	371.5%
Section G	ADDHYD 917					25							3.53	0.024	9.0	1.5%	900	1.87	1.189	1.87	0.08	1353	296.9%
Section H	ADDHYD 919					25							3.797	0.024	7.5	1.5%	900	1.87	1.189	1.87	0.07	1391	319.4%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.013	75.0	1.4%	900	3.37	2.142	2.72	0.46	563	28.6%

Driveway Culvert Conveyance Analysis
Alternative 3, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					25							0.747	0.013	180.0	2.7%	900	4.68	2.975	3.66	0.82	536	25.1%
Section C	ADDHYD 906					25							2.214	0.013	8.7	2.4%	1050	4.89	4.230	4.67	0.03	823	52.3%
Section E	ADDHYD 913					25							0.427	0.024	15.9	0.5%	900	1.09	0.693	1.08	0.25	750	61.6%
Section F	ADDHYD 912					25							0.484	0.024	9.4	0.5%	900	1.09	0.693	1.09	0.14	786	69.8%
Sectoin G	ADDHYD 921					25							0.539	0.024	14.2	0.5%	900	1.09	0.693	1.09	0.22	819	77.7%
Section H	ADDHYD 922					25							0.569	0.024	7.8	0.5%	900	1.09	0.693	1.09	0.12	835	82.1%
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.024	3.0	1.0%	985	1.64	1.247	1.64	0.03	1613	372.7%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 3, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	435	270.3%
Section B	NASHYD 1052					100							0.264	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	360	163.2%
Section C	NASHYD 1053					100							0.183	0.013	12.1	2.4%	300	2.12	0.150	2.12	0.10	323	122.2%
Section E	ADDHYD 908					100							5.061	0.024	7.8	1.5%	800	1.73	0.868	1.73	0.08	1549	582.8%
Section F	ADDHYD 915					100							5.628	0.024	9.6	1.5%	800	1.73	0.868	1.73	0.09	1612	648.1%
Section G	ADDHYD 917					100							6.043	0.024	9.0	1.5%	900	1.87	1.189	1.87	0.08	1655	508.3%
Section H	ADDHYD 919					100							6.407	0.024	7.5	1.5%	900	1.87	1.189	1.87	0.07	1692	538.9%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.013	75.0	1.4%	900	3.37	2.142	2.97	0.42	636	39.7%

Driveway Culvert Conveyance Analysis
Alternative 3, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					100							1.033	0.013	180.0	2.7%	900	4.68	2.975	4.00	0.75	605	34.7%
Section C	ADDHYD 906					100							3.074	0.013	8.7	2.4%	1050	4.89	4.230	4.89	0.03	931	72.7%
Section E	ADDHYD 913					100							0.484	0.024	15.9	0.5%	900	1.09	0.693	1.09	0.24	786	69.8%
Section F	ADDHYD 912					100							0.569	0.024	9.4	0.5%	900	1.09	0.693	1.09	0.14	835	82.1%
Sectoin G	ADDHYD 921					100							0.652	0.024	14.2	0.5%	900	1.09	0.693	1.09	0.22	879	94.0%
Section H	ADDHYD 922					100							0.696	0.024	7.8	0.5%	**900**	1.09	0.693	1.09	0.12	901	**100.4%**
West Side of Town Line																							
Section J	ADDHYD 911					100							7.533	0.024	3.0	1.0%	**985**	1.64	1.247	1.64	0.03	1933	**603.9%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 4, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	403	**219.3%**
Section B	NASHYD 1052					5							0.116	0.024	115.6	2.8%	300	1.24	0.088	1.24	1.55	333	**132.3%**
Section C	NASHYD 1053					5							0.071	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	285	87.5%
Section E	ADDHYD 908					5							0.838	0.024	7.8	1.5%	800	1.73	0.868	1.73	0.08	789	96.5%
Section F	ADDHYD 915					5							1.059	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	861	**121.9%**
Section G	ADDHYD 917					5							1.22	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	908	**102.6%**
Section H	ADDHYD 919					5							1.368	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	948	**115.1%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.024	75.0	1.4%	900	1.82	1.160	1.51	0.83	582	31.3%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 4, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					5							0.386	0.024	180.0	2.7%	900	2.53	1.611	1.96	1.53	526	24.0%
Section C	STANDHYD 1022					5							0.036	0.024	8.7	2.4%	900	2.39	1.519	0.99	0.15	221	2.4%
Section E	STANDHYD 1091					5							0.073	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	387	91.5%
Section F	ADDHYD 912					5							0.109	0.024	9.4	0.5%	400	0.63	0.080	0.63	0.25	450	**136.6%**
Sectoin G	ADDHYD 921					5							0.143	0.024	14.2	1.0%	400	0.90	0.113	0.90	0.26	437	**126.8%**
Section H	ADDHYD 922					5							0.162	0.024	7.8	2.0%	400	1.27	0.160	1.27	0.10	402	**101.5%**
West Side of Town Line																							
Section J	ADDHYD 911					5							1.76	0.024	3.0	1.0%	985	1.64	1.247	1.64	0.03	1120	**141.1%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 4, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	486	**362.9%**
Section B	NASHYD 1052					25							0.192	0.024	115.6	2.8%	**300**	1.24	0.088	1.24	1.55	402	**219.1%**
Section C	NASHYD 1053					25							0.118	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	345	**145.4%**
Section E	ADDHYD 908					25							2.293	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	1151	**264.0%**
Section F	ADDHYD 915					25							2.621	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	1210	**301.8%**
Section G	ADDHYD 917					25							2.84	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	1247	**238.9%**
Section H	ADDHYD 919					25							3.06	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	1282	**257.4%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.024	75.0	1.4%	900	1.82	1.160	1.74	0.72	708	52.8%

Driveway Culvert Conveyance Analysis
Alternative 4, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					25							0.691	0.024	180.0	2.7%	900	2.53	1.611	2.29	1.31	655	42.9%
Section C	STANDHYD 1022					25							0.057	0.024	8.7	2.4%	900	2.39	1.519	1.12	0.13	263	3.8%
Section E	STANDHYD 1091					25							0.117	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	462	146.7%
Section F	ADDHYD 912					25							0.174	0.024	9.4	0.5%	400	0.63	0.080	0.63	0.25	536	218.1%
Sectoin G	ADDHYD 921					25							0.229	0.024	14.2	1.0%	400	0.90	0.113	0.90	0.26	521	203.0%
Section H	ADDHYD 922					25							0.259	0.024	7.8	2.0%	400	1.27	0.160	1.27	0.10	480	162.4%
West Side of Town Line																							
Section J	ADDHYD 911					25							3.837	0.024	3.0	1.0%	985	1.64	1.247	1.64	0.03	1501	307.6%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 4, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	548	**499.0%**
Section B	NASHYD 1052					100							0.264	0.024	115.6	2.8%	**300**	1.24	0.088	1.24	1.55	453	**301.2%**
Section C	NASHYD 1053					100							0.183	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	407	**225.5%**
Section E	ADDHYD 908					100							3.966	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	1413	**456.7%**
Section F	ADDHYD 915					100							4.549	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	1488	**523.8%**
Section G	ADDHYD 917					100							4.957	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	1537	**416.9%**
Section H	ADDHYD 919					100							5.322	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	1578	**447.6%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.024	75.0	1.4%	900	1.82	1.160	1.82	0.69	801	73.3%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 4, 1:100-Year Storm

Version Number: 1 Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					100							0.968	0.024	180.0	2.7%	900	2.53	1.611	2.51	1.19	743	60.1%
Section C	STANDHYD 1022					100							0.084	0.024	8.7	2.4%	900	2.39	1.519	1.24	0.12	304	5.5%
Section E	STANDHYD 1091					100							0.174	0.024	15.9	0.5%	**400**	0.63	0.080	0.63	0.42	536	**218.1%**
Section F	ADDHYD 912					100							0.259	0.024	9.4	0.5%	**400**	0.63	0.080	0.63	0.25	622	**324.7%**
Sectoin G	ADDHYD 921					100							0.342	0.024	14.2	1.0%	**400**	0.90	0.113	0.90	0.26	606	**303.2%**
Section H	ADDHYD 922					100							0.386	0.024	7.8	2.0%	**400**	1.27	0.160	1.27	0.10	557	**242.0%**
West Side of Town Line																							
Section J	ADDHYD 911					100							6.217	0.024	3.0	1.0%	**985**	1.64	1.247	1.64	0.03	1798	**498.4%**

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 5, 1:5-Year Storm

Version Number: 1 Version Date: July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	403	**219.3%**
Section B	NASHYD 1052					5							0.116	0.024	115.6	2.8%	300	1.24	0.088	1.24	1.55	333	**132.3%**
Section C	NASHYD 1053					5							0.071	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	285	87.5%
Section E	ADDHYD 913					5							0.494	0.024	7.8	1.5%	800	1.73	0.868	1.68	0.08	647	56.9%
Section F	ADDHYD 915					5							0.519	0.024	9.6	1.5%	800	1.73	0.868	1.70	0.09	659	59.8%
Section G	ADDHYD 917					5							0.549	0.024	9.0	1.5%	900	1.87	1.189	1.72	0.09	673	46.2%
Section H	ADDHYD 919					5							0.584	0.024	7.5	1.5%	900	1.87	1.189	1.75	0.07	689	49.1%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.024	75.0	1.4%	900	1.82	1.160	1.51	0.83	582	31.3%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 5, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					5							0.416	0.024	180.0	2.7%	900	2.53	1.611	2.00	1.50	541	25.8%
Section C	ADDHYD 906					5							1.232	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	832	81.1%
Section E	ADDHYD 1091					5							0.073	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	387	91.5%
Section F	ADDHYD 912					5							0.109	0.024	9.4	0.5%	400	0.63	0.080	0.63	0.25	450	**136.6%**
Sectoin G	ADDHYD 921					5							0.143	0.024	14.2	1.0%	400	0.90	0.113	0.90	0.26	437	**126.8%**
Section H	ADDHYD 922					5							0.162	0.024	7.8	2.0%	400	1.27	0.160	1.27	0.10	402	**101.5%**
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.024	3.0	1.0%	**985**	1.64	1.247	1.64	0.03	1291	**206.0%**

Driveway Culvert Conveyance Analysis
Alternative 5, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	486	**362.9%**
Section B	NASHYD 1052					25							0.192	0.024	115.6	2.8%	**300**	1.24	0.088	1.24	1.55	402	**219.1%**
Section C	NASHYD 1053					25							0.118	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	345	**145.4%**
Section E	ADDHYD 913					25							0.878	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	803	**101.1%**
Section F	ADDHYD 915					25							0.927	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	820	**106.7%**
Section G	ADDHYD 917					25							0.977	0.024	9.0	1.5%	900	1.87	1.189	1.87	0.08	836	82.2%
Section H	ADDHYD 919					25							1.055	0.024	7.5	1.5%	900	1.87	1.189	1.87	0.07	860	88.7%
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					25							0.613	0.024	75.0	1.4%	900	1.82	1.160	1.74	0.72	708	52.8%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 5, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					25							0.747	0.024	180.0	2.7%	900	2.53	1.611	2.34	1.28	674	46.4%
Section C	ADDHYD 906					25							2.214	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	1036	145.7%
Section E	ADDHYD 1091					25							0.117	0.024	15.9	0.5%	400	0.63	0.080	0.63	0.42	462	146.7%
Section F	ADDHYD 912					25							0.174	0.024	9.4	0.5%	400	0.63	0.080	0.63	0.25	536	218.1%
Sectoin G	ADDHYD 921					25							0.229	0.024	14.2	1.0%	400	0.90	0.113	0.90	0.26	521	203.0%
Section H	ADDHYD 922					25							0.259	0.024	7.8	2.0%	400	1.27	0.160	1.27	0.10	480	162.4%
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.024	3.0	1.0%	985	1.64	1.247	1.64	0.03	1613	372.7%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 5, 1:100-Year Storm

Version Number:	1	Version Date:	July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.024	37.2	1.0%	**300**	0.75	0.053	0.75	0.83	548	**499.0%**
Section B	NASHYD 1052					100							0.264	0.024	115.6	2.8%	**300**	1.24	0.088	1.24	1.55	453	**301.2%**
Section C	NASHYD 1053					100							0.183	0.024	12.1	2.4%	300	1.15	0.081	1.15	0.18	407	**225.5%**
Section E	ADDHYD 913					100							1.233	0.024	7.8	1.5%	**800**	1.73	0.868	1.73	0.08	912	**142.0%**
Section F	ADDHYD 915					100							1.28	0.024	9.6	1.5%	**800**	1.73	0.868	1.73	0.09	925	**147.4%**
Section G	ADDHYD 917					100							1.34	0.024	9.0	1.5%	**900**	1.87	1.189	1.87	0.08	941	**112.7%**
Section H	ADDHYD 919					100							1.411	0.024	7.5	1.5%	**900**	1.87	1.189	1.87	0.07	959	**118.7%**
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.024	75.0	1.4%	900	1.82	1.160	1.82	0.69	801	73.3%

TATHAM ENGINEERING

Driveway Culvert Conveyance Analysis
Alternative 5, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Section B	ADDHYD 902					100							1.033	0.024	180.0	2.7%	900	2.53	1.611	2.53	1.18	762	64.1%
Section C	ADDHYD 906					100							3.074	0.024	8.7	2.4%	900	2.39	1.519	2.39	0.06	1172	**202.4%**
Section E	ADDHYD 1091					100							0.174	0.024	15.9	0.5%	**400**	0.63	0.080	0.63	0.42	536	**218.1%**
Section F	ADDHYD 912					100							0.259	0.024	9.4	0.5%	**400**	0.63	0.080	0.63	0.25	622	**324.7%**
Sectoin G	ADDHYD 921					100							0.342	0.024	14.2	1.0%	**400**	0.90	0.113	0.90	0.26	606	**303.2%**
Section H	ADDHYD 922					100							0.386	0.024	7.8	2.0%	**400**	1.27	0.160	1.27	0.10	557	**242.0%**
West Side of Town Line																							
Section J	ADDHYD 911					100							7.533	0.024	3.0	1.0%	**985**	1.64	1.247	1.64	0.03	1933	**603.9%**

TATHAM ENGINEERING

Storm Sewer Design Sheet
Alternative 6, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					5							0.116	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	320	**118.8%**
Section B	NASHYD 1052					5							0.116	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	265	71.7%
Section C	NASHYD 1053					5							0.071	0.013	12.1	2.4%	300	2.12	0.150	1.96	0.10	227	47.4%
Section E	ADDHYD 908					5							1.787	0.013	91.3	0.7%	1350	3.03	4.336	2.70	0.56	968	41.2%
	-					5							1.787	0.013	99.6	1.9%	1350	5.09	7.279	3.96	0.42	797	24.5%
Section F	ADDHYD 915					5							1.961	0.013	97.6	2.2%	1350	5.47	7.826	4.28	0.38	803	25.1%
Section G	ADDHYD 917					5							2.101	0.013	99.4	2.1%	1350	5.35	7.661	4.29	0.39	831	27.4%
	-					5							2.101	0.013	100.5	1.6%	1350	4.72	6.751	3.91	0.43	871	31.1%
Section H	ADDHYD 919					5							2.247	0.013	112.0	1.2%	1500	4.31	7.613	3.52	0.53	949	29.5%
	ADDHYD 920					5							2.425	0.013	9.8	4.4%	1500	8.38	14.811	5.87	0.03	761	16.4%

TATHAM ENGINEERING

Storm Sewer Design Sheet
Alternative 6, 1:5-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					5							0.363	0.013	75.0	1.4%	900	3.37	2.142	2.36	0.53	462	16.9%
Section B	ADDHYD 902					5							0.416	0.013	180.0	2.7%	900	4.68	2.975	3.13	0.96	430	14.0%
Section C	ADDHYD 906					5							1.232	0.013	8.7	2.4%	1050	4.89	4.230	3.98	0.04	661	29.1%
Section E	STANDHYD 1091					5							0.073	0.013	15.9	0.5%	375	1.12	0.124	1.09	0.24	307	58.9%
Section F	ADDHYD 912					5							0.109	0.013	9.4	0.5%	375	1.12	0.124	1.12	0.14	357	87.9%
Sectoin G	ADDHYD 921					5							0.143	0.013	14.2	1.0%	375	1.59	0.175	1.59	0.15	347	81.6%
Section H	ADDHYD 922					5							0.162	0.013	7.8	2.0%	375	2.25	0.248	2.25	0.06	320	65.3%
West Side of Town Line																							
Section J	ADDHYD 911					5							2.57	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	1026	111.6%

TATHAM ENGINEERING

Storm Sewer Design Sheet
Alternative 6, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					25							0.192	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	386	196.6%
Section B	NASHYD 1052					25							0.192	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	320	118.7%
Section C	NASHYD 1053					25							0.118	0.013	12.1	2.4%	300	2.12	0.150	2.12	0.10	274	78.8%
Section E	ADDHYD 908					25							3.206	0.013	91.3	0.7%	1350	3.03	4.336	3.03	0.50	1205	73.9%
	-					25							3.206	0.013	99.6	1.9%	1350	5.09	7.279	4.63	0.36	992	44.0%
Section F	ADDHYD 915					25							3.538	0.013	97.6	2.2%	1350	5.47	7.826	5.02	0.32	1002	45.2%
Section G	ADDHYD 917					25							3.84	0.013	99.4	2.1%	1350	5.35	7.661	5.05	0.33	1042	50.1%
	-					25							3.84	0.013	100.5	1.6%	1350	4.72	6.751	4.60	0.36	1092	56.9%
Section H	ADDHYD 919					25							4.107	0.013	112.0	1.2%	1500	4.31	7.613	4.14	0.45	1190	53.9%
	ADDHYD 920					25							4.374	0.013	9.8	4.4%	1500	8.38	14.811	6.89	0.02	949	29.5%

TATHAM ENGINEERING

Storm Sewer Design Sheet
Alternative 6, 1:25-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
South Side of Warminster Sideroad																							
Section A	ADDHYD 901					25							0.613	0.013	75.0	1.4%	900	3.37	2.142	2.72	0.46	563	28.6%
Section B	ADDHYD 902					25							0.747	0.013	180.0	2.7%	900	4.68	2.975	3.66	0.82	536	25.1%
Section C	ADDHYD 906					25							2.214	0.013	8.7	2.4%	1050	4.89	4.230	4.67	0.03	823	52.3%
Section E	STANDHYD 1091					25							0.117	0.013	15.9	0.5%	375	1.12	0.124	1.12	0.24	367	94.4%
Section F	ADDHYD 912					25							0.174	0.013	9.4	0.5%	450	1.27	0.202	1.27	0.12	426	86.3%
Sectoin G	ADDHYD 921					25							0.229	0.013	14.2	1.0%	450	1.79	0.285	1.79	0.13	414	80.3%
Section H	ADDHYD 922					25							0.259	0.013	7.8	2.0%	450	2.54	0.403	2.54	0.05	381	64.2%
West Side of Town Line																							
Section J	ADDHYD 911					25							4.649	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	1281	**201.9%**

TATHAM ENGINEERING

Storm Sewer Design Sheet
Alternative 6, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
North Side of Warminster Sideroad																							
Section A	NASHYD 1052					100							0.264	0.013	37.2	1.0%	300	1.38	0.098	1.38	0.45	435	**270.3%**
Section B	NASHYD 1052					100							0.264	0.013	115.6	2.8%	300	2.29	0.162	2.29	0.84	360	**163.2%**
Section C	NASHYD 1053					100							0.183	0.013	12.1	2.4%	375	2.46	0.272	2.46	0.08	323	67.4%
Section E	ADDHYD 908					100							5.371	0.013	91.3	0.7%	1350	3.03	4.336	3.03	0.50	1462	**123.9%**
	-					100							5.371	0.013	99.6	1.9%	1350	5.09	7.279	5.09	0.33	1204	73.8%
Section F	ADDHYD 915					100							5.938	0.013	97.6	2.2%	1350	5.47	7.826	5.47	0.30	1217	75.9%
Section G	ADDHYD 917					100							6.353	0.013	99.4	2.1%	1350	5.35	7.661	5.35	0.31	1258	82.9%
	-					100							6.353	0.013	100.5	1.6%	1350	4.72	6.751	4.72	0.36	1319	94.1%
Section H	ADDHYD 919					100							6.717	0.013	112.0	1.2%	1500	4.31	7.613	4.31	0.43	1431	88.2%
	ADDHYD 920					100							7.192	0.013	9.8	4.4%	1500	8.38	14.811	7.88	0.02	1144	48.6%

TATHAM ENGINEERING

Storm Sewer Design Sheet
Alternative 6, 1:100-Year Storm

Version Number: 1 **Version Date:** July 2022

Project Information

Warminster Sideroad Drainage Improvements	322863

Drawing Reference

Overall Drainage Plan (OPD-1)	Aug 2022

Prepared By

ARO	Aug 2022

Reviewed By

DRT	Aug 2022

Municipality

Township of Oro-Medonte

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	22.50	-0.73	-
5	29.90	-0.73	-
10	34.80	-0.72	-
25	40.90	-0.72	-
50	45.50	-0.72	-
100	50.00	-0.72	-

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
South Side of Warminster Sidreroad																							
Section A	ADDHYD 901					100							0.85	0.013	75.0	1.4%	900	3.37	2.142	2.97	0.42	636	39.7%
Section B	ADDHYD 902					100							1.033	0.013	180.0	2.7%	900	4.68	2.975	4.00	0.75	605	34.7%
Section C	ADDHYD 906					100							3.074	0.013	8.7	2.4%	1050	4.89	4.230	4.89	0.03	931	72.7%
Section E	STANDHYD 1091					100							0.174	0.013	15.9	0.5%	450	1.27	0.202	1.27	0.21	426	86.3%
Section F	ADDHYD 912					100							0.259	0.013	9.4	0.5%	525	1.40	0.304	1.40	0.11	494	85.2%
Sectoin G	ADDHYD 921					100							0.342	0.013	14.2	1.0%	525	1.99	0.430	1.99	0.12	482	79.5%
Section H	ADDHYD 922					100							0.386	0.013	7.8	2.0%	450	2.54	0.403	2.54	0.05	443	95.7%
West Side of Town Line																							
Section J	ADDHYD 911					100							7.533	0.013	3.0	1.0%	985	3.02	2.303	3.02	0.02	1536	327.1%

Appendix G: Preliminary Construction Cost Estimate

WARMINSTER SIDEROAD DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE
OPINION OF PROBABLE CONSTRUCTION COSTS
SEPTEMBER, 2023

TATHAM ENGINEERING

PROJECT #323863

ALTERNATIVE 1: WARMINSTER SIDEROAD FROM 1920 WARMINSTER SIDEROAD TO TOWN LINE

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	15	$1,500.00	$22,500.00
	SUBTOTAL: GENERAL WORKS				**$42,500.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	915	$125.00	$114,375.00
2.02	Remove & Dispose of Gravel Driveways	ea	6	$500.00	$3,000.00
2.03	Remove & Dispose of Existing Culvert	m	350	$105.00	$36,750.00
2.04	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	662	$32.00	$21,190.40
2.05	400 mm CSP Culvert	m	108	$500.00	$54,000.00
2.06	450 mm CSP Culvert	m	7	$525.00	$3,675.00
2.07	500 mm CSP Culvert	m	60	$600.00	$35,700.00
2.08	550 mm CSP Culvert	m	8	$800.00	$6,000.00
2.09	800 mm CSP Culvert	m	68	$1,000.00	$68,000.00
2.10	900 mm CSP Culvert	m	83	$1,125.00	$93,375.00
2.11	910 x 660 mm CSPA Culvert	m	13	$1,200.00	$15,000.00
2.12	600 x 600 mm Ditch Inlet Catchbasin	ea	1	$2,775.00	$4,800.00
2.13	525 mm HDPE Storm Sewer	m	60	$590.00	$35,400.00
2.14	Reinstate Gravel Driveways	ea	6	$500.00	$3,000.00
2.15	Reinstate Asphalt Roadway/Driveways	sq.m	662	$66.00	$43,705.20
2.16	R10 Rip Rap	sq.m	672	$75.00	$50,400.00
2.17	Heavy Duty Silt Fence	m	1,220	$30.00	$36,600.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$625,000.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	229	$40.00	$9,150.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	5	$300.00	$1,500.00
	SUBTOTAL: PROVISIONAL ITEMS				**$10,700.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$203,500.00
4.02	Protect Utilities/Services Cost			10%	$63,900.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$267,400.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$945,600.00**

WARMINSTER SIDEROAD DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE
OPINION OF PROBABLE CONSTRUCTION COSTS
SEPTEMBER, 2023

TATHAM ENGINEERING

PROJECT #323863

ALTERNATIVE 2: WARMINSTER SIDEROAD FROM 1920 WARMINSTER SIDEROAD TO TOWN LINE

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	10	$1,500.00	$15,000.00
	SUBTOTAL: GENERAL WORKS				**$35,000.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	610	$125.00	$76,250.00
2.02	Clearing and Grubbing (Tree Removal)	sq.m	1,220	$35.00	$42,700.00
2.03	Remove & Dispose of Gravel Driveways	ea	4	$500.00	$2,000.00
2.04	Remove & Dispose of Existing Culvert	m	190	$105.00	$19,950.00
2.05	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	313	$32.00	$10,003.20
2.06	1150 x 820 mm CSPA Culvert	m	190	$1,560.00	$296,400.00
2.07	1880 x 1260 mm CSPA Culvert	m	13	$2,775.00	$34,965.00
2.08	910 x 660 mm CSPA Culvert	m	13	$1,200.00	$15,000.00
2.09	Reinstate Gravel Driveways	ea	4	$500.00	$2,000.00
2.10	Reinstate Asphalt Roadway/Driveways	sq.m	313	$66.00	$20,631.60
2.11	R10 Rip Rap	sq.m	320	$75.00	$24,000.00
2.12	Heavy Duty Silt Fence	m	610	$30.00	$18,300.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$562,200.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	700	$40.00	$28,000.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	5	$300.00	$1,500.00
	SUBTOTAL: PROVISIONAL ITEMS				**$29,500.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$188,100.00
4.02	Utlities/Services Relocation Cost			30%	$188,100.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$376,200.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$1,002,900.00**

WARMINSTER SIDEROAD DRAINAGE IMPROVEMENTS
TOWNSHIP OF ORO-MEDONTE
OPINION OF PROBABLE CONSTRUCTION COSTS
SEPTEMBER, 2023

PROJECT #323863

ALTERNATIVE 3: WARMINSTER SIDEROAD FROMT 1920 WARMINSTER SIDEROAD TO TOWN LINE

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	10	$1,500.00	$15,000.00
	SUBTOTAL: GENERAL WORKS				**$35,000.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	610	$125.00	$76,250.00
2.02	Clearing and Grubbing (Tree Removal)	sq.m	1,220	$35.00	$42,700.00
2.03	Remove & Dispose of Gravel Driveways	ea	2	$500.00	$1,000.00
2.04	Remove & Dispose of Existing Culvert	m	160	$105.00	$16,800.00
2.05	Remove & Dispose of Existing Storm Sewer and Drains	m	60	$105.00	$6,300.00
2.06	Remove & Dispose of Existing Catchbasin Inlet Sturctures	ea	1	$675.00	$675.00
2.07	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	350	$32.00	$11,187.20
2.08	1030 x 740 mm CSPA Culvert	m	200	$1,350.00	$270,000.00
2.09	1880 x 1260 mm CSPA Culvert	m	13	$2,775.00	$34,965.00
2.10	910 x 660 mm CSPA Culvert	m	13	$1,200.00	$15,000.00
2.11	Reinstate Gravel Driveways	ea	2	$500.00	$1,000.00
2.12	Reinstate Asphalt Roadway/Driveways	sq.m	350	$66.00	$23,073.60
2.13	R10 Rip Rap	sq.m	352	$75.00	$26,400.00
2.14	Heavy Duty Silt Fence	m	610	$30.00	$18,300.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$543,700.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	1,500	$40.00	$60,000.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	5	$300.00	$1,500.00
	SUBTOTAL: PROVISIONAL ITEMS				**$61,500.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$192,100.00
4.02	Utlities/Services Relocation Cost			30%	$192,100.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$384,200.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$1,024,400.00**

ALTERNATIVE 4: WARMINSTER SIDEROAD FROMT 1920 WARMINSTER SIDEROAD TO TOWN LINE

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	2	$1,500.00	$3,000.00
	SUBTOTAL: GENERAL WORKS				**$23,000.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	SWMF Excavation, Grading & Plantings	ha	0.7	$250,000.00	$175,000.00
2.02	Excavate, Grade, Topsoil, & Seed Conveyance Swale	m	395	$125.00	$49,375.00
2.03	Clearing and Grubbing (Tree Removal)	sq.m	7,700	$35.00	$269,500.00
2.04	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	28	$32.00	$883.20
2.05	1050 mm Dia Storm Sewer	m	85	$1,440.00	$122,400.00
2.06	1150 x 820 mm CSPA Culvert	m	12	$1,560.00	$18,720.00
2.07	910 x 660 mm CSPA Culvert	m	13	$1,200.00	$15,000.00
2.08	Reinstate Asphalt Roadway/Driveways	sq.m	28	$66.00	$1,821.60
2.09	R10 Rip Rap	sq.m	70	$75.00	$5,250.00
2.10	Heavy Duty Silt Fence	m	1,090	$30.00	$32,700.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$690,700.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	11,300	$40.00	$452,000.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	1	$300.00	$300.00
	SUBTOTAL: PROVISIONAL ITEMS				**$452,300.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$349,800.00
4.02	Utlities/Services Relocation Cost			15%	$174,900.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$524,700.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$1,690,700.00**

ALTERNATIVE 5: WARMINSTER SIDEROAD FROMT 1920 WARMINSTER SIDEROAD TO TOWN LINE

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	2	$1,500.00	$3,000.00
	SUBTOTAL: GENERAL WORKS				**$23,000.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Conveyance Ditch	m	700	$125.00	$87,500.00
2.02	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	68	$32.00	$2,163.20
2.03	900 mm Dia. Culvert	m	113	$1,125.00	$127,125.00
2.04	Concrete Headwall - 900 mm Dia.	ea	2	$44,100.00	$88,200.00
2.05	910 x 660 mm CSPA Culvert	m	13	$1,200.00	$15,000.00
2.06	Reinstate Asphalt Roadway/Driveways	sq.m	68	$66.00	$4,461.60
2.07	R10 Rip Rap	sq.m	70	$75.00	$5,250.00
2.08	Heavy Duty Silt Fence	m	1,200	$30.00	$36,000.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$365,700.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	1,700	$40.00	$68,000.00
3.02	Protect Underground Services	m	65	$500.00	$32,500.00
3.03	Remove, Salvage, & Reinstate Existing Signs	ea	2	$300.00	$600.00
	SUBTOTAL: PROVISIONAL ITEMS				**$101,100.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$147,000.00
4.02	Utlities/Services Relocation Cost			15%	$73,500.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$220,500.00**
5.0	**PROPERTYACQUISITION**				
5.01	12 m Wide Parcel Through 1922 Warminster Sideroad	LS	1	$50,000.00	$50,000.00
5.02	12 m Wide Parcel Through 3320 Town Line	LS	1	$40,000.00	$40,000.00
	SUBTOTAL: PROPERTY ACQUISITION				**$90,000.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$800,300.00**

ALTERNATIVE 6: WARMINSTER SIDEROAD FROMT 1920 WARMINSTER SIDEROAD TO TOWN LINE

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
1.0	**GENERAL WORKS**				
1.01	Mobilization & Demobilization	LS	1	$20,000.00	$20,000.00
1.02	Traffic Control	ea setup	15	$1,500.00	$22,500.00
	SUBTOTAL: GENERAL WORKS				**$42,500.00**
2.0	**DRAINAGE IMPROVEMENTS**				
2.01	Excavate, Grade, Topsoil, & Seed Roadside Ditch	m	610	$125.00	$76,250.00
2.02	Clearing and Grubbing (Tree Removal)	sq.m	1,220	$35.00	$42,700.00
2.03	Remove & Dispose of Gravel Driveways	ea	4	$500.00	$2,000.00
2.04	Remove & Dispose of Existing Storm Sewer and Drains	m	55	$105.00	$5,775.00
2.05	Remove & Dispose of Existing Culvert	m	190	$105.00	$19,950.00
2.06	Remove & Dispose of Existing Asphalt Roadway/Driveways (Full Depth, Including Granulars)	sq.m	1,228	$32.00	$39,283.20
2.07	1350 mm Dia. Storm Sewer	m	490	$2,020.00	$989,800.00
2.08	1500 mm Dia. Storm Sewer	m	125	$2,330.00	$291,250.00
2.09	600 mm x 600 mm Single Catchbasin & Lead	ea	19	$4,410.00	$83,790.00
2.10	2400 mm Dia. Maintenance Hole	ea	3	$27,210.00	$81,630.00
2.11	2400 mm Dia. Ditch Inlet Maintenance Hole	ea	2	$32,710.00	$65,420.00
2.12	Reinstate Gravel Driveways	ea	4	$500.00	$2,000.00
2.13	Reinstate Asphalt Roadway/Driveways	sq.m	1,228	$66.00	$81,021.60
2.14	R10 Rip Rap	sq.m	48	$75.00	$3,600.00
2.15	Heavy Duty Silt Fence	m	610	$30.00	$18,300.00
	SUBTOTAL: DRAINAGE IMPROVEMENTS				**$1,802,800.00**
3.0	**PROVISIONAL ITEMS**				
3.01	Remove & Dispose of Excess Material	cu.m	1,200	$40.00	$48,000.00
3.02	Remove, Salvage, & Reinstate Existing Signs	ea	5	$300.00	$1,500.00
	SUBTOTAL: PROVISIONAL ITEMS				**$49,500.00**
4.0	**CONSTRUCTION ALLOWANCE/CONTINGENCY**				
4.01	Construction Contingency			30%	$568,500.00
4.02	Utlities/Services Relocation Cost			30%	$568,500.00
	SUBTOTAL: CONSTRUCTION ALLOWANCE/CONTINGENCY				**$1,137,000.00**
	TOTAL TENDER PRICE (EXCLUDING HST, INCL. CONTINGENCY & PROVISIONAL ITEMS):				**$3,031,800.00**

Appendix H:
Notice of Study Commencement Documents

Warminster Sideroad Drainage Improvements
Municipal Class Environmental Assessment
Notice of Study Commencement

Background
The Township of Oro-Medonte has initiated an environmental assessment following Schedule B of the Municipal Class Environmental Assessment Process to establish the preferred method to address drainage deficiencies, reduce flooding, resolve public safety concerns, and improve maintenance opportunities along Warminster Sideroad from 1920 Warminster Sideroad to Town Line. The study area is shown on the map provided with this notice.

Study Process
This study will be carried out in accordance with the requirements of the *Environmental Assessment Act*. Results from this study will be documented in an environmental assessment project file, which will be submitted to the Ministry for review. At that time, the public, Indigenous communities, and other interested persons will be informed when and where the project file can be reviewed.

The Township is proceeding with a Schedule B Municipal Class Environmental Assessment (EA) to consider the natural, physical, social, cultural, and economic impacts associated with the alternative drainage solutions developed to address the existing drainage deficiencies in the Study Area. The Class EA process includes:

- Establishing the existing drainage conditions and deficiencies in the study area (Problem Statement);
- Developing alternative solutions to address the existing drainage deficiencies (Opportunity);
- Identifying the potential impacts of each alternative solution on noted environments and possible mitigating measures;
- Conducting public and agency consultation; and
- An assessment and evaluation of the alternatives culminating in a preferred solution.

Consultation
Members of the public, agencies, Indigenous communities, and other interested persons are encouraged to actively participate in the planning of this undertaking by contacting staff directly with information, comments or questions.

A Public Information Centre will be scheduled to provide an opportunity for the public and stakeholders to review the alternative drainage solutions under consideration, and to provide feedback and comments. Additional notices indicating the date and location of the PIC will be circulated. Upon completion of the Study, a Final Class EA Report documenting the Preferred Solution will be prepared for public/agency review and comment.

Project Contacts
If you would like to be added to or removed from our project mailing list or have project-related questions, please contact the Owner and/or Consultant as noted below:

Owner
The Township of Oro-Medonte
148 Line 7 South
Oro-Medonte, ON L0L 2E0
Justin Metras
Manager, Infrastructure and Capital Works
jmetras@oro-medonte.ca
(705) 487-2171 (x 2125)

Consultant
Tatham Engineering Limited
10 Diana Drive, Unit 7
Orillia, On L3V 8K8
Alysse Overholt, P.Eng.
Intermediate Engineer
aloverholt@tathameng.com
(705) 325-1753 (x 2141)

All personal information included in a submission – such as name, address, telephone number and property location – is collected, maintained and disclosed for the purpose of transparency and consultation. The information is collected under the authority of the *Environmental Assessment Act* or is collected and maintained for the purpose of creating a record that is available to the general public as described in s.37 of the *Freedom of Information and Protection of Privacy Act*. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

This notice issued June 21, 2023

Warminster Sideroad Drainage Improvements Municipal Class EA Study

Key Plan

Township of Oro-Medonte
Proud Heritage, Exciting Future

AGENCY STAKEHOLDER GROUP	DELIVERY METHOD	DELIVERY CONFIRMED
Alderville First Nations Chief	Email	
Chippewas of Beausoleil Chief	Mail	
Chippewas of Georgina Island Chief	Mail	
Chippewas of Nawash Unceded First Nation	Email	
Chippewas of Rama First Nation	Email	
Curve Lake First Nations	Email	
Ducks Unlimited	Mail	
Fisheries and Oceans Canada - Fish and Fish Habitat Protection Program	Mail	
Georgian Triangle Development Institue	Email	
Great Lakes Métis Council	Email	
Hiawatha First Nations Chief	Mail	
Historic Saugeen Métis	Email	✓
Huronne-Wendat Nation	Email	
Indigenous and Northern Affairs Canada	Email	
Infrastructure Ontario	Email	
Ministry of Indigenous Affairs	Mail	
Ministry of Municipal Affairs and Housing	Mail	
Ministry of the Environment, Conservation and Parks	Email	✓
Ministry of Tourism, Culture & Sport	Email	
Ministry of Transportation	Email	
Mississaugas of Scugog Island Chief	Mail	
Nottawasaga Valley Conservation Authority	Email	✓
Ontario Clean Water Agency	Mail	
Ontario Realty Corporation	Mail	
Saugeen First Nation	Email	
Saugeen Ojibway Nation - Environmental Office	Email	
Severn Sound Environmental Association	Email	
Simcoe County	Email	
Simcoe County District School Board	Mail	
Township of Severn	Email	

CATEGORY	ADDRESS	DELIVERED
Resident	1844 Warminster Sideroad	✓
Resident	1852 Warminster Sideroad	✓
Resident	1858 Warminster Sideroad	✓
Resident	1866 Warminster Sideroad	✓
Resident	1872 Warminster Sideroad	✓
Resident	1880 Warminster Sideroad	✓
Resident	1892 Warminster Sideroad	✓
Resident	1896 Warminster Sideroad	✓
Resident	1902 Warminster Sideroad	✓
Resident	1908 Warminster Sideroad	✓
Resident	1912 Warminster Sideroad	✓
Resident	1916 Warminster Sideroad	✓
Resident	1920 Warminster Sideroad	✓
Resident	1922 Warminster Sideroad	✓
Resident	1944 Warminster Sideroad	✓
Resident	1948 Warminster Sideroad	✓
Resident	1958 Warminster Sideroad	✓
Resident	1964 Warminster Sideroad	✓
Resident	1968 Warminster Sideroad	✓
Resident	1978 Warminster Sideroad	✓
Resident	1988 Warminster Sideroad	✓
Resident	1992 Warminster Sideroad	✓
Resident	1996 Warminster Sideroad	✓
Resident	2004 Warminster Sideroad	✓
Resident	2008 Warminster Sideroad	✓
Resident	2012 Warminster Sideroad	✓
Resident	2020 Warminster Sideroad	✓
Resident	2024 Warminster Sideroad	✓
Resident	2030 Warminster Sideroad	✓
Resident	2036 Warminster Sideroad	✓
Resident	2044 Warminster Sideroad	✓
Resident	2050 Warminster Sideroad	✓
Resident	2058 Warminster Sideroad	✓
Resident	1859 Warminster Sideroad	✓
Resident	1865 Warminster Sideroad	✓
Resident	1871 Warminster Sideroad	✓
Resident	1875 Warminster Sideroad	✓
Resident	1885 Warminster Sideroad	✓
Resident	1945 Warminster Sideroad	✓
Resident	1949 Warminster Sideroad	✓
Resident	1959 Warminster Sideroad	✓
Resident	1961 Warminster Sideroad	✓
Resident	1971 Warminster Sideroad	✓
Resident	1981 Warminster Sideroad	✓
Resident	1989 Warminster Sideroad	✓
Resident	1993 Warminster Sideroad	✓
Resident	1999 Warminster Sideroad	✓
Resident	2005 Warminster Sideroad	✓
Resident	2011 Warminster Sideroad	✓
Resident	2017 Warminster Sideroad	✓
Resident	2025 Warminster Sideroad	✓
Resident	2029 Warminster Sideroad	✓
Resident	2033 Warminster Sideroad	✓
Resident	2039 Warminster Sideroad	✓
Resident	2045 Warminster Sideroad	✓
Resident	2049 Warminster Sideroad	✓
Resident	2055 Warminster Sideroad	✓
Resident	2061 Warminster Sideroad	✓