Strohvest Subdivision
Gerber Road
Township of Wellesley
Functional Servicing Report

March 21, 2022

Prepared for:

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Project No.: 161413217

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1.0 INTRODUCTION

1.1 SITE LOCATION

The Strohvest Subdivision (Site) is located at the southwest end of the Village of Wellesley, within the rural area of Region of Waterloo (Region) and the Township of Wellesley (Township). The subject property can be viewed in two stages: the South portion (Stage 1) considered in this Report (10.2 ha.) as the current Stage; and the north portion comprising of the balance of the property (Stage 2) considered as future stage in this Report. The total Site area is approximately 16.4 ha and is bounded by existing developments to the east and north, existing farmed agricultural land to the west and existing Gerber Road to the South. The Proposed Draft Plan (Stage 1) consists of 66 single-family lots, 17 semi-detached lots and 12 multi-family blocks totaling 166 units. The above described are illustrated on Figure 1.0 – Site Location Plan and Proposed Draft Plan – Appendix A.

1.2 BACKGROUND / OVERVIEW

Residential development in Waterloo Region and specifically Wellesley Township has been steady in recent years, with an average of 0.47% growth per year. This residential growth has been occurring primarily in rural communities located in the Township, and most notably the Town of Wellesley. The Region has projected that the residential population within the Town will increase from 11,260 (in 2016) to 12,054 by 2031.

This Report should be read in combination with the Preliminary Functional Servicing Report completed for the Subdivision previously dated May 2017.

In order to develop short- and long-term wastewater servicing strategies for the Town of Wellesley (Town), the Region completed a Wastewater Treatment Master Plan in 2018 that outlines the capacity and improvements needed as the Wellesley Wastewater Treatment Plant (WWTP) ages and population increases. Previous assessments of the WWTP had indicated upgrades required that were ultimately completed in 2018 to improve performance and capacity able to accommodate the expected growth including the Site. The Regional Official Plan shows both Stages 1 and 2 within the Town limits, that said, Stage 1 was identified within the growth plan while Stage 2 was not included.

1.3 PURPOSE OF THE REPORT

The purpose of this Functional Servicing Report (FSR) is to outline how the proposed Strohvest Subdivision can be supplied with adequate services, including sanitary, domestic water, storm drainage, stormwater management (SWM), and utilities. This Report is prepared in support of the Draft Plan Application. Please refer to the Proposed Draft Plan – Appendix A.

Supplementary Reports that should be read in conjunction with this Report includes:

- Geotechnical Report by Stantec dated August, 2021
- Scoped Natural Heritage Report by Stantec Consulting Ltd. dated November, 2021
- Noise Impact Study by Stantec Consulting Ltd. dated August, 2021
- Hydrogeology Report by Stantec Consulting Ltd. dated December, 2021
- Region of Waterloo – 2018 Wastewater Treatment Master Plan by CIMA, 2018
- Preliminary Servicing Feasibility in support of Urban Area Expansion, prepared by Stantec Consulting Ltd., April 2017
- Wellesley WWTP Process and Condition Assessment Final Report by Stantec, 2015
- Region of Waterloo Official Plan

This Report demonstrates that the Strohvest Subdivision lands (Stage 1) can be developed with full municipal servicing, SWM, and utilities to the requirements of the various approval agencies. The Future Stage 2 is also considered in the capacity of the downstream sewers, SWM Facility (SWMF) and water demand to ensure that the development can proceed when desired.

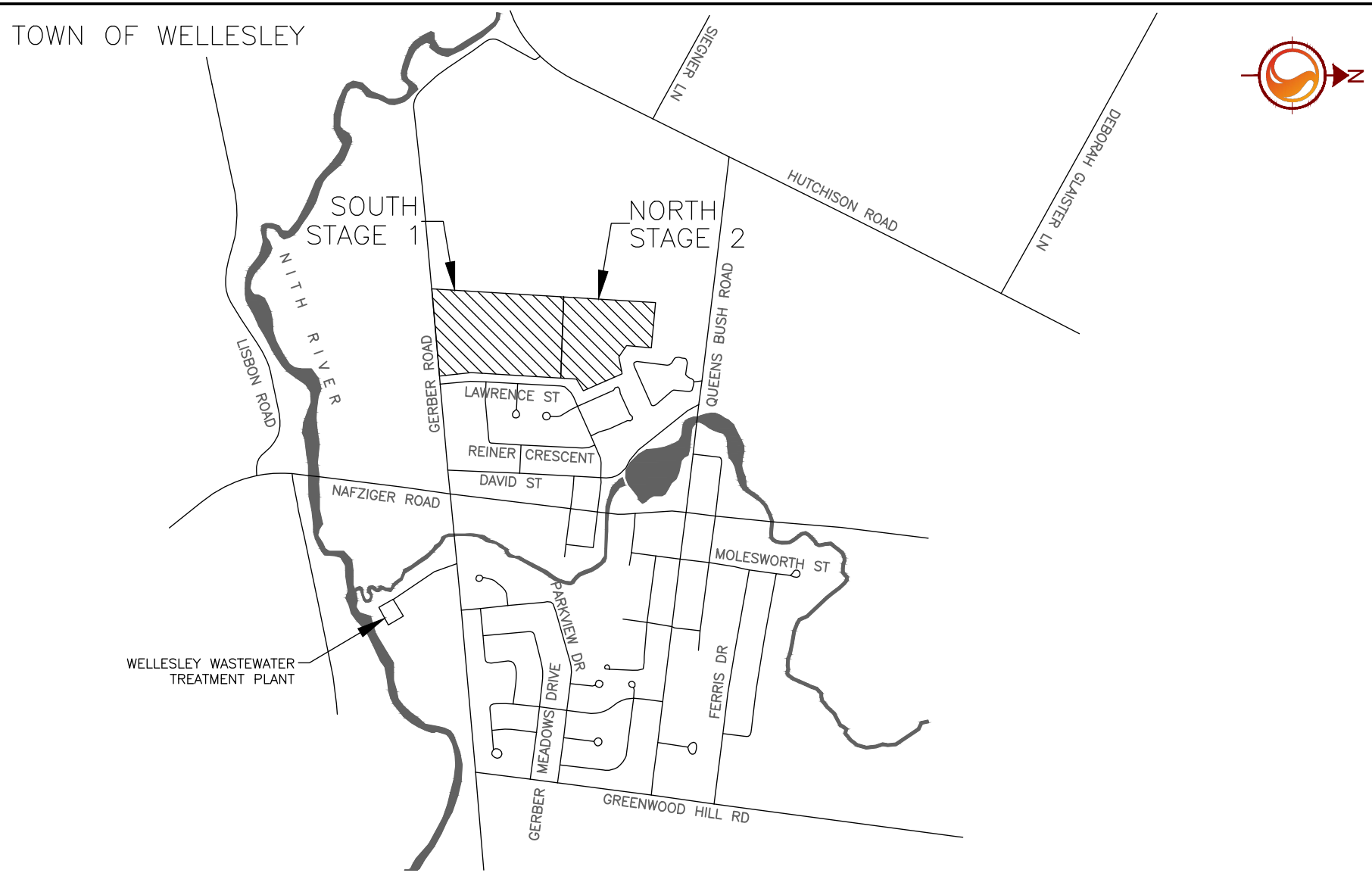
The servicing strategies presented in this Report are conceptual. Detailed engineering drawings (for construction) and a Final SWM Report will be submitted as part of the final engineering design process once the proposed subdivision has received Draft Plan Approval.

1.4 ENVIRONMENTAL ASSESSMENT REQUIREMENTS

Under the procedures set out in the Municipal Class Environmental Assessment Act, projects completed by the private sector through a Planning Act Process are considered as having fulfilled the Class EA requirements, except for some specific Schedule ‘C’ projects that are outlined in the Act.

All of the works required for the Strohvest Subdivision lands are described in the subsequent sections of this Report. The plans, included in this Report, show the location of the proposed sanitary and storm sewers, proposed watermains, as well as grading, utilities and subdivision phasing information. The intent of this Report and, the supplementary Reports, is to ensure that the commenting agencies and the public are made aware of the servicing strategies for the proposed development.

As above, all of the other works, and in particular all of the works required for the Strohvest Subdivision lands, will be completed by the Developer (i.e., by the Private Sector), are clearly described/shown in this Report in support of the Draft Plan, and therefore, is exempt from the Class EA.



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Client/Project
STROHVEST ONTARIO INC.
WELLESLEY PROPERTY

GERBER ROAD, WELLESLEY
TOWNSHIP OF WELLESLEY, ON

Project No.
161413217

Title
SITE LOCATION PLAN

Revision

Date
2022.01.07

Reference Sheet

Figure No.
1

2.0 EXISTING GRADING AND SERVICING

2.1 EXISTING LAND USE AND SITE TOPOGRAPHY

The subject lands are presently used as agricultural lands. A number of large mature trees are present adjacent to Gerber Road and the west property line, surrounding the existing adjacent home.

The topography of the site is relatively flat with gentle hills with elevations ranging from approximately 363.5 m along the west property line to approximately 353.0 m at the south side of the site along Gerber Road. There are localized hills and valleys within the site with slopes ranging from 0.8% to 5%. There are two major existing drainage patterns within the site; the first and largest drains approximately 17.97 ha to a low area along the south property line. This area includes a significant external area from the neighbouring farm field. This area currently is controlled by a 1,200 mm diameter (dia.) culvert under Gerber Road, draining overland to the south and ultimately to the Nith River. The second drains approximately a 2.71 ha area via sheet flow uncontrolled offsite through the northwest corner of the Site. This area then flows via sheet flow through to the existing farm field toward Queens Bush Road. The third drains 2.22 ha of agricultural area in the north-eastern portion of the site draining east to an existing RYCB. This is illustrated on the Existing Conditions Plan No. C-050, and Existing Plan and Profile Drawings for Lawrence Street and Gerber Road included in Appendix C.

2.2 DESIGN CONSTRAINTS AND PROCEDURES

Constraints in designing the road profiles and lot grading are as follows:

- Match existing grades, where possible, to minimize grading and cut/fill quantities and minimize changes to the surface hydrology and hydrogeology of the area
- Accommodating High Groundwater through grading, and 0.6 m vertical separation from underside of footing
- Match existing Gerber Road elevations and roadside swale
- Satisfy the Region of Waterloo / Town of Wellesley requirements for minimum and maximum road grades
- Maintain adequate cover over storm, sanitary sewers and watermain
- Match existing grades along the entire perimeter of the site, including the existing Lawrence Street Subdivision

2.3 PROPOSED ROAD PROFILES AND OVERAL SITE GRADING

Preliminary road profiles within the subject site were established based on the proposed street pattern to satisfy the constraints outlined in the previous Section 2.2. Most of the road profiles have been designed to follow the existing topography of the site, addressing the HGWL separation with grades ranging from 0.5% to 5.5% in order to minimize fill and match perimeter grades, as well as meet criteria and optimized grading for the proposed servicing solution.

The proposed centerline road elevations are illustrated on the General Servicing Plan, Drawing No. C-100, Road Profile Drawing Nos. C-200 & C-201, and Conceptual Grading Plan Drawing Nos. C-400 & C-401 all included in Appendix B.

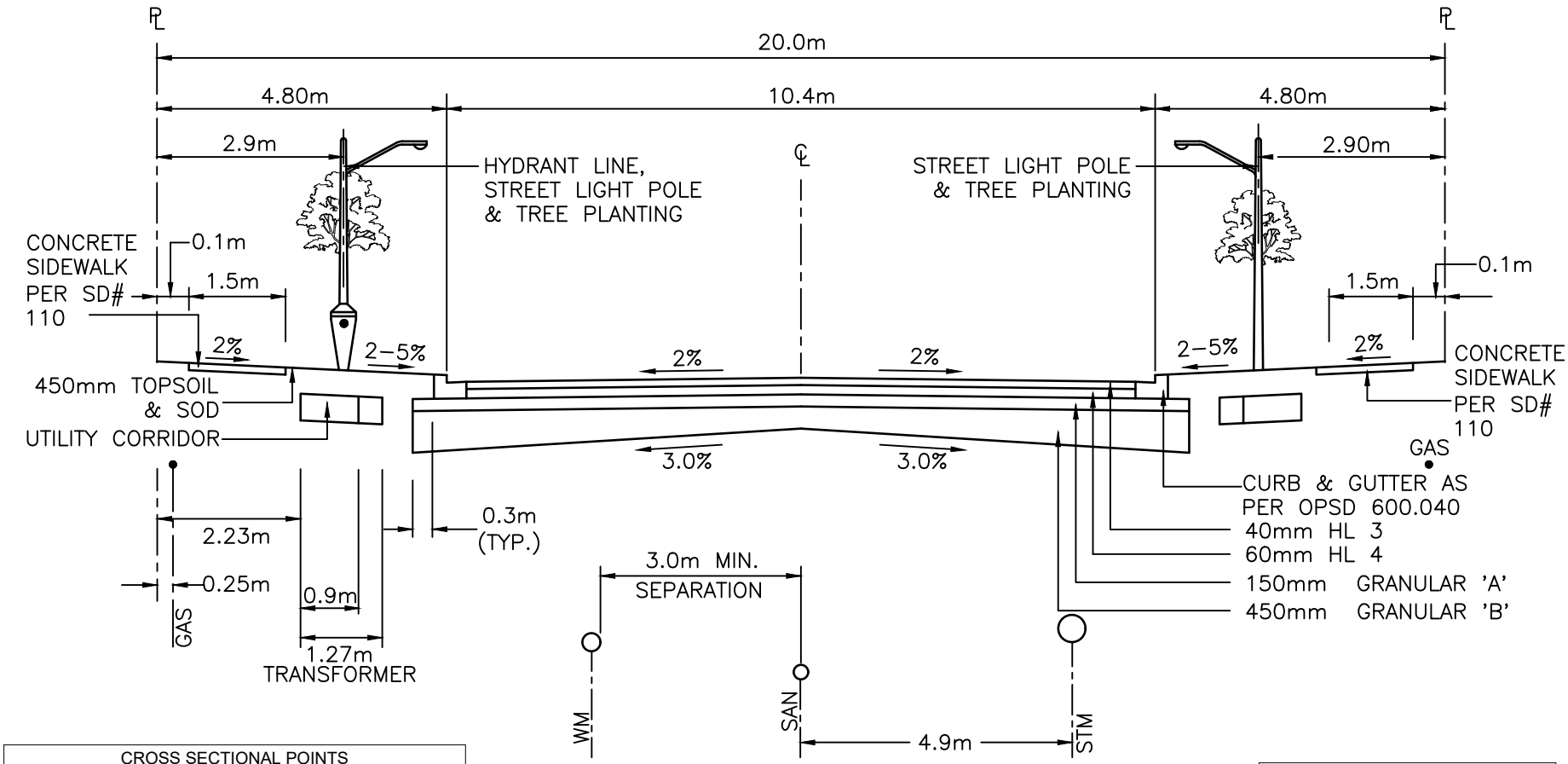
The subject lands front onto the north side of Gerber Road. The Town was contacted regarding the future cross-section and road drainage for this section of road. The Town has indicated that the current road configuration and alignment are not expected to change, although urbanization in the future should be considered.

A 20.0 m right-of-way cross-section in accordance with Region and Town Standards is proposed for the internal roads and typical section shown on Figure 2.0 – Typical Cross Section.

The proposed lot grading within the site ranges from 2.0% to a maximum of 6.0%, with 3:1 transition slopes utilized to accommodate the various grade changes within the proposed subdivision and at various perimeter locations. A combination of Type ‘A’ (back to front drainage), Type ‘D’ (split drainage), or Type ‘B’ (walkout) lots are all used in the proposed design. No Type ‘C’ (front walk-ins) lots are anticipated. The proposed lot grading is illustrated on the Grading Drawings No. C-400 & 401 included in Appendix B.

Preliminary earthwork calculations have been performed for the subject property which indicates that there is approximately 450,000 m^3 of fill shortage such to provide the required housing/building code separation from the high groundwater elevation, with an excess of 90,000 m^3 of topsoil. Where possible, topsoil will be used as fill within green spaces (i.e., parks, boulevards, and rear yards) or import from nearby to provide an earth balance, etc.

At detailed design, profiles and grading will be refined to minimize the required earth cut/fill volumes.



CROSS SECTIONAL POINTS		
DESCRIPTION	VERTICAL OFFSET FR. C/L	HORIZONTAL OFFSET FR. C/L
EDGE / PAVEMENT	-0.098	4.90
GUTTER LINE	-0.123	5.20
TOP / CURB	+0.027	5.40
FRONT / WALK	+0.147	8.40
BACK / WALK	+0.177	9.90
PROPERTY LINE	+0.181	10.00

20.0m ROAD CROSS SECTION

STREET A–E

STA:0+000 TO 0+000

NTS

MINIMUM DEPTH OF COVER (UNLESS OTHERWISE SPECIFIED)	
SANITARY SEWER	2.80m
STORM SEWER	1.50m
WATERMAIN	2.00m
GAS MAIN	0.80m
UTILITY CORRIDOR	0.90m

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TOWNSHIP OF WELLESLEY

Project No.
161413217

Title
TYPICAL CROSS SECTION

Revision

Date
2021.07.13

Reference Sheet

Figure No.
2

3.0 SANITARY SERVICING

3.1 ULTIMATE SERVICING

Local sanitary sewers of 200 mm dia. will be constructed throughout the proposed Strohvest Subdivision lands and will be constructed within the proposed roadway for Streets “A” to “E”. The sanitary design utilizes one outlet; this outlet drains south through Street “A” to Gerber Road, and along Gerber Road to the east to Lawrence Street to an existing MH.

Based on the current *Region of Waterloo and Area Municipal Design Guidelines and Supplemental Specifications for Municipal Service* (DGSSMS) design standards, when calculating the sanitary flows, the proposed or future zoning for the development is to be utilized. As part of the Draft Plan process, the single-family lots, semi-lots and townhouse blocks are identified as residential flow using an average flow of 275 Litres per person per day (l/c/d). This equates to a flow rate of 16.4 Litres per Second (l/s) in Phase 1 and ultimately 33.7 l/s for the entirety of the Developable lands owned by the proponent. Please refer to our proposed (Stage 1) sanitary design sheet in Appendix B.

The onsite sewers will have adequate capacity and will be installed at sufficient depths to enable servicing the Stage 1 lands by gravity including the future phase to the North (Stage 2). Please refer to the General Servicing Plan No. C-100 included in Appendix B, for an illustration of the sanitary servicing strategy.

4.0 WATER DISTRIBUTION SYSTEM ANALYSIS

4.1 INTRODUCTION

A water distribution analysis has been undertaken for the proposed subdivision based on the Draft Plan Concept and the Preliminary Servicing and Grading Plans presented in the previous sections. The primary intent of the analysis is to determine appropriate sizes for the proposed watermains within the Subdivision that will adequately distribute projected domestic and fire flow demands, and to confirm if the required fire flow can be achieved through the proposed fire hydrants onsite under various domestic and fire demand scenarios recommended in the Ministry of the Environment Conservation and Parks (MECP) and Region of Waterloo Pressure and Distribution Guidelines.

The detailed analysis presented in the following sections covers both the current Stage 1 and future Stage 2 areas of the proposed subdivision. The water servicing strategy for the proposed development will include two connections to the existing 200 mm dia. watermain on Lawrence Street to provide a looped system, as shown on the General Servicing Plan No. C-100 included in Appendix B. These two connections will be provided as part of Stage 1 development of the Subdivision.

4.2 METHODOLOGY

4.2.1 Model Development and Design Criteria

The water distribution analysis was performed using the Haestad Methods Hydraulic Modeling WaterCAD Software. The distribution network was created by assigning physical parameters to each node and pipe. The model was run under various demand scenarios, and each was checked against the relevant guidelines for operating and residual pressures as well as fire flow availability. The parameters and criteria are outlined in the following sections.

Appendix D contains correspondence dated December 16, 2021, from the Region of Waterloo and the boundary conditions data they have provided from the Region's overall water model. The Region has provided data pertaining to node 'JCT_01084' which is located at one of the proposed connection points at Gerber Road and Lawrence Street. Hydraulic modeling results for this node under various demand scenarios were provided to establish the Hydraulic Grade Line (HGL) for the proposed analysis.

The water for the proposed distribution network within Strohvest Subdivision will be drawn from two connections on Lawrence Street as outlined in Section 4.1 above. From these connections, 200 mm dia. watermains will be extended within the proposed road rights-of-way throughout the proposed Subdivision as shown on the General Servicing Plan No. C-100 included in Appendix B.

4.2.2 Region of Waterloo Municipal Design Guidelines

The *DGSSMS* is intended to provide a common regional and area-wide standardization for municipal water distribution and wastewater designs and installation, was used. The general guidelines have been published to provide direction for water distribution system analysis and design, including:

- Pressure, demand, and velocity criteria
- Hydraulic modeling parameters (i.e., friction factors)
- Hydrant spacing and location
- Minimum watermain sizing criteria

The recommendations of these guidelines have been followed in completing this analysis.

4.2.3 Boundary Conditions

HGL information for the proposed Subdivision is based on the modeling results provided by the Region, included in Appendix D. The HGL's were obtained for the average day and maximum day as well as data pertaining to a range of fire flow scenarios. A reservoir was assigned the HGL determined from the Region's model for each demand scenario. Fire flows were derived from the fire flow analysis flow curve provided by the Region. Table 1 provides a summary of the hydraulic grade lines used in the analysis:

Table 2: Hydraulic Grade Lines (Node JCT_01084)

Demand Scenario	Hydraulic Grade Line (m)
Average Day	425.06
Maximum Day	422.07
Minimum Hour	425.45
Peak Hour	417.84
Max Day + 70 L/S Fire	388.07
• *HGL interpolated from the fire flow analysis data provided by the Region of Waterloo	

Based on the fire flow analysis results provided by the Region, the maximum fire flow availability at Node 'JCT_01084' is limited to 78.3 L/s during the maximum day scenario while maintaining a minimum design pressure of 140 kPa (20 psi) at all nodes within the pressure zone.

4.2.4 Peaking Factors

The peaking factors used in the model are based on the Region's DGSSMS document and *Table 3-1* of the *2008 MOE Design Guidelines for Drinking-Water Systems*, as outlined in Table 2.

Table 3: Peaking Factors

Demand Scenario	Factor
Average Day	1.00
Maximum Day	2.00
Peak Hour	3.00
Minimum Hour	0.50

4.2.5 System Demands

Population projections were used in conjunction with per capita rates and demand factors to calculate future water demands for the proposed development. A residential per capita rate of 225 L/cap/day was used based on the Region of Waterloo Water Supply and Distribution Optimization Master Plan, May 2015. Using the Draft Plan concept and population estimates, water demand allocation was completed by assigning future demand from contributory areas to each applicable node. Please refer to Appendix D for detailed water demand calculations.

4.2.6 Fire Flow Requirements

According to the DGSSMS document, the fire flow requirements for the proposed development shall be determined in accordance with the current issue of the *Water Supply for Public Fire Protection, Fire Underwriter's Survey (FUS).* The FUS manual outlines the following criteria for the fire flow requirements:

- Modern semi and detached homes >3 m separation – 4,000 L/min (67 L/S)
- Modern semi and detached homes <3 m separation – 6,000 L/min (100 L/S)
- High density, contiguous multi-block homes – 8,000 L/min (133 L/S)

Assuming a worst-case scenario where the majority of the proposed residences may be within a 3 m separation of each other, the larger 100 L/S fire flow is generally used in the modeling of semi and single detached residential areas. The multi-residential blocks (i.e., townhouses) are generally modeled using the 133 L/S fire flow demand. That said, for smaller communities like Wellesley, the fire flow requirement is generally less than that seen in large urban centres.

As noted in Section 4.2.3 above, the maximum fire flow availability at the proposed connection point is limited to 78.3 L/s as per the data provided by the Region. Accordingly, the proposed development has been modeled using a lower fire flow requirement of 70 L/s. The Township and the Region need to review the proposed fire flow requirement criteria and confirm their acceptance or advise of any concerns.

4.2.7 Pressure Requirements

The Region of Waterloo Pressure Guidelines are to be maintained for all demand scenarios and are consistent with the MECP requirements. The guidelines are shown in Table 3 below.

Table 4: Region of Waterloo Pressure Requirements

Demand Scenario	Pressure Guidelines (kPa)	
	Min.	Max.
Average Day	350	550
Maximum Day	350	550
Peak Hour	275	700
Minimum Hour	275	700
Max. Day + Fire	140	700

The Region requires the use of individual pressure-reducing valves (PRV) on each water service where pressures exceed 550 kPa (80 psi) under any demand scenario.

4.2.8 Velocity Requirements

The Region and the MECP recommends that velocities throughout the distribution system not exceed a maximum of 5 m/s for non-regional watermains and 1.5 m/s for regional watermains during any demand scenario. Areas of concern are typically at long cul-de-sacs or dead-end stubs of smaller dia. (150 mm dia.). Large fire flow loads may cause the velocity in these mains to exceed 5 m/s.

4.2.9 Friction Factors

The following Hazen-Williams C-factors are commonly used to estimate frictional losses through the distribution system based on material type, as outlined in Table 4.

Table 5: Hazen-Williams C-Factors

Pipe Material	C
PVC	150
Ductile Iron (D.I.)	130
Concrete Pressure Pipe (CPP)	140
High-Density Polyethylene (HDPE)	140

All pipes were assumed to be PVC and a C value of 150 was applied.

4.3 RESULTS

As indicated earlier in Section 4.2.1 and shown schematically on the proposed water distribution network included in Appendix D, the subdivision pipe sizes were assumed at 200 mm dia. connecting to the existing 200 mm dia. watermain on Lawrence Street at two locations to provide a looed system. The water model was run according to the boundary conditions, design criteria and water demands outlined in the previous sections.

A series of tables summarizing the output results of the WaterCAD analysis are also included in Appendix D. Tables 5 and 6 present a summary of the modeling results at select nodes within the development.

Table 6: Modeling Results – Fire Flow[1]

	Node	Node Elevation (m)	Required Fire Flow (L/S)	Available Fire Flow (L/S)	Required System Pressure (kPa)	Fire Node Pressure (kPa)	Residual System Pressure (kPa)
Two Connections to Existing Watermains on Lawrence Street	J-4	358.00	70	71	140	175	140
	J-8	360.80	70	71	140	154	140
	J-12	362.40	70	67	140	140	177

1. Representative nodes shown. See Appendix D for remaining nodes and all pipe results

Based on the results shown in Table 5 and Appendix D, a fire flow of 70 L/s can be provided at each node within the Stage 1 area with the MECP minimum system pressure of 140 kPa as per the DGSSMS. The estimated fire flow available at a couple of nodes (J-11 and J-12) are marginally lower than 70 L/s.

The Region of Waterloo requires the use of individual PRVs on each water service where pressures exceed 550 kPa (80 psi) under any demand scenario. Table 6 provides a summary of pressures during normal operating conditions at select nodes within the Development. Based on the results shown in Table 6 and Appendix D, individual PRVs will be required throughout the subject Subdivision.

Table 7: Modeling Results - Pressures[1]

	Node	Node Elevation (m)	Pressure (kPa)			
			Average Day Demand	Maximum Day Demand	Peak Hour Demand	Minimum Hour Demand
Two Connections to Existing Watermains on Lawrence Street	J-4	362.00	617	588	546	621
	J-8	364.50	593	563	522	597
	J-12	367.00	568	539	497	572

1. Representative nodes shown. See Appendix D for remaining nodes

The Region of Waterloo recommends maintaining the velocity in watermains below 5 m/s, where possible, to prevent transient pressures from damaging the pipe system. The watermain configuration for the proposed development can generally deliver the required fire flow to the onsite hydrants while maintaining velocities of less than 5 m/s.

4.4 SUMMARY

From the above analysis, the main findings can be summarized as follows:

- The proposed water distribution network will consist of two connections to the existing 200 mm dia. watermain on Lawrence Street. From these connections, 200 mm dia. watermains will be extended throughout the subject Subdivision
- Based on the boundary conditions data provided by the Region, the maximum fire flow availability at the proposed connection on Lawrence Street at Gerber Road is limited to 78.3 L/s during the maximum day scenario while maintaining a minimum design pressure of 140 kPa (20 psi) at all nodes within the pressure zone. Therefore, the proposed development has been modeled using a lower fire flow requirement of 70 L/s which is lower than the FUS recommended fire flow requirements of 100 L/s for semi and single detached areas, and 133 L/s for townhouse development areas. The Township and the Region need to review and confirm their acceptance or advise of any concerns
- Velocities in all watermains are less than 5 m/s under fire flow conditions
- Individual PRVs will be required within the proposed development

5.0 PRELIMINARY STORMWATER MANAGEMENT

The Preliminary Stormwater Management (PSWM) Report has been completed in support of a Draft Plan of Subdivision for the proposed Strohvest Subdivision, Wellesley, Ontario. This section discusses the PSWM strategy for the site that has been developed in order to mitigate potential impacts of the proposed development on adjacent water features.

5.1 STUDY APPROACH

A SWM strategy for the site has been developed in order to mitigate against potential offsite water quality and quantity impacts associated with the Development of the subject lands.

The SWM design involved the following study components:

- Complete a hydrologic study to determine the existing site conditions with respect to topography, soils information, and existing land uses
- Prepare an existing and proposed development condition hydrologic model using Visual OTTHYMO Version 6.2 (VO6) to determine runoff volumes and peak flow rates to downstream areas
- Complete the preliminary design of the SWMF to provide sufficient water quality and water quantity control to achieve target rates to downstream receivers
- Summarize the Study through preliminary design and recommendations

5.2 BACKGROUND

The following Report and primary guidance documents were referenced in the completion of the proposed SWM design:

- *Hydrogeological Assessment, Stroh Lands, Wellesley, Ontario*, Stantec Consulting Ltd., December 2021
- *Final Geotechnical Investigation Report for Proposed Subdivision Development, Stroh Lands, Gerber Road, Wellesley, Ontario*, Stantec Consulting Ltd., August 6, 2021
- *Erosion and Sediment Control Guide for Urban Construction*, Toronto and Region Conservation Authority, 2019
- *Strohvest Ontario Inc. – Village of Wellesley Preliminary Servicing Feasibility in Support of Urban Area Expansion*, Stantec Consulting Ltd., May 2017
- *Township of Wellesley Official Plan*, Township of Wellesley, Ontario, 2013
- *Stormwater Management Planning and Design (SWMPD) Manual*, Ministry of the Environment, Conservation and Parks (MECP), March 2003

5.3 STORMWATER MANAGEMENT DESIGN CRITERIA

The SWM criteria for the subject lands were established through the above-mentioned documentation and pre-consultation with the Grand River Conservation Authority (GRCA) and the Township of Wellesley. The SWM criteria are as follows:

- **Water Quality** – Provide sufficient permanent pool and extended detention volume to meet the MECP *Enhanced* (80% Total Suspended Solids [TSS] Removal) criteria and promote the at-source removal of potential contaminants.
- **Water Quantity** – Provide sufficient water quantity control to maintain post-development peak flow rates to pre-development levels for all storms up to and including the 100-year storm event.
- **Infiltration and Water Balance** – Promote infiltration measures where possible and provide best efforts to match pre-development infiltration rates.
- **Erosion Control** – Provide sufficient extended detention for the 25 mm storm event with a minimum 24-hour drawdown period.
- **Erosion and Sediment Control** – Provide appropriate erosion and sediment control during construction/area grading to protect adjacent properties from potential siltation.

5.4 EXISTING CONDITIONS

5.4.1 Topography and Surface Drainage

As noted in the *Final Geotechnical Investigation Report* (Stantec, 2021), the site topography can be described as relatively flat with gentle undulating rolling hill features. Based on topography mapping, the ground surface is highest in the northern portion of the subject site near elevation 363 m above mean sea level (AMSL) and slopes down toward Gerber Road in the south near elevation 353 m AMSL. Thus, the overall grade change is about 10 m.

The site generally is split by a drainage divide running east to west in the northern half of the property. The drainage divide creates two predominant drainage zones (flows to the north and flows to the south) with the majority of the site draining south, overland, towards an existing 1.2 m dia. corrugated steel pipe (CSP) culvert that crosses Gerber Road and ultimately discharging to the Nith River. The remainder of the site drains overland to the north towards Queens Bush Road. Also, some external flows enter the site through the existing agricultural fields on the west side.

Existing conditions drainage information is presented on Figure 3, Existing Drainage Area Plan.

5.4.2 Geotechnical Information

As identified in the *Final Geotechnical Investigation Report* (Stantec, 2021), the subsurface soils for the site are predominantly comprised of glacial tills. Non-cohesive sands and silts were generally found in boreholes advanced in the north and central eastern portion of the site. Occasional cobbles and boulders were noted within the glacial till deposits.

Bedrock was not encountered at the boreholes advanced for this site. Based on available bedrock mapping and data of the area, bedrock is anticipated at approximate depths of 50 m to 60 m below current grades.

Based on results from the *Hydrogeological Assessment (Stantec, 2021),* groundwater levels for the site ranged between 0.5 m BGS to 2.9 m BGS (elevations ranging from 353.2 m to 361.3 m AMSL), from June to August 2021. There is a potential for localized perched groundwater at shallower depths. Groundwater dewatering may be required as part of the site preparation stage and possibly during the construction of site services.

The predominant cohesive soil conditions (clayey silt and clay till) will generally be suitable for at-source infiltration of precipitation; however, due to the high silt content, lower infiltration rates should be expected. Higher infiltration rates would be expected for the non-cohesive sands and silts contacted in the northern and central eastern portion of the site depending on the soils exposed at the bottom of the infiltration facilities as well as depth to groundwater.

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Notes

100 / A=1.57 CATCHMENT ID / CONTRIBUTING AREA (ha)

MAJOR OVERLAND FLOOD ROUTE

PROPOSED DRAINAGE BOUNDARY

Scale

1:2500

0 25 75 125m

Client/Project

STROHVEST ONTARIO INC.
WELLESLEY PROPERTY

GERBER ROAD, WELLESLEY
TOWNSHIP OF WELLESLEY, ON

Project No.
161413217

Title

EXISTING DRAINAGE AREA PLAN

Revision

Date
2022.03.17

Reference Sheet

Figure No.
3

If infiltration of water from the pond into the underlying soils or infiltration of groundwater into the pond is not desired, a pond liner should be considered due to the presence of non-cohesive silt seams, layers, and deposits. A liner may not be required where clay deposits are exposed at the pond bottom; however, this should be confirmed by additional laboratory testing and inspection at the time of construction.

At source infiltration of the onsite native soils (glacial tills, silts, and sands) may be considered; however, lower infiltration rates should be expected and will depend on the gradation of the soils and the depth to groundwater. Infiltration through the existing fill is not recommended.

5.5 STORMWATER MANAGEMENT DESIGN

5.5.1 Hydrologic Modeling

A hydrologic model was prepared using Visual OTTHYMO Version 6.2 (VO6) to simulate drainage conditions for the subject development under existing and proposed development conditions. The model was employed to predict flows and design SWM systems to ensure the criteria are achieved.

In the absence of IDF parameters for Township of Wellesley, City of Kitchener's IDF parameters were used. Model results were obtained for the existing and proposed conditions for the following events:

- The 25 mm, 4-hour Chicago Storm derived using the parameters as provided in Table 7
- The 2-, 5-, 25-, 50-, and 100-year, 3-hour Chicago distributions derived using the parameters provided in Table 7
- The 48-hour Regional Rainfall Event (i.e., Hurricane Hazel)

Table 8: Rainfall Events - City of Kitchener IDF Parameters

Return Period	IDF Parameters			
	A	B	C	Depth (mm)
25 mm, 4-hr	508.5	6	0.7989	25.0
2-year, 3-hr	743	6	0.7989	34.3
5-year, 3-hr	1593	11	0.8789	47.2
25-year, 3-hr	3158	15	0.9355	68.1
50-year, 3-hr	3886	16	0.9495	77.2
100-year, 3-hr	4688	17	0.9624	87.3
Hurricane Hazel	-	-	-	285

5.5.2 Existing Conditions Hydrologic Model

An existing conditions hydrologic model was prepared to simulate existing conditions for the site. Input and output files for the Visual OTTHYMO Version 6.2 (VO6) model are provided in Appendix F. SCS Curve Numbers and catchment parameters were calculated for each existing catchment based on land use and soil type and are provided in Appendix E.

Delineation of existing drainage catchments is provided on Figure 3, Existing Drainage Area Plan, and is summarized below:

- Catchment 100: 17.97 ha of agricultural area including the external agricultural area to the west of the site draining south towards Gerber Road
- Catchment 101: 2.71 ha of agricultural area in the northern portion of the site draining north
- Catchment 102: 2.22 ha of agricultural area in the north-eastern portion of the site draining east to an existing rear yard catchbasin behind the properties fronting Zinkann Crescent.

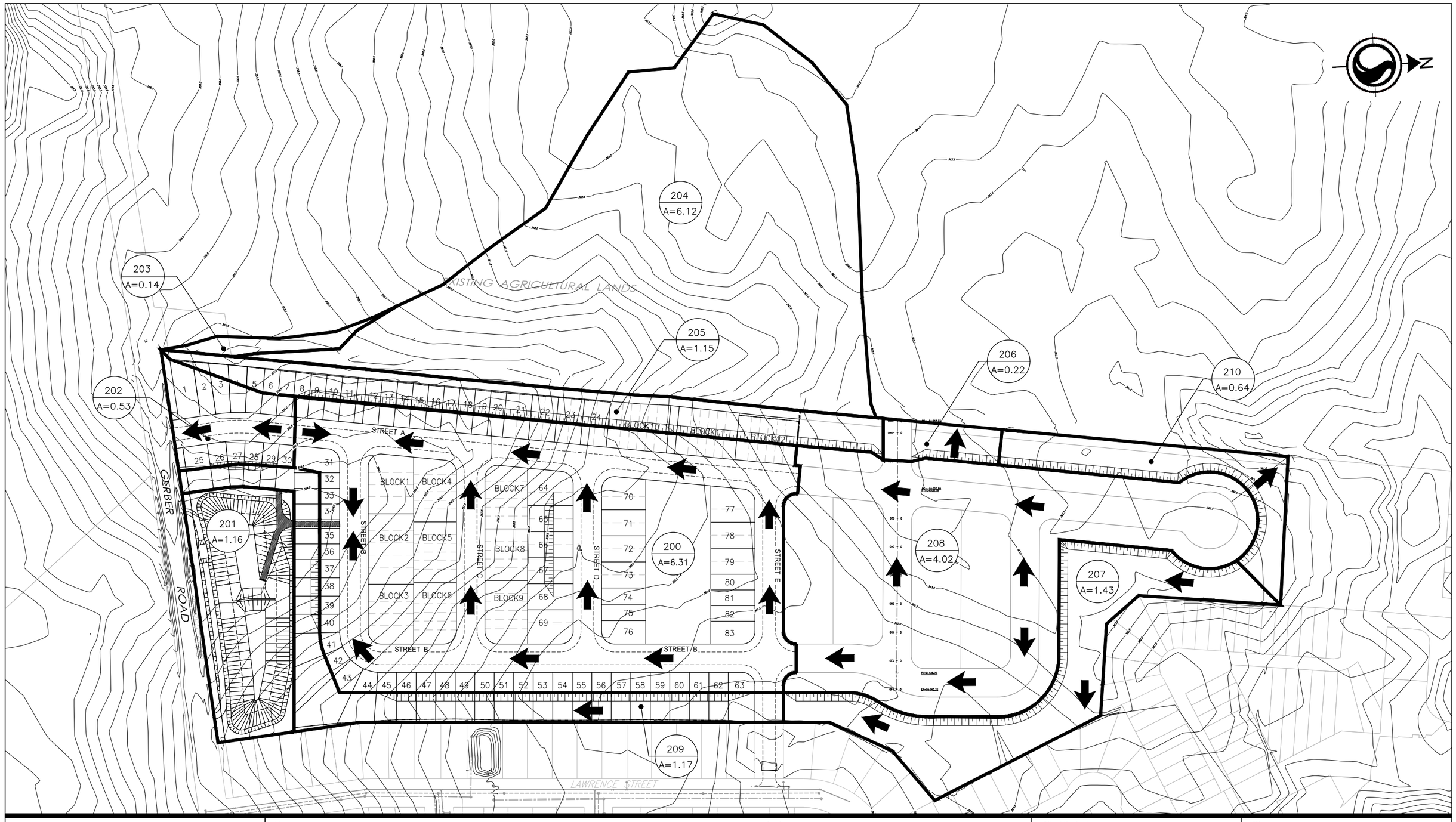
5.5.3 Proposed Conditions Hydrologic Model

The proposed development incorporates a mixed residential development consisting of single-detached and semi-detached lots, and 12 townhouse blocks (able to support up to 66 townhouse units), and a single SWMF. The proposed SWMF will be located in the southern portion of the site along Gerber Road and discharge to the existing Gerber Road Culvert flowing from north to south.

The SWMF is proposed to provide water quality and quantity control for the entire Strohvest Lands Subdivision and the external agricultural lands to the west. This includes the northern portion of the site that is not included in the current Draft Plan but has been assumed to have similar land use to the southern portion for sizing of the SWMF (i.e., a mix of residential lot and housing types within the proposed Draft Plan of Subdivision). Major flows from a small portion of the site entrance and flows from a small portion of the external agricultural lands drain south towards Gerber Road, bypassing the SWMF and flowing directly to the Gerber Road Culvert. Flows from a small portion of the future development, mainly including rear yards and rooftop areas, drain uncontrolled towards north.

SCS Curve Numbers were calculated for each of the proposed catchments based on land use and soil type and are provided in Appendix E. All input and output files are provided in Appendix F. The delineation of the proposed drainage catchments is provided on Figure 4, Proposed Drainage Area Plan, and is summarized as follows:

- Catchment 200: 6.31 ha of proposed residential development draining to onsite SWMF
- Catchment 201: 1.16 ha SWMF Block
- Catchment 202: 0.53 ha of proposed residential development with minor flows contributing to onsite SWMF and major flows draining to the south



Stantec

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Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

100 / A=1.57 CATCHMENT ID / CONTRIBUTING AREA (ha)

MAJOR OVERLAND FLOOD ROUTE

PROPOSED DRAINAGE BOUNDARY

Scale

1:2500 0 25 75 125m

Client/Project

STROHVEST ONTARIO INC.
WELLESLEY PROPERTY

GERBER ROAD, WELLESLEY
TOWNSHIP OF WELLESLEY, ON

Project No.
161413217

Title

PROPOSED DRAINAGE AREA PLAN

Revision

Date
2022.01.07

Reference Sheet

Figure No.
4

V:\01614\active\161413217\design\drawing\civil\sheet_files\SWM\161413217_POST.dwg
1/13/2022 3:19:37 PM By: Valecillos, Erika

- Catchment 203: 0.14 ha of external agricultural land draining downstream of the SWMF
- Catchment 204: 6.12 ha of external agricultural land draining to site via sheet flow and contributing to the SWMF
- Catchment 205: 1.15 ha of proposed residential development draining to SWMF (mostly rear yards and rooftops)
- Catchment 206: 0.22 ha of future residential development draining northwest (mostly rear yards and rooftops)
- Catchment 207: 1.43 ha of future residential development draining to the SWMF (mostly rear yards and rooftops)
- Catchment 208: 4.02 ha of future residential development draining to the SWMF
- Catchment 209: 1.17 ha of proposed development draining to SWMF (mostly rear yards and rooftops)
- Catchment 210: 0.64 ha of future residential development draining to the SWMF (mostly rear yards and rooftops)

5.5.4 Proposed SWM Strategy

The proposed SWM strategy for the Strohvest Lands Subdivision incorporates minor system conveyance via storm sewer networks to the proposed SWMF for water quality and quantity control while major storm runoff is generally conveyed via overland flow through the rights-of-way. The SWM strategy has been developed in accordance with the objectives and criteria previously listed.

5.5.4.1 Stormwater Management Facility Design

Runoff from the majority of the proposed development will drain to the proposed wet pond SWMF located immediately north of Gerber Road on the southeast portion of the site. The proposed SWMF is designed to provide water quantity and quality control for 22.53 ha of land including 16.41 ha of proposed/future development of the Strohvest Ontario Inc. lands as well as 6.12 ha of external agricultural land. As outlined in the preliminary criteria, the SWMF is required to provide 'enhanced' water quality treatment prior to discharging downstream.

The preliminary design of the SWMF has maximum ponding elevations of 353.66 m above sea level (ASL) and 354.61 m ASL during the 100-year and Regional Storm events, respectively. This leads to a depth of 1.56 m above permanent pool during the 100-year storm event and a depth of 2.51 m during the Regional Storm event. The freeboard to the emergency weir for 100-year and Regional Storm events is 1.04 m and 0.09 m, respectively, with an additional 0.3 m freeboard to the top of the pond. Although the Regional Storm event ponds to an active depth greater than 2 m, the 100-year active depth is still below the 2 m MECP target. A 1.5 m deep forebay has been included in the design to provide for the centralized collection of sediment for

ease of removal. The forebay sediment storage capacity is 426 m^3 at a maximum depth of 0.5 m, providing an expected cleanout frequency of approximately once every 21 years. The MECP volume requirement for quality control, based on an enhanced level of treatment, is 3,606 m^3. Subtracting the 40 m^3/ha (901 m^3) of extended detention volume included in this volume leads to required permanent pool volume of 2,704 m^3 for enhanced treatment.

The preliminary design provides 3,258 m^3 of permanent pool within the forebay and main cell areas (excluding sediment storage), meaning an enhanced level of water quality treatment is achieved. In addition to the permanent pool characteristics, the SWMF will provide sufficient extended detention storage to achieve a 25-hour drawdown of the 25 mm event. Design characteristics for the proposed SWMF are summarized in Table 8, with design calculations provided in Appendix G.

The forebay length required to provide appropriate dispersion and settling length for the 5-year inlet flow is 42 m and the length provided is approximately 60 m. Detailed design calculations are provided in Appendix G.

The SWMF is proposed to be drained by a multi-stage outlet consisting of an inverted pipe, ditch inlet catchbasin (DICB) and overflow weir. Low flows will discharge through the inverted pipe that will provide temperature mitigation by drawing the cooler water near the bottom of the wet pond. A manhole downstream of the inverted pipe containing two orifice plates to provide extended detention and control the smaller storm events while the outlet pipe from the DICB contains a third orifice control for larger storm events. The trapezoidal emergency overflow spillway conveys flows only during the emergency circumstance of blockage of the remaining outlet structures. Details on the outlet structure sizes and elevations are summarized in Table 8 below and the detailed stage-storage-discharge analysis for the proposed SWMF is provided in Appendix G. Additionally, a detailed drawing of the SWMF is included on Drawing C-800 (Appendix E).

Table 9: SWMF Design Characteristics

Parameter	Basin Characteristics
Total Contributing Area (quality and quantity)	22.53 ha
Total Percent Impervious to SWMF (includes external agricultural area)	43%
Quality Control:	
Unit Area Storage Requirement - Enhanced Treatment	160 m^3
Total Volume Required- Enhanced Treatment	3,606 m^3
Permanent Pool Volume Required - Enhanced Treatment	2,704 m^3
Permanent Pool Volume Provided	3,258 m^3
Permanent Pool Depth in Main Cell	1.5 m
Permanent Pool Depth in Forebay	1.5 m
MECP Extended Detention Volume Required (40 m^3/ha)	901 m^3
4-hour, 25 mm Chicago Event Extended Detention Drawdown Time	25.3 hrs.
Forebay Parameters:	
Required Forebay Length	41.4 m

Sediment Storage Volume Provided	426 m^3
Cleanout Frequency	21.1 Years
Outlet Structure Details:	
Orifice #1 Invert/Dia.	352.10 m / 100mm
Orifice #2 Invert/Dia.	352.60 m / 450 mm
DICB T/G Elevation (low side)	353.40 m
Orifice #3 Invert/Dia. (within DICB)	352.50 m / 600 mm
Overflow Weir Crest Invert/ Length/ Side Slopes (H:V)	354.70 m / 10 m / 10:1

Target peak flow rates as well as peak flow rates for proposed conditions are summarized in Table 9 below while detailed modelling files are included in Appendix F. As observed in the table below, water quantity targets have been met as the post-development peak flow rates from the SWMF and the areas discharging downstream of the SWMF are at or below target levels.

Table 10: SWMF Operating Characteristics

Storm Event	25 mm	2-year	5-year	25-year	50-year	100-year	Regional
Existing Peak Flow Rate from Site towards Gerber Road (m^3/s)	0.033	0.120	0.310	0.728	0.942	1.174	1.908
Proposed Peak Flow Rate to the SWMF (m^3/s)	1.186	1.858	2.585	3.932	4.568	5.212	2.890
Proposed Peak Flow Rate from the SWMF (m^3/s)	0.014	0.073	0.207	0.441	0.733	1.018	1.596
Maximum Storage Volume (m^3)	2,106	3,104	4,259	6,669	7,380	8,087	15,248
Maximum Ponding elevation (m)	352.60	352.80	353.02	353.44	353.55	353.66	354.61
Drawdown Time (hrs.)	25.27	29.76	30.96	32.13	32.32	32.44	33.17
Proposed Peak Flow Rates Draining around SWMF (m^3/s)	0.001	0.002	0.005	0.081	0.115	0.148	0.019
Total Proposed Peak Flow Rates from the Study Area to the Gerber Road Culvert (m^3/s)	0.014	0.073	0.208	0.444	0.738	1.027	1.608

Peak flow rates from site towards north, for existing and proposed conditions, are summarized in Table 10 below while detailed modelling files are included in Appendix F. As observed in the table below, post-development peak flow rates towards north are at or below pre-development peak flow rates, therefore water quantity targets are met. No flows from the proposed development will be directed towards the east (as under existing catchment 102), and therefore, no comparison of flows to this area is presented.

Table 11: Existing and Proposed Flow Rates Towards North

Storm Event	25 mm	2-year	5-year	25-year	50-year	100-year	Regional
Existing Peak Flow Rate from Site towards North (m^3/s)	0.002	0.012	0.041	0.115	0.156	0.201	0.310
Proposed Peak Flow Rate from Site Towards North (m^3/s)	0.002	0.006	0.012	0.026	0.033	0.040	0.027

5.5.5 Additional Design Considerations

5.5.5.1 Infiltration

The geotechnical work performed by Stantec identifies a predominant soil of glacial tills across the site with smaller areas of sands and silts. The conclusion of the *Final Geotechnical Investigation Report* (Stantec, 2021) is that the soils are generally suitable for infiltration; however, due to the high silt content, lower infiltration rates should be expected. Non-cohesive sands and silts found in the northern and central eastern portion of the site will likely have higher infiltration rates and present a better opportunity for infiltration, while infiltration through the existing fill is not recommended.

To promote infiltration, it is proposed all rooftops throughout the subdivision be directed to soakaway pits sized to retain runoff from the 25 mm event where possible. Additionally, all rooftop areas within the townhome blocks are to be directed to lot-level or centralized soakaway pits within the Block. End-of-pipe infiltration is likely not possible due to high groundwater conditions in the area of the SWMF.

Further investigation/analysis will be necessary at the detailed design and site plan stages to confirm infiltration rates and depth to high groundwater levels at the base of any proposed infiltration trenches.

5.5.5.2 Water Balance

A water balance analysis completed as part of the current work determined that the development of the lands to a residential land use with an impervious coverage of 59% would result in significant impacts on the volume of water that is recharged to the groundwater system, if only “passive” infiltration through the remaining pervious surfaces were considered. The water balance analysis, included within Appendix H, indicates that the estimated pre-development infiltration of 143 mm/year would see a 59% reduction to 59 mm/year, if “active” infiltration measures are not implemented.

It is recommended that rooftop runoff from the 25 mm event be captured which will result in a 138 mm/year increase in groundwater recharge over the "passive" post-development scenario. This will result in 53 mm/year infiltration surplus compared to pre-development conditions. Based on the water balance calculations included in Appendix H, the final runoff surplus as a result of the development will be 239 mm/year, which will be controlled in the proposed SWMF. As per preliminary results from the *Hydrogeological Assessment (Stantec, 2021),* high groundwater elevations may inhibit implementation of rooftop infiltration galleries throughout large portions of the site. The water balance and infiltration design will need to be revisited during detail design to ensure best efforts are made to match pre-development infiltration levels while maintaining sufficient separation from groundwater.

5.5.5.3 SWMF Liner

As discussed in the *Geotechnical Investigation*, the soils within the proposed SWMF Block include sandy silts and clay tills with the high groundwater level measured to be within 2.2 m below the existing ground surface at 355.60 m (bottom of wet pond is 350.5 m). Due to the shallow depths to groundwater and tight soils, no end-of -pipe infiltration is proposed at this stage. To improve the extended detention time in the facility and prevent untreated runoff from infiltrating, it is recommended at this stage to provide a liner within the facility; however, it is recommended to revisit this at the detailed design stage. Further details related to the design of the liner are recommended to be explored at the detailed design Stage.

5.6 EROSION AND SEDIMENT CONTROL PLAN

The erosion and sediment control strategy has been developed and is to be implemented during the construction process, in order to minimize the potential for offsite discharge of sediment and the resultant negative environmental impacts. This plan will focus on the protection of the downstream areas.

5.6.1 Erosion Potential

The *Toronto and Region Conservation Authority's Erosion and Sediment Control Guide for Urban Construction (2019)* was used to determine the erosion potential of the site. The erosion potential is based on slope gradient, slope length, and soil texture and is then used to determine the appropriate erosion control methods, as follows:

- Site Slopes: Generally Gentle (< 2%) – average slope is approximately 1.8%
- Slope Lengths: Long (generally greater than 30 m)
- Erodibility Classification: High erodibility rate for loam and moderate erodibility rate for sandy-loam soils

Therefore, based on this classification, the site has moderate to high erosion potential.

5.6.2 Preliminary Erosion and Sedimentation Control Plan

The following approach to erosion and sediment control onsite has been prepared to minimize the potential impacts associated with onsite erosion and/or offsite transport of sediment to downstream areas.

Prior to any grading or servicing works commencing onsite, erosion and sedimentation control measures shall be implemented as detailed on the Pre-grading, Erosion and Sedimentation Control Plans (prepared during detail design). The erosion and sedimentation controls will include the following items:

- Steep slopes (>3:1) shall have erosion blankets.
- Light and/or heavy-duty silt fencing will be erected on all site boundaries where there is potential for runoff to be discharged offsite, to protect adjacent downstream lands from migration of sediment in overland flow. The location of this fencing will be adjacent to the limit of grading. Silt fence attached to paige wire fencing will be installed periodically throughout the site adjacent to sensitive areas. Silt fencing should be erected before grading begins to protect adjacent and downstream areas from migration of sediment in overland flow.
- Storm service outlets will be installed during servicing and roadworks construction to provide lot level dead and live storage.
- Erosion control berms/swales will be located in appropriate (critical) areas to divert flows to temporary sediment basins.
- A construction entrance feature (“mud-mat”) will be provided at all site entrances to minimize the offsite transport of sediment via construction vehicles.
- Swales constructed onsite will have temporary rock check dams to help attenuate flows and encourage deposition of suspended sediment where appropriate.
- All disturbed areas where construction is not expected for 30 days shall be re-vegetated with 50 mm of topsoil and hydro-seeding according to OPSS 572.
- During construction, all catchbasins are to be sealed until roads are paved to prevent sediment deposition in the catchbasin’s sumps and conveyance of silt to the SWMF.
- An Erosion Control Implementation Schedule will be included with the Detailed Erosion and Sedimentation Control Plan, prepared in conjunction with the pregrading application and/or final engineering design.
- Following completion of construction, defined as 90% house construction, and site stabilization, all erosion and sediment control measures and accumulated sediment are to be removed.

The erosion control measures shall be maintained in good repair during the entire construction period and shall only be removed as contributing drainage areas are restored and stabilized. In addition, the condition of erosion control works, their overall performance, and any repairs, replacement or modifications to the installed

item shall be noted in monitoring Reports submitted to the GRCA and the Township. Monitoring Reports should be submitted bi-monthly (quarterly during periods of inactivity or house construction) and should be based on inspection completed bi-weekly or after any significant rainfall events (>13 mm), whichever is more frequent.

5.6.3 Monitoring, Maintenance and Mitigation

Monitoring and maintenance activities are an important part of a SWM Plan to ensure that the designed features continue to operate as intended. A Monitoring Program should be established in consultation with the Region of Waterloo, Township of Wellesley, and the Ministry of Environment, Conservation and Parks and incorporated into the Final Stormwater Management Plan.

6.0 STORM SERVICING

Storm drainage for the proposed development will discharge to the onsite SWMF and a small area (rear yards) will discharge overland to the northwest corner. The major overland flow route follows the Streets and into the SWMF via Street “B”. The future Stage 2 Lands major flow north of Street “E” will be conveyed via oversized pipe to the SWMF.

The proposed storm sewer system will be designed to convey all minor storm events or those up to and including the 5-year return-period, as per the Region of Waterloo standards. The conveyance system for major flow events or those greater than a 5-year return-period frequency will be confined to the road right-of-ways and generally mimics the direction of the minor system, save for the reference above.

7.0 UTILITIES

7.1 HYDRO

According to Waterloo North Hydro there is residual capacity in the system to support the Proposed Strohvest Subdivision.

7.2 GAS

According to Union Gas mapping records provided to Stantec, there is gas servicing on both Gerber Road and Lawrence Street. Gas infrastructure ends in a tee on the western side of the Lawrence Street junction that would likely provide servicing for the subject lands.

In further discussions with the service provider, it was confirmed that Union Gas currently has no plans for plant upgrades in any of their plant locations in the Township; however, there was also no indication of pressure or distribution concerns at this time.

7.3 TELECOMMUNICATIONS

According to Bell and Rogers Telecommunications mapping records provided to Stantec, there is Roger's telecommunications on Lawrence Street, while Bell infrastructure is located on both Gerber Road and Lawrence Street both in close proximity to the subject lands.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 CONCLUSIONS

Based on the finding of this Report, it is concluded that:

- The proposed Strohvest Lands Subdivision can be adequately serviced by municipal sewage, storm drainage, water services and utilities
- The proposed wet pond SWMF provides water quantity and water quality control for the proposed Strohvest Lands Subdivision
- Sufficient permanent pool in the proposed SWMF is provided to achieve an 'Enhanced' water quality control for the Subdivision in order to meet MECP water quality requirements
- The proposed SWMF provides sufficient storage to attenuate post-development discharge to maintain existing target flow rates
- Lot level soakaway pits should be incorporated to infiltrate the first 25 mm of clean roof runoff where possible and to help promote at-source infiltration across the site

8.2 RECOMMENDATIONS

- This Report be circulated to the Municipalities and various approval agencies in support of Draft Plan of Subdivision Approval
- Detailed grading and servicing design drawings be prepared, a Final Stormwater Management Report and Erosion Settlement Control Plan be completed once the Draft Plan of Subdivision for Strohvest Subdivision has been approved

APPENDIX A

Conceptual Draft Plan of Subdivision DP-1

EXISTING RESIDENTIAL

EXISTING AGRICULTURE

EXISTING AGRICULTURE

BLOCK 15
6.0m WALKWAY
0.019ha

BLOCK 14
LINEAR PARK
0.270ha

BLOCK 16
6.0m WALKWAY
0.020ha

BLOCK 18
ROAD WIDENING
0.025ha

STREET 'A'

STREET 'A'

GERBER ROAD

BLOCK 10
TOWNHOUSES
0.139ha
6 UNITS

BLOCK 11
TOWNHOUSES
0.140ha
6 UNITS

BLOCK 12
TOWNHOUSES
0.138ha
6 UNITS

BLOCK 1
TOWNHOUSES
0.130ha
4 UNITS

BLOCK 4
TOWNHOUSES
0.130ha
6 UNITS

BLOCK 2
TOWNHOUSES
0.158ha
5 UNITS

BLOCK 5
TOWNHOUSES
0.127ha
6 UNITS

BLOCK 3
TOWNHOUSES
0.130ha
4 UNITS

BLOCK 6
TOWNHOUSES
0.128ha
6 UNITS

BLOCK 7
TOWNHOUSES
0.130ha
6 UNITS

BLOCK 8
TOWNHOUSES
0.109ha
5 UNITS

BLOCK 9
TOWNHOUSES
0.132ha
6 UNITS

STREET 'B'

STREET 'C'

STREET 'D'

STREET 'E'

BLOCK 13
PARK
0.518ha

FUTURE DEVELOPMENT
(OTHER LANDS OWNED BY APPLICANT)

BLOCK 17
STORMWATER
MANAGEMENT
1.087ha

BLOCK 19
ROAD WIDENING
0.108ha

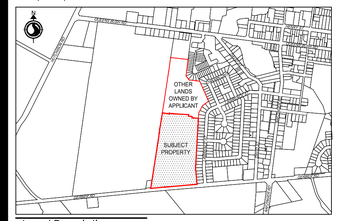
EXISTING AGRICULTURE

EXISTING STORMWATER FACILITY

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

LAWRENCE STREET



Key Map NTS.

Legal Description

Plan 1148, Part Lot 80,
Registered Reference Plan 58R-3548, Part 1,
Township of Wellesley,
Regional Municipality of Waterloo

Information Required

Under Section 51(17) of the Planning Act,
R.S.O 1990 c.P 13 as Amended
a) - As Shown
b) - As Shown
c) - As Shown
d) - As Listed Below
e) - As Shown
f) - As Shown
g) - As Shown
h) - Municipal Water
i) - As Shown
j) - Municipal Sanitary and Storm Sewers
k) - None

Surveyor's Certificate

I hereby certify the boundaries of the subject lands and their relationship to the adjoining lands have been accurately and correctly shown.

Signed _____
Jeremy Matthews, O.L.S.
Stantec Consulting

Date _____

Owner's Certificate

I hereby authorize Stantec Consulting Ltd. to submit this Draft Plan of Subdivision on my behalf.

Signed _____
Ron Stroh
Strohvest Ontario Inc.

Date _____

Land Use Schedule

Lots/Blocks	Land Use	Area (ha)	# of Units
Lots 1-20, 25-63, 74-76, 80-83	Single Detached	2.915	66
Lots 21-24, 64-73, 77-79	Semi Detached	1.047	34
Blocks 1-12	Townhouse	1.596	66
Block 13	Park	0.518	
Block 14	Linear Park	0.270	
Blocks 15-16	6.0m Walkway	0.039	
Block 17	Stormwater Management	1.087	
Blocks 18-19	Road Widening	0.133	
Roads		2.582	
TOTAL		10.187	166 Units

Revision	By	Appd	YYYY.MM.DD
Issued for Client Review	JJ	GR	2021.06.14
File Name: 161413217_R-DP	JJ	GR	2021.04.21
	Dwn.	Dsgn.	Chkd. YYYY.MM.DD

Permit-Seal

APPROVED: _____ DATE: _____

I hereby certify that the plan was prepared under the supervision of a registered professional planner, within the meaning of the Ontario Professional Planners Institute Act, 1994.

Client/Project
STROHVEST ONTARIO INC.

WELLESLEY PROPERTY
GERBER ROAD

TOWNSHIP OF WELLESLEY, ON

Title
DRAFT PLAN OF SUBDIVISION

Project No. 161413217
Scale 1:750 (0, 7.5, 22.5, 37.5m)
Revision 0
Sheet 1 of 1
Drawing No. DP-1

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APPENDIX B

Conceptual Servicing Plan C-100
Conceptual Profiles C-200
Conceptual Profiles C-201
Conceptual Grading Plan C-400
Conceptual Grading Plan C-401
Sanitary Sewer Design Sheet

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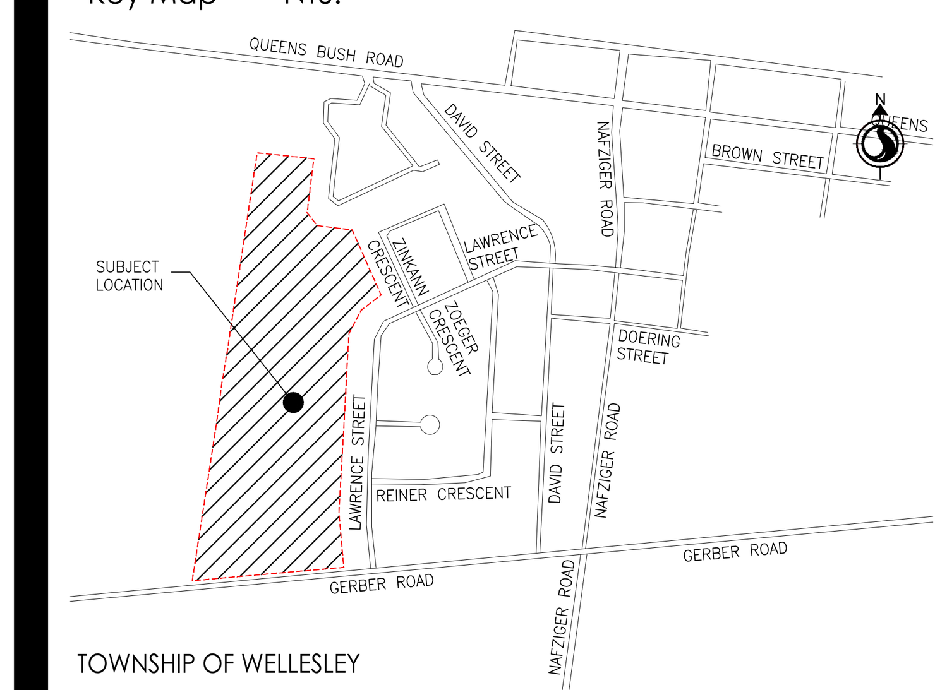
Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
2. DRAFT PLAN PREPARED BY XXX, DATED XXX.
3. CALCULATED PLAN PREPARED BY XXX, DATED XXX.
4. TOPOGRAPHICAL SURVEY PREPARED BY STANTEC CONSULTING LTD., DATED NOV 18, 2021. CONTOURS OUTSIDE OF THE PROPERTY LINE, AND WITHIN THE HEAVILY WOODED AREA OF THE SITE, HAVE BEEN OBTAINED FROM S.W.O.O.P TOPOGRAPHIC INFORMATION (2015).

Key Map NTS.



TOWNSHIP OF WELLESLEY

Legend

PROPOSED WATERMAIN (200mmø UNLESS NOTED OTHERWISE)
EXISTING WATERMAIN
FUTURE WATERMAIN
PROPOSED SANITARY SEWER
EXISTING SANITARY SEWER
FUTURE SANITARY SEWER
PROPOSED STORM SEWER
EXISTING STORM SEWER
FUTURE STORM SEWER
PROPOSED LIMIT OF DRAFT PLAN
OVERLAND FLOW DIRECTION

LP	ELEV.
ROAD	300.82

ROAD STATUS (LP = LOW POINT HP = HIGH POINT)
ROAD ELEVATION

Revision	By	Appd	YYYY.MM.DD

File Name: 161413217_C-UG	Dwn.	Chkd.	Dsgn.	YY.MM.DD
				2022.01.12

Permit-Seal

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT ONTARIO
JOHN VLEEMING
Nº 824712

Professional Engineers Ontario
Licensed Engineering Technologist
Name: J. R. K. BROUSSEAU
Number: 100227228
Limitations: Preparation of municipal servicing design and specifications for gravity sanitary sewer, storm sewer watermain layout, site grading, development erosion control and development of local roads.
Association of Professional Engineers of Ontario

Client/Project

STROHVEST ONTARIO INC.

WELLESLEY PROPERTY
GERBER ROAD

TOWNSHIP OF WELLESLEY, ON

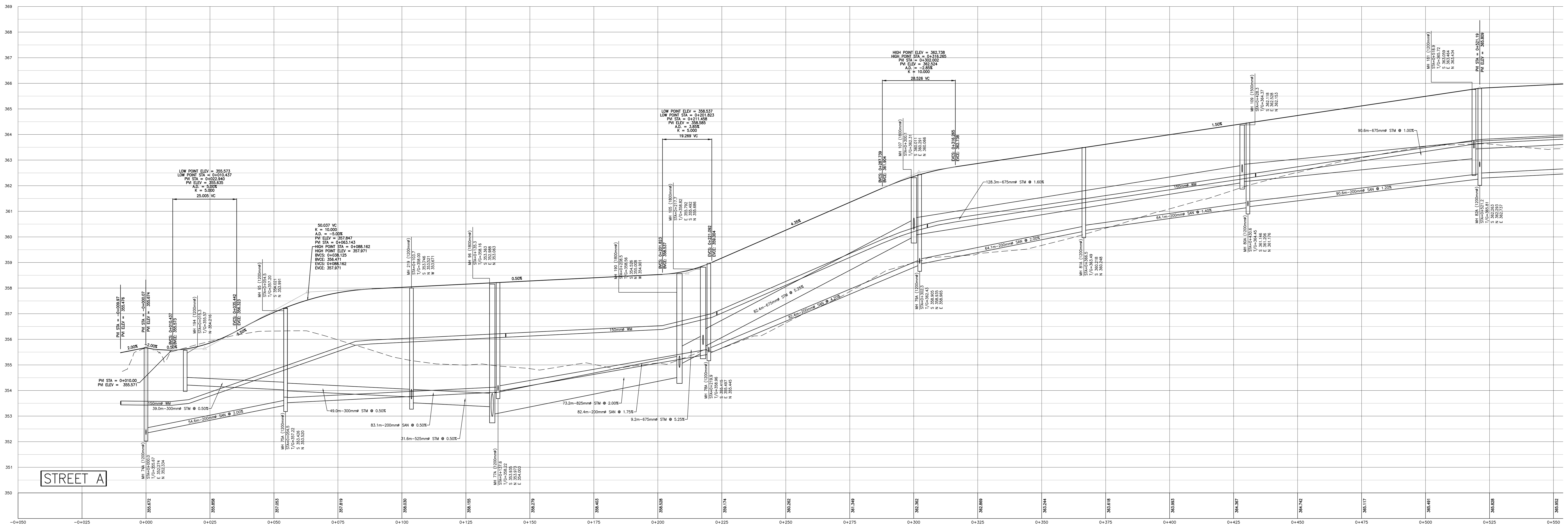
Title

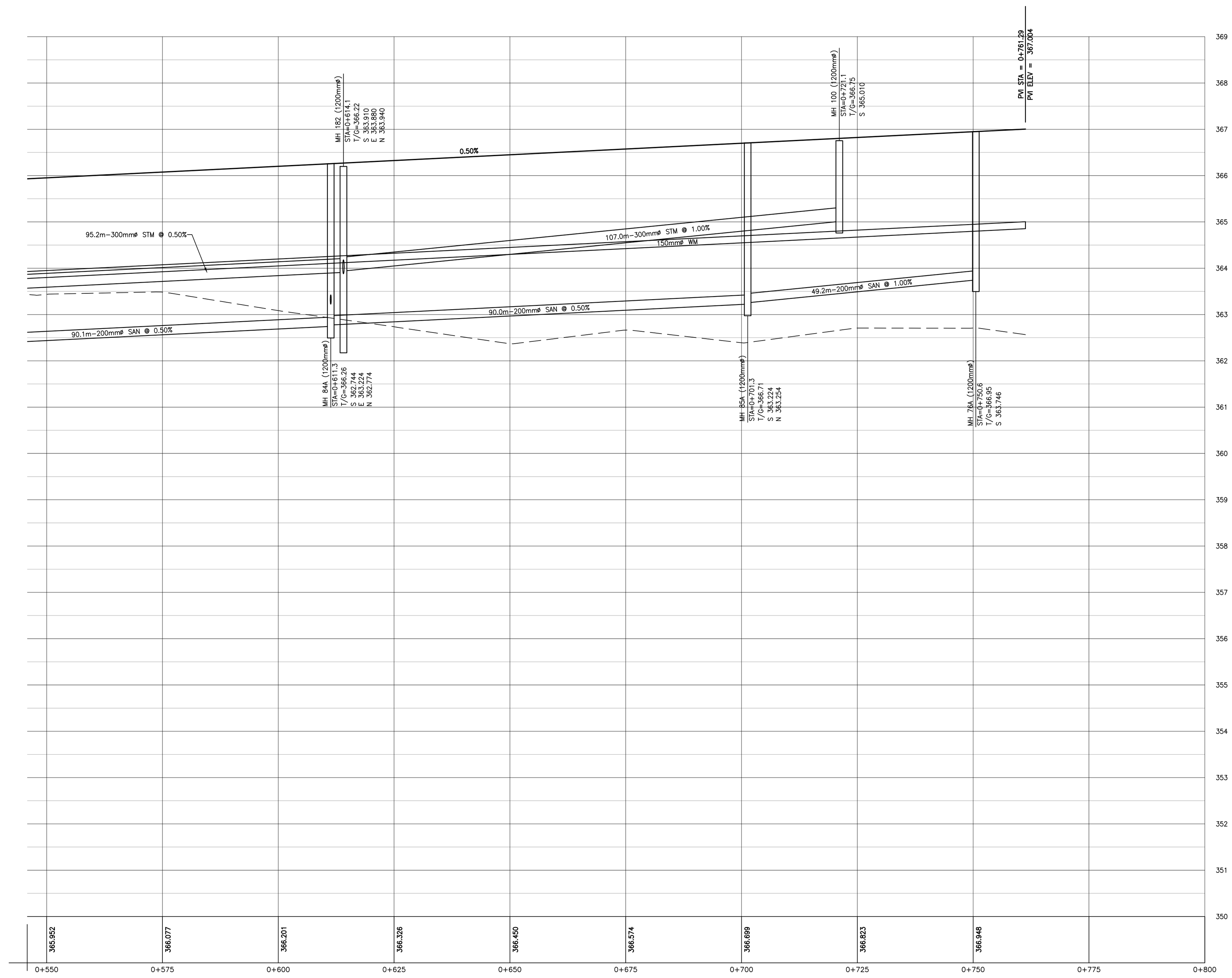
CONCEPTUAL SERVICING PLAN

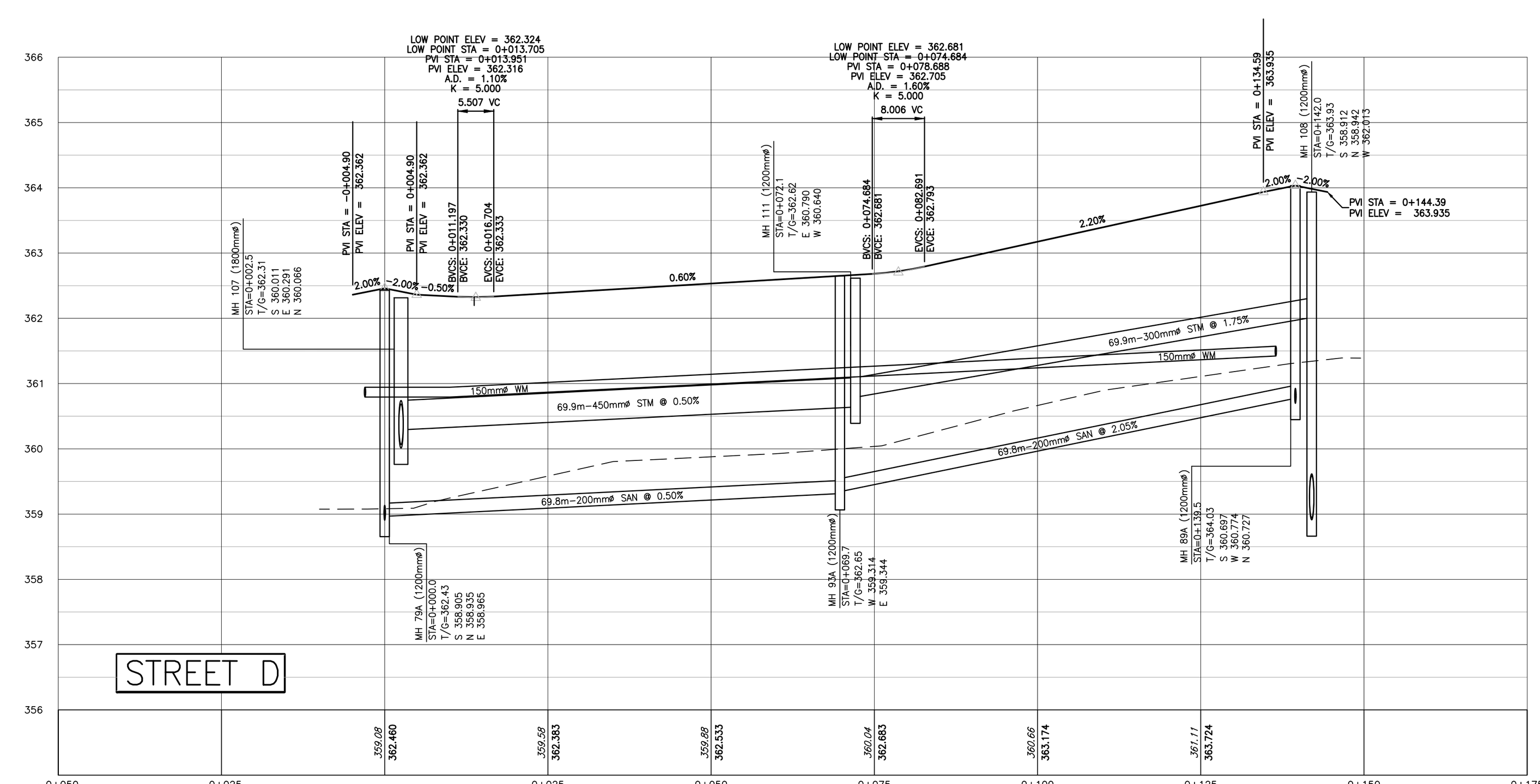
Project No.	Scale
161413217	1:1250 (0 12.5 37.5 62.5m)

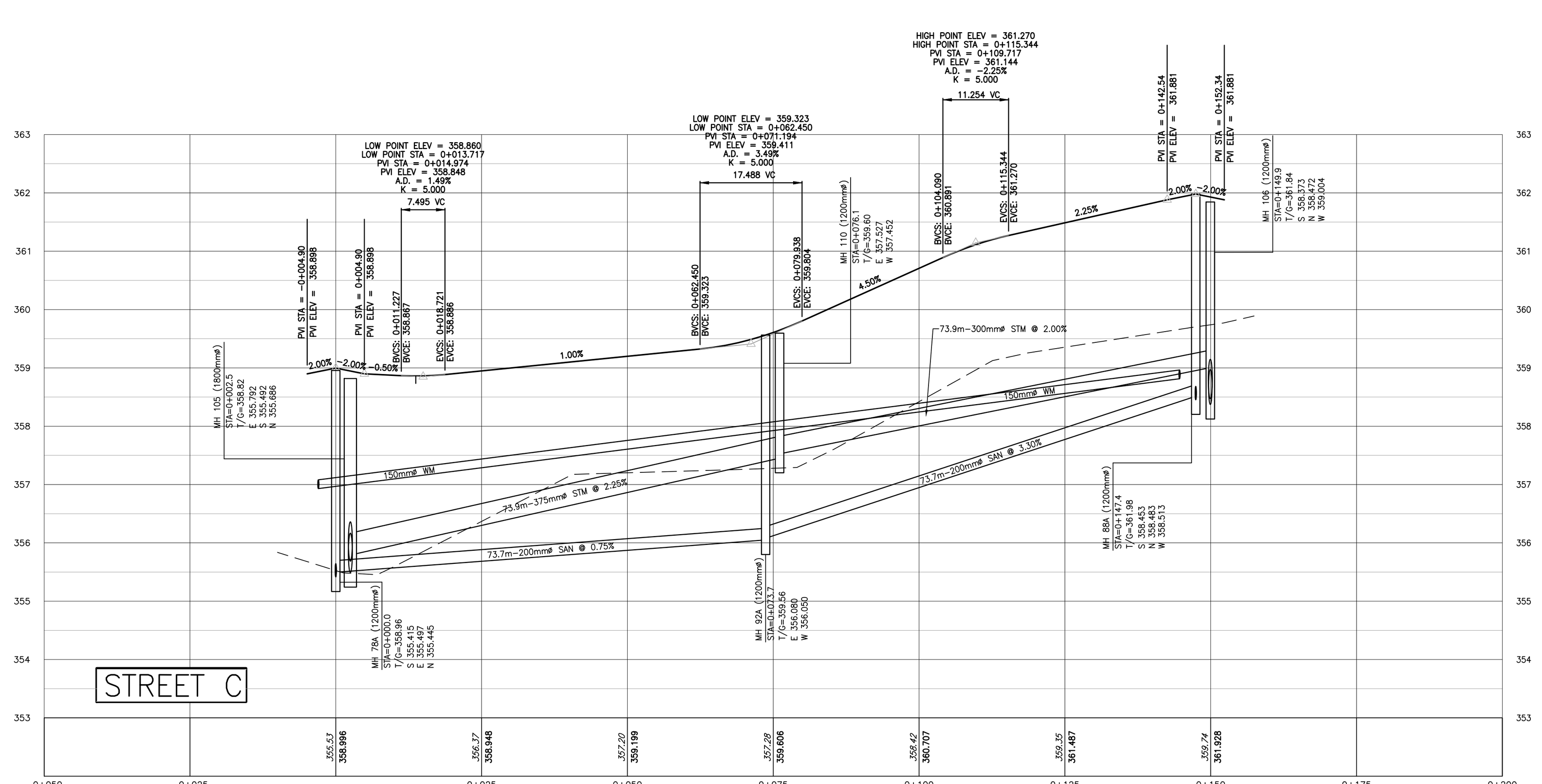
Revision	Sheet	Drawing No.
0	of	C-100

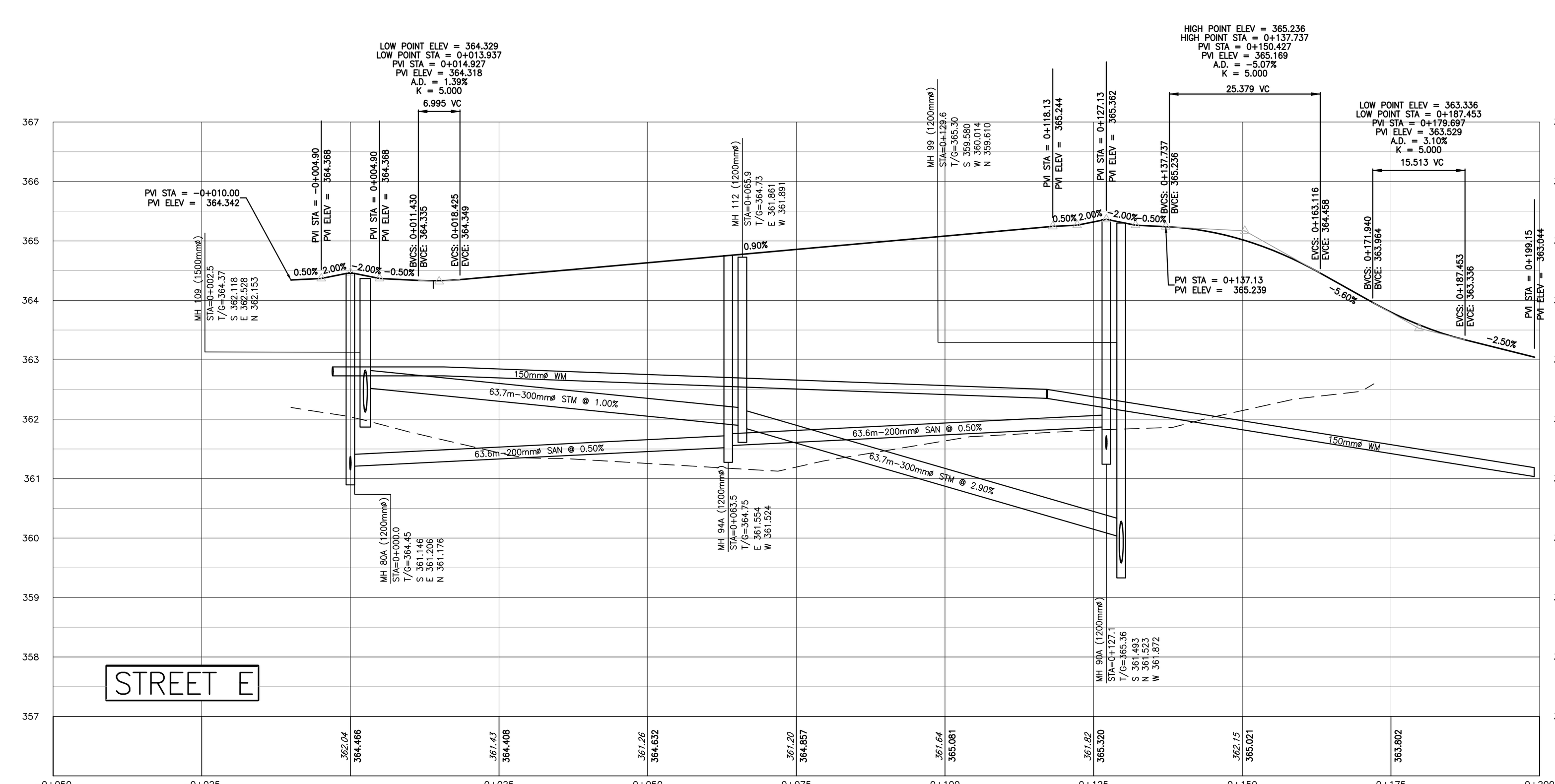
ORIGINAL SHEET - ARCH D

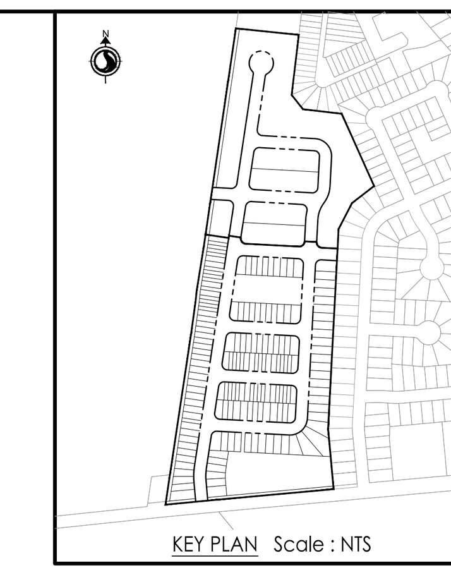












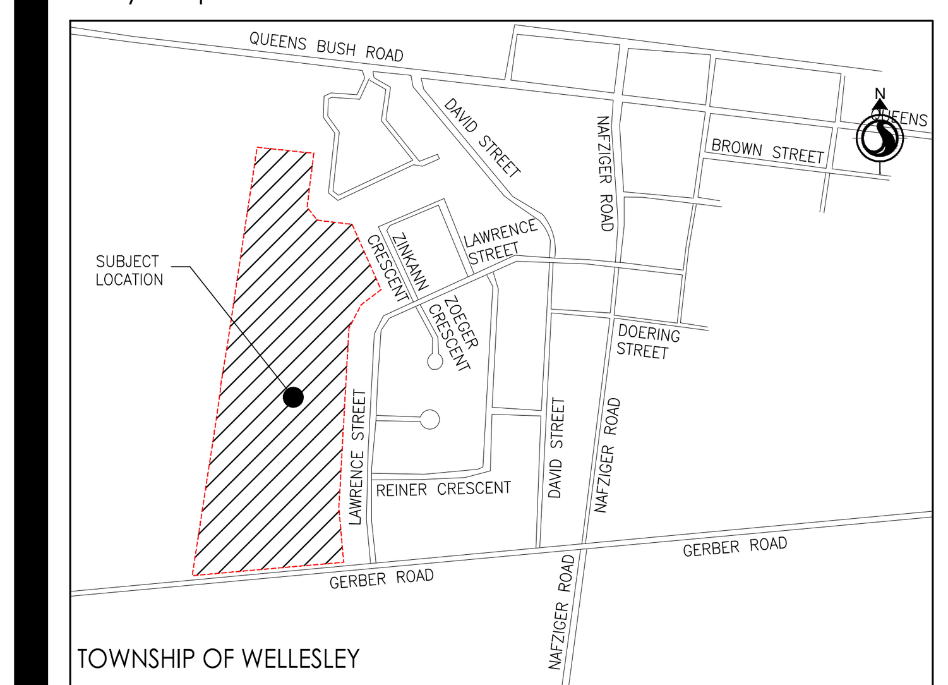
Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
2. DRAFT PLAN PREPARED BY XXX, DATED XXX.
3. CALCULATED PLAN PREPARED BY XXX, DATED XXX.
4. TOPOGRAPHICAL SURVEY PREPARED BY STANTEC CONSULTING LTD., DATED NOV 18, 2021. CONTOURS OUTSIDE OF THE PROPERTY LINE, AND WITHIN THE HEAVILY WOODED AREA OF THE SITE, HAVE BEEN OBTAINED FROM S.W.O.O.P TOPOGRAPHIC INFORMATION (2015).

Key Map NTS.



Legend

Revision	By	Appd	YYYY.MM.DD

File Name: 161413217_C-200	Dwn.	Chkd.	Dsgn.	2022.01.12 YY.MM.DD

Permit-Seal

CERTIFIED ENGINEERING TECHNOLOGIST — OACETT ONTARIO — JOHN VLEEMING — Nº 824712

Professional Engineers Ontario
Licensed Engineering Technologist
Name: J. R. K. BROUSSEAU
Number: 100227228
Limitations: Preparation of municipal servicing design and specifications for gravity sanitary sewer, storm sewer watermain layout, site grading, development erosion control and development of local roads.
Association of Professional Engineers of Ontario

Client/Project
STROHVEST ONTARIO INC.

WELLESLEY PROPERTY
GERBER ROAD

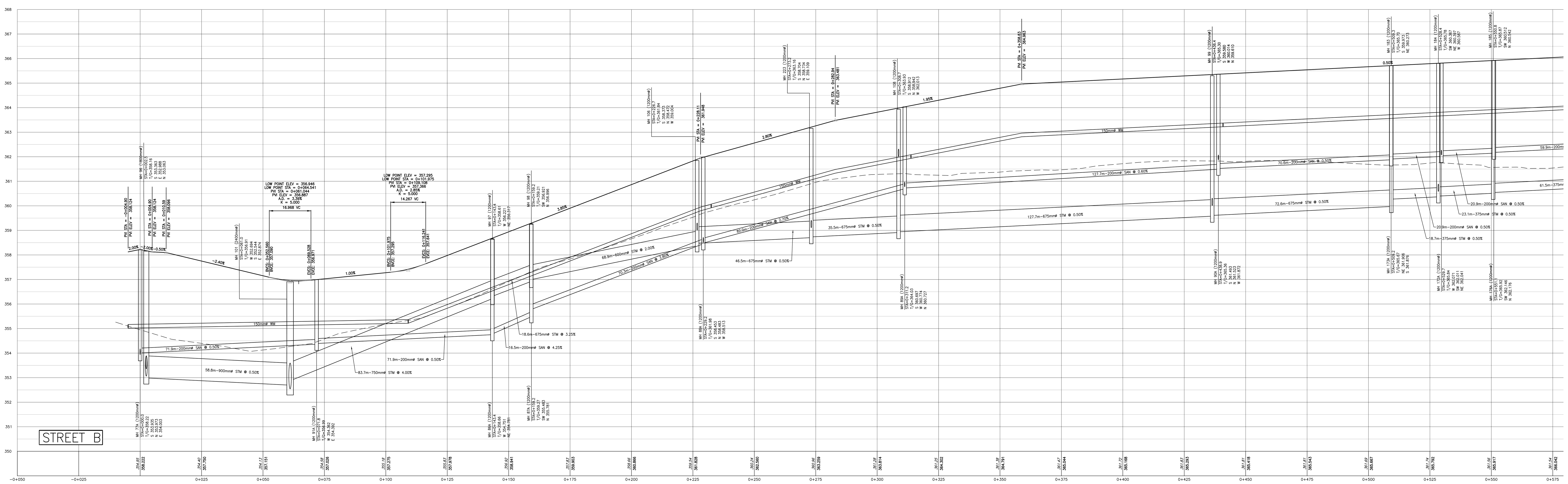
TOWNSHIP OF WELLESLEY, ON

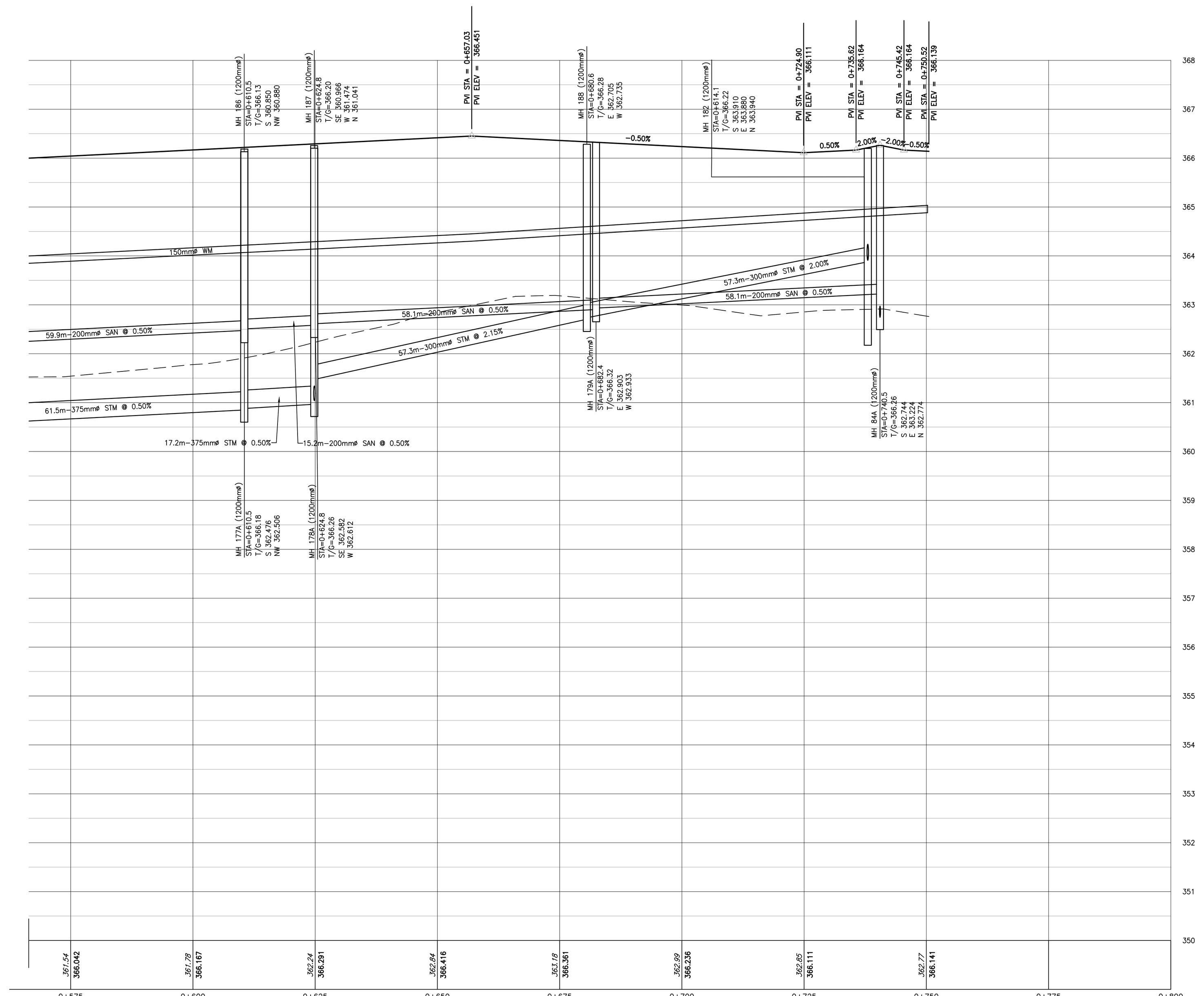
Title
CONCEPTUAL PROFILES

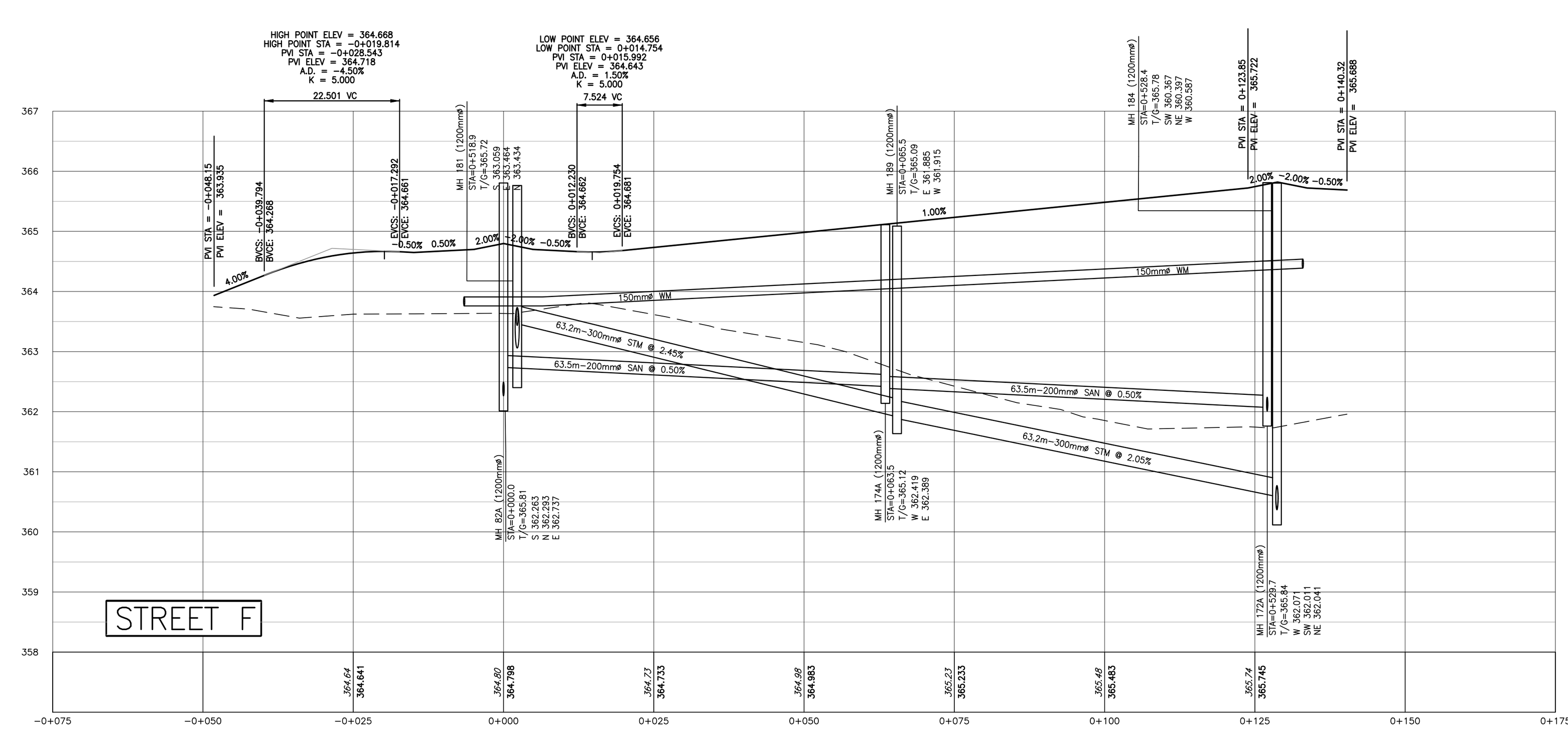
Project No.	Scale
161413217	

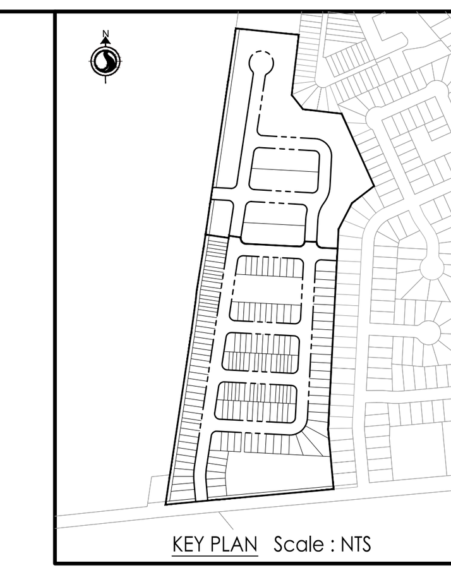
Revision	Sheet	Drawing No.
0	of	C-200

ORIGINAL SHEET - ARCH D









Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

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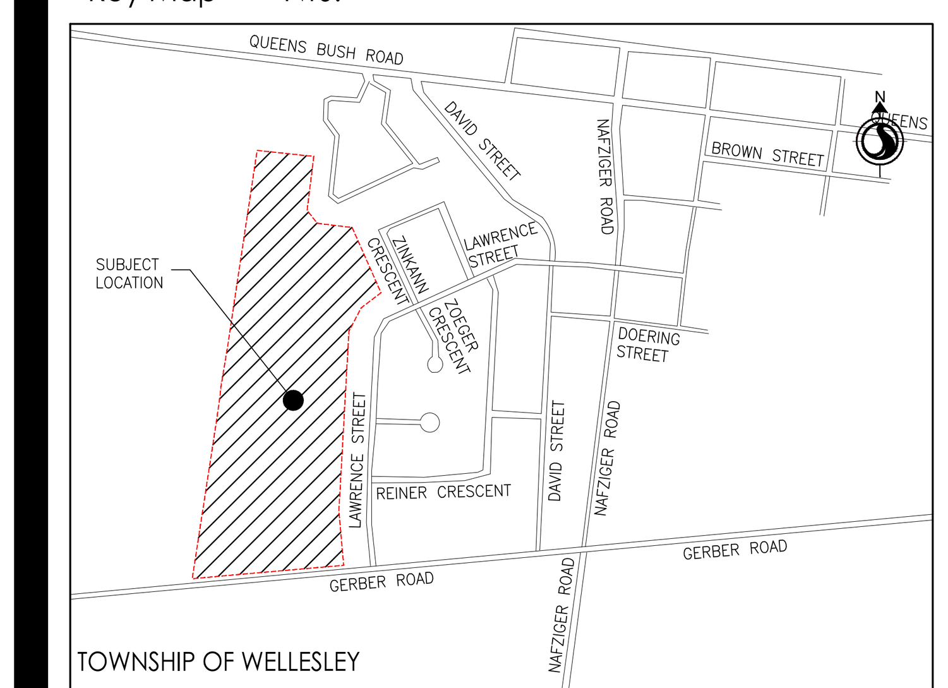
Key Map NTS.

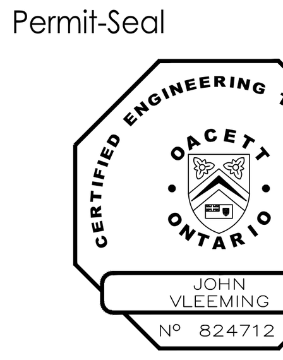


Legend

Revision	By	Appd	YYYY.MM.DD

File Name: 161413217_C-200				2022.01.12
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal



Professional Engineers Ontario

Licensed Engineering Technologist
Name: J. R. K. BROUSSEAU
Number: 100227228
Limitations: Preparation of municipal servicing design and specifications for gravity sanitary sewer, storm sewer watermain layout, site grading, development erosion control and development of local roads.
Association of Professional Engineers of Ontario

Client/Project

STROHVEST ONTARIO INC.

WELLESLEY PROPERTY
GERBER ROAD

TOWNSHIP OF WELLESLEY, ON

Title

CONCEPTUAL PROFILES

Project No.	Scale
161413217	

Revision	Sheet		Drawing No.
0		of	C-201

ORIGINAL SHEET - ARCH D

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Notes

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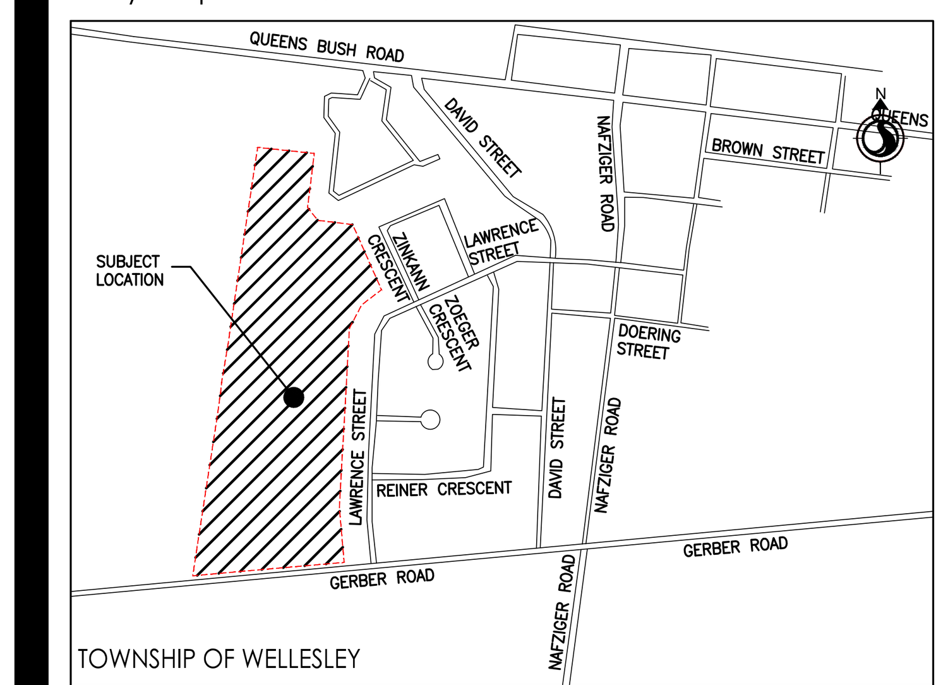
Key Map NTS.



Legend

347.06	EXISTING ELEVATION
352.92	FUTURE ELEVATION
352.92	PROPOSED ELEVATION
5.0% 2.0%	FLOW DIRECTION
	PROPOSED DRAINAGE SWALE
349.00	EXISTING CONTOUR
A	LOT TYPE (SEE DETAIL ON THIS DRAWING)
	STORM MANHOLE
	CATCHBASIN MANHOLE
	CATCHBASIN
	SANITARY MANHOLE
	VALVE & BOX
	HYDRANT
	WATER SERVICE VALVE
	PROPOSED SLOPE (3:1 UNLESS NOTED OTHERWISE)
	DROP CURB
	BARRIER CURB (OPSD 600.110)
	CONCRETE MOUNTABLE CURB (OPSD 600.060)
	CURB AND STANDARD GUTER (OPSD 600.040)
	OVERLAND FLOW DIRECTION
	RETAINING WALL
	PROPERTY SUBDIVISION BOUNDARY LIMITS

Revision	By	Appd	YYYY.MM.DD

File Name: 161413217_C-GP	Dwn.	Chkd.	Dsgn.	2022.03.03 YY.MM.DD

Permit-Seal

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT ONTARIO
JOHN VLEEMING
Nº 824712

Professional Engineers Ontario
Licensed Engineering Technologist
Name: J. R. K. BROUSSEAU
Number: 100227228
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Association of Professional Engineers of Ontario

Client/Project

STROHVEST ONTARIO INC.

WELLESLEY PROPERTY
GERBER ROAD

TOWNSHIP OF WELLESLEY, ON

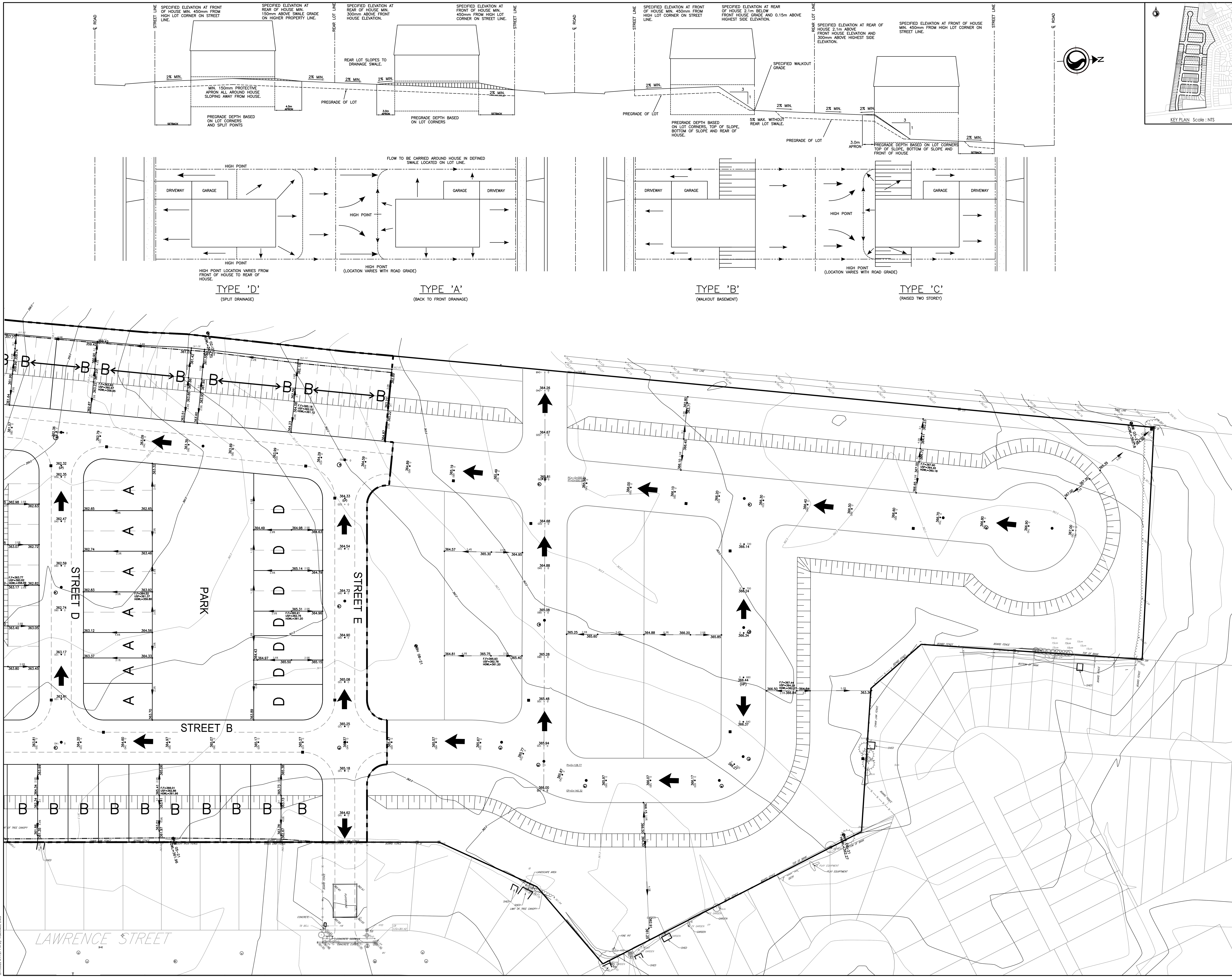
Title

CONCEPTUAL GRADING PLAN

Project No. 161413217
Scale 1:750 (0, 7.5, 22.5, 37.5m)

Revision 0
Sheet of
Drawing No. **C-400**

ORIGINAL SHEET - ARCH D



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Notes

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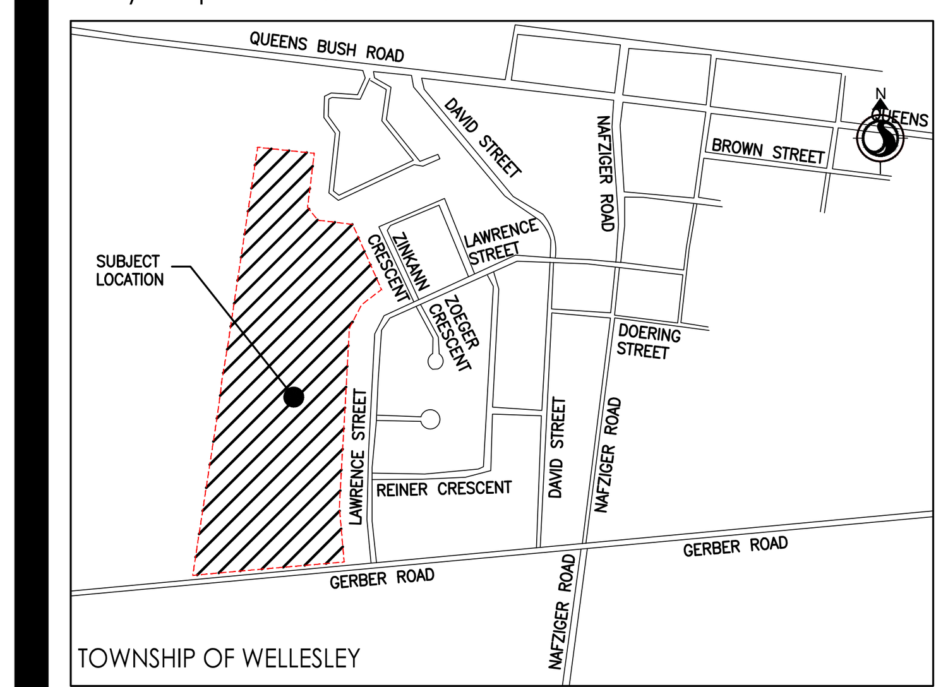
Key Map NTS.



Legend

- 347.06 EXISTING ELEVATION
- 352.92 FUTURE ELEVATION
- 352.92 PROPOSED ELEVATION
- FLOW DIRECTION
- PROPOSED DRAINAGE SWALE
- EXISTING CONTOUR
- A LOT TYPE (SEE DETAIL ON THIS DRAWING)
- STORM MANHOLE
- CATCHBASIN MANHOLE
- CATCHBASIN
- SANITARY MANHOLE
- VALVE & BOX
- HYDRANT
- WATER SERVICE VALVE
- PROPOSED SLOPE (3:1 UNLESS NOTED OTHERWISE)
- DROP CURB
- BARRIER CURB (OPSD 600.110)
- CONCRETE MOUNTABLE CURB (OPSD 600.060)
- CURB AND STANDARD GUTER (OPSD 600.040)
- OVERLAND FLOW DIRECTION
- RETAINING WALL
- PROPERTY SUBDIVISION BOUNDARY LIMITS

Revision	By	Appd	YYYY.MM.DD

File Name: 161413217_C-GP				2022.03.03
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT ONTARIO
JOHN VLEEMING
Nº 824712

Professional Engineers Ontario
Licensed Engineering Technologist
Name: J. R. K. BROUSSEAU
Number: 100227228
Limitations: Preparation of municipal servicing design and specifications for gravity sanitary sewer, storm sewer watermain layout, site grading, development erosion control and development of local roads.
Association of Professional Engineers of Ontario

Client/Project

STROHVEST ONTARIO INC.

WELLESLEY PROPERTY
GERBER ROAD

TOWNSHIP OF WELLESLEY, ON

Title

CONCEPTUAL GRADING PLAN

Project No.	Scale
161413217	1:750 (0 7.5 22.5 37.5m)

Revision	Sheet		Drawing No.
0		of	C-401

Stantec

SUBDIVISION
STROHVEST LANDS

SANITARY SEWER

DESIGN SHEET - PHASE 1

DATE: 3/2/2022
DESIGNED BY: EMV
CHECKED BY: JHV/KRB

FILE NUMBERS:
PROJECT NUMBER: 161413217

March 2, 2022

Region of Waterloo

DESIGN PARAMETERS

3/2/2022

AVERAGE DAILY FLOW PER PERSON =	275	l/c/day	RESIDENTIAL:	0.0041	l/s/c
			COMMERCIAL:	0.0032	l/s/ha
MINIMUM VELOCITY =	0.600	m/s	INDUSTRIAL:	0.5000	l/s/ha
n =	0.013		INSTITUTIONAL:	1.0000	l/s/ha
MAX PEAK FAC.=	4.500		INFILTRATION:	0.1500	l/s/ha
MIN PEAK FAC.=	1.500		RESIDENTIAL HARMON PEAKING FACTOR		

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INDUST		INSTIT		C+I+I	INFILTRATION			TOTAL FLOW	PIPE					
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP. DENSITY (p/ha)	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	(l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Street E	*90A*	*94A*	*0.29*	*115*	*33*	*0.29*	*33*	*4.348*	*0.588*							*0.000*	*0.29*	*0.29*	*0.044*	*0.632*	*63.60*	*200*	*0.50*	*22.630*	*0.73*	*0.29*
	94A	*80A*	*0.30*	*115*	*35*	*0.59*	*68*	*4.286*	*1.195*							*0.000*	*0.30*	*0.59*	*0.089*	*1.284*	*63.60*	*200*	*0.50*	*22.630*	*0.73*	*0.34*
	80A					*0.59*	*68*											*0.59*								
Street A	*80A*	*81A*	*0.39*	*115*	*45*	*0.98*	*113*	*4.229*	*1.959*							*0.000*	*0.39*	*0.98*	*0.147*	*2.106*	*64.10*	*200*	*1.40*	*37.820*	*1.22*	*0.57*
	81A	*79A*	*0.34*	*115*	*39*	*1.32*	*152*	*4.189*	*2.611*							*0.000*	*0.34*	*1.32*	*0.198*	*2.809*	*64.10*	*200*	*2.00*	*45.260*	*1.46*	*0.76*
	79A					*1.32*	*152*											*1.32*								
Street D	*89A*	*93A*	*0.51*	*115*	*59*	*0.51*	*59*	*4.300*	*1.040*							*0.000*	*0.51*	*0.51*	*0.077*	*1.117*	*69.80*	*200*	*2.05*	*45.570*	*1.47*	*0.59*
	93A	*79A*	*0.52*	*115*	*60*	*1.03*	*119*	*4.222*	*2.060*							*0.000*	*0.52*	*1.03*	*0.155*	*2.215*	*69.80*	*200*	*0.50*	*22.630*	*0.73*	*0.42*
	79A					*1.03*	*119*											*1.03*								
Street A	*79A*	*78A*	*0.48*	*115*	*55*	*2.83*	*326*	*4.063*	*5.431*							*0.000*	*0.48*	*2.83*	*0.425*	*5.856*	*82.40*	*200*	*4.20*	*65.410*	*2.11*	*1.22*
	78A					*2.83*	*326*											*2.83*								
Street C	*88A*	*92A*	*0.54*	*115*	*62*	*0.54*	*62*	*4.295*	*1.092*							*0.000*	*0.54*	*0.54*	*0.081*	*1.173*	*73.70*	*200*	*3.30*	*57.970*	*1.87*	*0.75*
	92A	*78A*	*0.52*	*115*	*60*	*1.06*	*122*	*4.219*	*2.110*							*0.000*	*0.52*	*1.06*	*0.159*	*2.269*	*73.70*	*200*	*0.75*	*27.590*	*0.89*	*0.52*
	78A					*1.06*	*122*											*1.06*								
Street A	*78A*	*77A*	*0.46*	*115*	*53*	*4.35*	*501*	*3.974*	*8.163*							*0.000*	*0.46*	*4.35*	*0.653*	*8.816*	*82.40*	*200*	*1.75*	*42.160*	*1.36*	*1.03*
	77A					*4.35*	*501*											*4.35*								
Street B	*90A*	*89A*	*0.72*	*115*	*83*	*0.72*	*83*	*4.265*	*1.451*							*0.000*	*0.72*	*0.72*	*0.108*	*1.559*	*127.70*	*200*	*0.60*	*24.800*	*0.80*	*0.42*
	89A	*88A*	*0.43*	*115*	*49*	*1.15*	*132*	*4.209*	*2.278*							*0.000*	*0.43*	*1.15*	*0.173*	*2.451*	*82.00*	*200*	*2.70*	*52.390*	*1.69*	*0.79*
	88A	*88A*	*0.44*	*115*	*51*	*1.59*	*183*	*4.162*	*3.123*							*0.000*	*0.44*	*1.59*	*0.239*	*3.362*	*70.30*	*200*	*3.80*	*62.310*	*2.01*	*0.94*
	87A	*86A*	*0.23*	*115*	*26*	*1.82*	*209*	*4.141*	*3.548*							*0.000*	*0.23*	*1.82*	*0.273*	*3.821*	*16.50*	*200*	*4.25*	*65.720*	*2.12*	*1.00*
	86A	*91A*	*0.63*	*115*	*72*	*2.45*	*281*	*4.090*	*4.712*							*0.000*	*0.63*	*2.45*	*0.368*	*5.080*	*71.90*	*200*	*0.50*	*22.630*	*0.73*	*0.57*
	91A	*77A*	*0.56*	*115*	*64*	*3.01*	*345*	*4.052*	*5.732*							*0.000*	*0.56*	*3.01*	*0.452*	*6.184*	*71.90*	*200*	*0.50*	*22.630*	*0.73*	*0.60*
	77A					*3.01*	*345*											*3.01*								
Street A	*77A*	*75A*	*0.66*	*115*	*76*	*8.02*	*922*	*3.822*	*14.448*							*0.000*	*0.66*	*8.02*	*1.203*	*15.651*	*83.10*	*200*	*0.50*	*22.630*	*0.73*	*0.79*
	75A	*74A*	*0.39*	*115*	*45*	*8.41*	*967*	*3.809*	*15.102*							*0.000*	*0.39*	*8.41*	*1.262*	*16.364*	*54.60*	*200*	*2.00*	*45.260*	*1.46*	*1.33*
Gerber Road	*74A*	*73A*	-	*115*	-	*8.41*	*967*	*3.809*	*15.102*							*0.000*	*0.00*	*8.41*	*1.262*	*16.364*	*88.90*	*200*	*0.50*	*22.630*	*0.73*	*0.80*
	73A	*72A*	-	*115*	-	*8.41*	*967*	*3.809*	*15.102*							*0.000*	*0.00*	*8.41*	*1.262*	*16.364*	*90.00*	*200*	*0.50*	*22.630*	*0.73*	*0.80*
	72A	*EX MH*	-	*115*	-	*8.41*	*967*	*3.809*	*15.102*							*0.000*	*0.00*	*8.41*	*1.262*	*16.364*	*90.00*	*200*	*0.50*	*22.630*	*0.73*	*0.80*
	EX MH					*8.41*	*967*											*8.41*								

Stantec

SUBDIVISION
STROHVEST LANDS

SANITARY SEWER

DESIGN SHEET - PHASE 1 AND 2

DATE: 3/9/2022
DESIGNED BY: EMV
CHECKED BY: JHV/KRB

FILE NUMBERS:
PROJECT NUMBER: 161413217

March 9, 2022

Region of Waterloo

DESIGN PARAMETERS

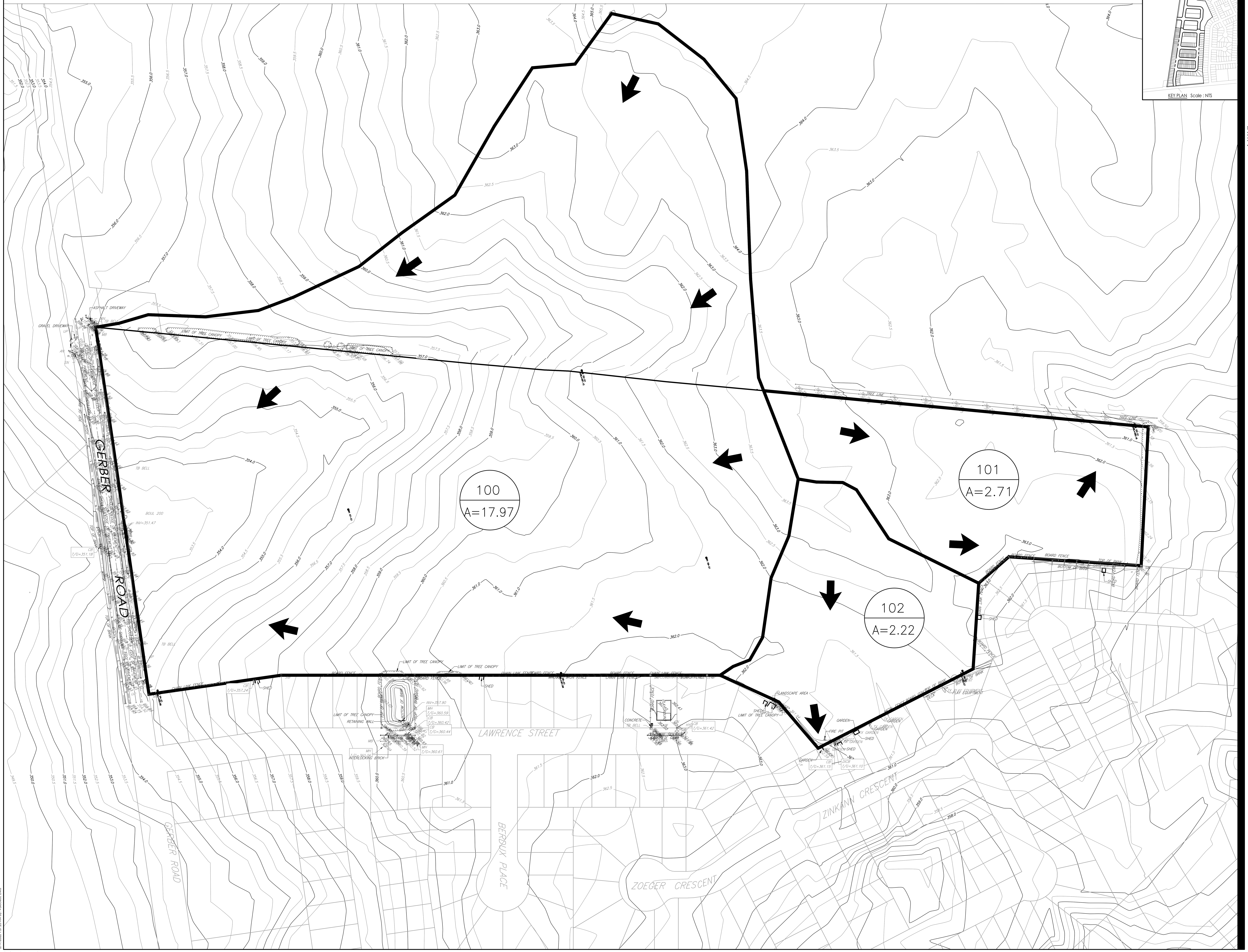
3/9/2022

AVERAGE DAILY FLOW PER PERSON =	275	l/c/day	RESIDENTIAL:	0.0041	l/s/c
			COMMERCIAL:	0.0032	l/s/ha
MINIMUM VELOCITY =	0.600	m/s	INDUSTRIAL:	0.5000	l/s/ha
n =	0.013		INSTITUTIONAL:	1.0000	l/s/ha
MAX PEAK FAC.=	4.500		INFILTRATION:	0.1500	l/s/ha
MIN PEAK FAC.=	1.500		RESIDENTIAL HARMON PEAKING FACTOR		

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INDUST		INSTIT		C+I+I	INFILTRATION			TOTAL FLOW	PIPE					
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP. DENSITY (p/ha)	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	(l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
	Fut	*Plug*	*3.72*	*115*	*428*	*3.72*	*428*	*4.008*	*7.033*							*0.000*	*3.72*	*3.72*	*0.558*	*7.591*	*69.60*	*200*	*1.20*	*35.030*	*1.13*	*0.86*
Street A	*Plug*	*80A*	*0.09*	*115*	*10*	*3.81*	*438*	*4.003*	*7.189*							*0.000*	*0.09*	*3.81*	*0.572*	*7.761*	*21.00*	*200*	*1.20*	*35.030*	*1.13*	*0.88*
	80A					*3.81*	*438*											*3.81*								
Street E	*90A*	*94A*	*0.29*	*115*	*33*	*0.29*	*33*	*4.348*	*0.588*							*0.000*	*0.29*	*0.29*	*0.044*	*0.632*	*63.60*	*200*	*0.50*	*22.630*	*0.73*	*0.29*
	94A	*80A*	*0.30*	*115*	*35*	*0.59*	*68*	*4.286*	*1.195*							*0.000*	*0.30*	*0.59*	*0.089*	*1.284*	*63.60*	*200*	*0.50*	*22.630*	*0.73*	*0.34*
	80A					*0.59*	*68*											*0.59*								
Street A	*80A*	*81A*	*0.39*	*115*	*45*	*4.79*	*551*	*3.952*	*8.928*							*0.000*	*0.39*	*4.79*	*0.719*	*9.647*	*64.10*	*200*	*1.40*	*37.820*	*1.22*	*0.98*
	81A	*79A*	*0.34*	*115*	*39*	*5.13*	*590*	*3.936*	*9.521*							*0.000*	*0.34*	*5.13*	*0.770*	*10.291*	*64.10*	*200*	*2.00*	*45.260*	*1.46*	*1.14*
	79A					*5.13*	*590*											*5.13*								
Street D	*89A*	*93A*	*0.51*	*115*	*59*	*0.51*	*59*	*4.300*	*1.040*							*0.000*	*0.51*	*0.51*	*0.077*	*1.117*	*69.80*	*200*	*2.05*	*45.570*	*1.47*	*0.59*
	93A	*79A*	*0.52*	*115*	*60*	*1.03*	*119*	*4.222*	*2.060*							*0.000*	*0.52*	*1.03*	*0.155*	*2.215*	*69.80*	*200*	*0.50*	*22.630*	*0.73*	*0.42*
	79A					*1.03*	*119*											*1.03*								
Street A	*79A*	*78A*	*0.48*	*115*	*55*	*6.64*	*764*	*3.872*	*12.129*							*0.000*	*0.48*	*6.64*	*0.996*	*13.125*	*82.40*	*200*	*4.20*	*65.410*	*2.11*	*1.60*
	78A					*6.64*	*764*											*6.64*								
Street C	*88A*	*92A*	*0.54*	*115*	*62*	*0.54*	*62*	*4.295*	*1.092*							*0.000*	*0.54*	*0.54*	*0.081*	*1.173*	*73.70*	*200*	*3.30*	*57.970*	*1.87*	*0.75*
	92A	*78A*	*0.52*	*115*	*60*	*1.06*	*122*	*4.219*	*2.110*							*0.000*	*0.52*	*1.06*	*0.159*	*2.269*	*73.70*	*200*	*0.75*	*27.590*	*0.89*	*0.52*
	78A					*1.06*	*122*											*1.06*								
Street A	*78A*	*77A*	*0.46*	*115*	*53*	*8.16*	*939*	*3.817*	*14.695*							*0.000*	*0.46*	*8.16*	*1.224*	*15.919*	*82.40*	*200*	*1.75*	*42.160*	*1.36*	*1.24*
	77A					*8.16*	*939*											*8.16*								
Street B	*Fut*	*Plug*	*2.73*	*115*	*314*	*2.73*	*752*	*3.876*	*11.950*							*0.000*	*2.73*	*2.73*	*0.410*	*12.360*	*51.60*	*200*	*0.50*	*22.630*	*0.73*	*0.74*
	Plug	*90A*	*0.02*			*2.75*	*752*	*3.876*	*11.950*							*0.000*	*0.02*	*2.75*	*0.413*	*12.363*	*19.00*	*200*	*0.50*	*22.630*	*0.73*	*0.74*
	90A	*89A*	*0.72*	*115*	*83*	*3.47*	*835*	*3.849*	*13.177*							*0.000*	*0.72*	*3.47*	*0.521*	*13.698*	*127.70*	*200*	*0.60*	*24.800*	*0.80*	*0.82*
	89A	*88A*	*0.43*	*115*	*49*	*3.90*	*884*	*3.834*	*13.896*							*0.000*	*0.43*	*3.90*	*0.585*	*14.481*	*82.00*	*200*	*2.70*	*52.390*	*1.69*	*1.39*
	88A	*88A*	*0.44*	*115*	*51*	*4.34*	*935*	*3.819*	*14.640*							*0.000*	*0.44*	*4.34*	*0.651*	*15.291*	*70.30*	*200*	*3.80*	*62.310*	*2.01*	*1.61*
	87A	*86A*	*0.23*	*115*	*26*	*4.57*	*961*	*3.811*	*15.016*							*0.000*	*0.23*	*4.57*	*0.686*	*15.702*	*16.50*	*200*	*4.25*	*65.720*	*2.12*	*1.65*
	86A	*91A*	*0.63*	*115*	*72*	*5.20*	*1033*	*3.791*	*16.056*							*0.000*	*0.63*	*5.20*	*0.780*	*16.836*	*71.90*	*200*	*0.50*	*22.630*	*0.73*	*0.81*
	91A	*77A*	*0.56*	*115*	*64*	*5.76*	*1097*	*3.774*	*16.974*							*0.000*	*0.56*	*5.76*	*0.864*	*17.838*	*71.90*	*200*	*0.50*	*22.630*	*0.73*	*0.81*
	77A					*5.76*	*1097*											*5.76*								
Street A	*77A*	*75A*	*0.66*	*115*	*76*	*14.58*	*2112*	*3.567*	*30.887*							*0.000*	*0.66*	*14.58*	*2.187*	*33.074*	*83.10*	*200*	*0.50*	*22.630*	*0.73*	*0.83*
	75A	*74A*	*0.39*	*115*	*45*	*14.97*	*2157*	*3.560*	*31.484*							*0.000*	*0.39*	*14.97*	*2.246*	*33.730*	*54.60*	*200*	*2.00*	*45.260*	*1.46*	*1.61*
Gerber Road	*74A*	*73A*	-	*115*	-	*14.97*	*2157*	*3.560*	*31.484*							*0.000*	*0.00*	*14.97*	*2.246*	*33.730*	*88.90*	*200*	*0.50*	*22.630*	*0.73*	*0.83*
	73A	*72A*	-	*115*	-	*14.97*	*2157*	*3.560*	*31.484*							*0.000*	*0.00*	*14.97*	*2.246*	*33.730*	*90.00*	*200*	*0.50*	*22.630*	*0.73*	*0.83*
	72A	*EX MH*	-	*115*	-	*14.97*	*2157*	*3.560*	*31.484*							*0.000*	*0.00*	*14.97*	*2.246*	*33.730*	*90.00*	*200*	*0.50*	*22.630*	*0.73*	*0.83*
	EX MH					*14.97*	*2157*											*14.97*								

APPENDIX C

Existing Plan and Profile Drawings



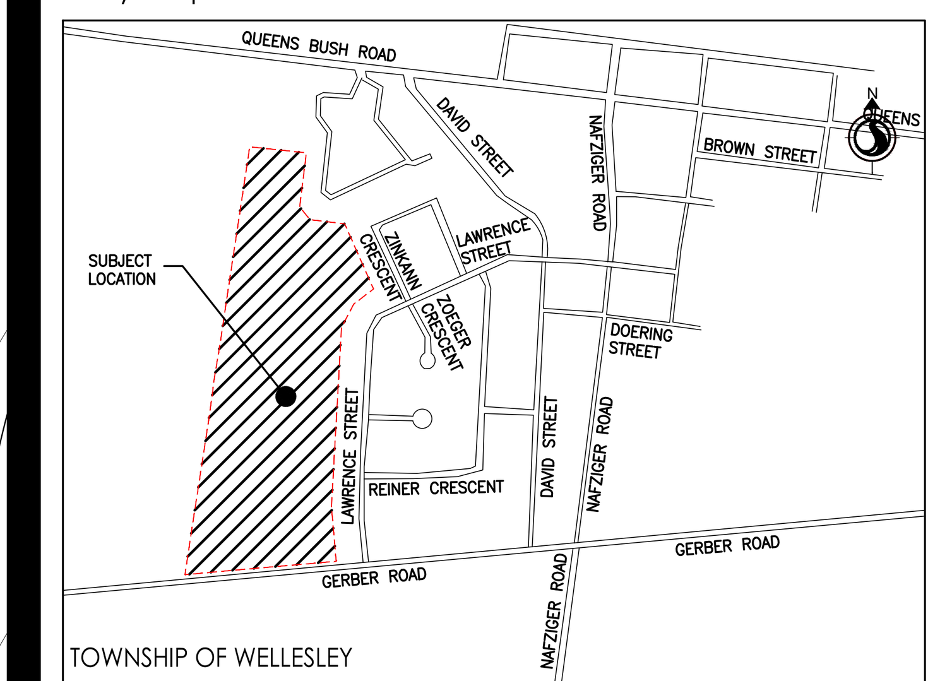
Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
2. DRAFT PLAN PREPARED BY XXX, DATED XXX.
3. CALCULATED PLAN PREPARED BY XXX, DATED XXX.
4. TOPOGRAPHICAL SURVEY PREPARED BY STANTEC CONSULTING LTD., DATED NOV 18, 2021. CONTOURS OUTSIDE OF THE PROPERTY LINE, AND WITHIN THE HEAVILY WOODED AREA OF THE SITE, HAVE BEEN OBTAINED FROM S.W.O.O.P TOPOGRAPHIC INFORMATION (2015).

Key Map NTS.



Legend

	PROPERTY BOUNDARY
352.00	EXISTING CONTOUR
	EXISTING FENCE
BH 2 345.96	APPROXIMATE BORE HOLE LOCATION AND EXISTING GROUND ELEVATION

Revision	By	Appd	YYYY.MM.DD

File Name: 161413217_EXTERNAL	Dwn.	Chkd.	Dsgn.	YY.MM.DD
				2022.01.05

Permit-Seal

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT ONTARIO
JOHN VLEEMING
Nº 824712

Professional Engineers Ontario

Licensed Engineering Technologist
Name: J. R. K. BROUSSEAU
Number: 100227228
Limitations: Preparation of municipal servicing design and specifications for gravity sanitary sewer, storm sewer watermain layout, site grading, development erosion control and development of local roads.
Association of Professional Engineers of Ontario

Client/Project

STROHVEST ONTARIO INC.

WELLESLEY PROPERTY
GERBER ROAD

TOWNSHIP OF WELLESLEY, ON

Title

EXISTING CONDITIONS AND REMOVALS PLAN

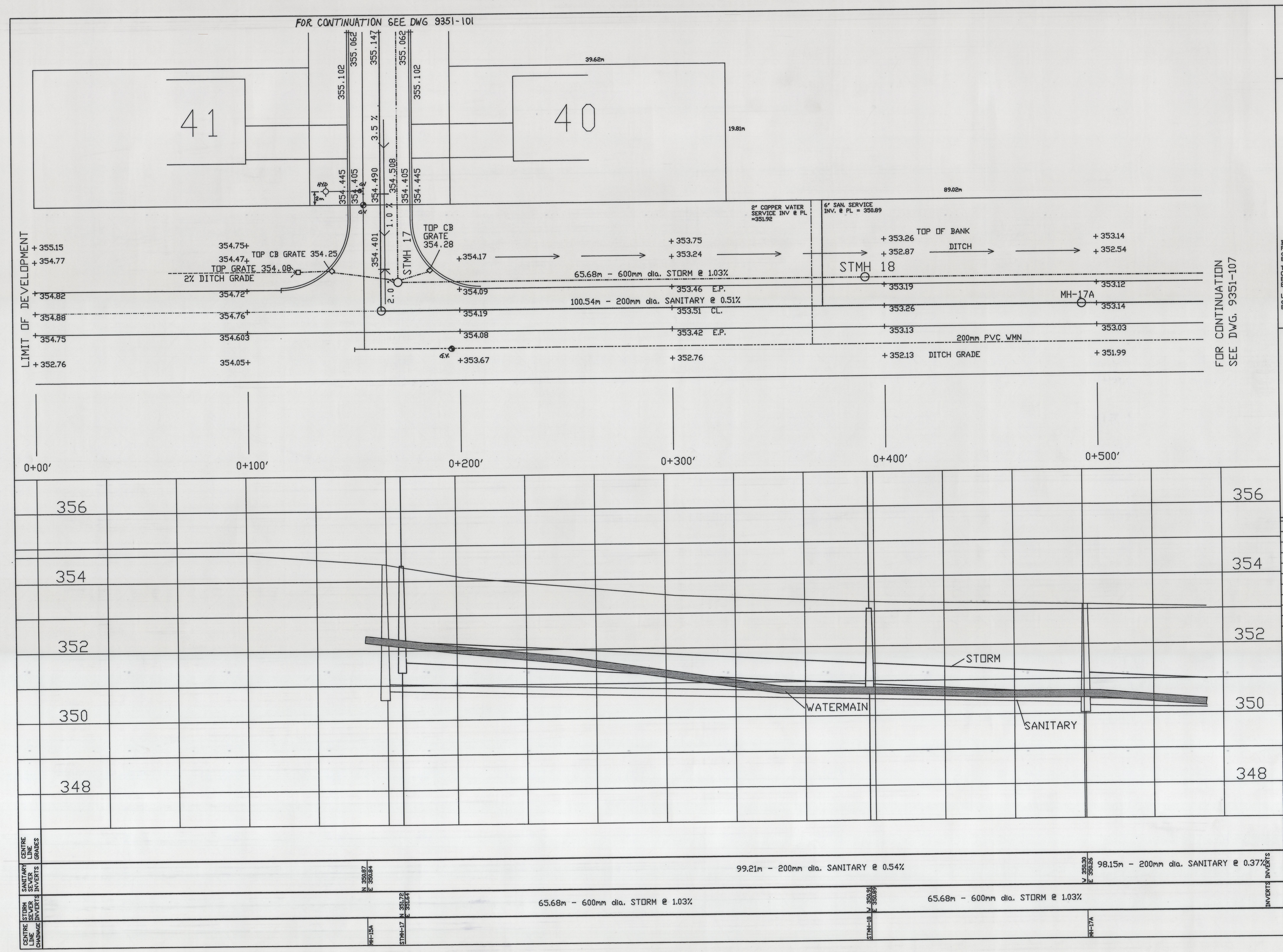
Project No. 161413217

Scale 1:1250 (0 12.5 37.5 62.5m)

Revision 0 Sheet of

Drawing No. C-050

ORIGINAL SHEET - ARCH D



LEGEND

- 357.67 PROPOSED LOT GRADE
- 359.303 EXISTING GRADE
- +354.000 CENTRELINE GRADE OR CURB GRADE
- 10 BUILDING ENVELOPE AND LOT NUMBER
- FLOW DIRECTION
- MAJOR STORM FLOW ROUTE
- RWL RAIN WATER LEADERS TO BE DIRECTED TO FRONT OF LOT
- SWALE
- PHASE BOUNDARY

BENCH MARKS:
Plate in SE corner of bridge over mill Pond on Queen Street, East of David Street
ELEVATION 354.139 COUNTY BM 019

Tablet on top of S Cnr NE Wingwall of Concrete Bridge Reg'l Rd. 12 approx 245m East of Reg'l Rd. 5
ELEVATION 347.110 COUNTY BM 028

Local TBM - Top of Hydrant at Reiner and Evelyn (West side of Reiner)
ELEVATION 362.193

NO.	REVISIONS	BY	DATE
3			
2			
1	G.V.s ADDED	LAG	NOV 99
0	AS CONSTRUCTED	TH	AUG /98

L.A. GIRARD Engineering (Ontario) Ltd.
266 MAIN ST. E. OTTERVILLE, ONT.
NOJ 1R0
TEL. & FAX (519) 879-6875

WELLESLEY HEIGHTS LTD
CAMBRIDGE, ONTARIO

WELLESLEY HEIGHTS SUBDIVISION RP 1393
TOWNSHIP OF WELLESLEY

PLAN & PROFILE
TOWNSHIP ROAD NO 1

SCALE: HOR 1 : 250 VERT 1 : 50
DATE: AUGUST /98
DRAWING BY: TH
CHECKED BY: L.A.G.
PROJECT NO. 9351
DRAWING NO. 9351- 106

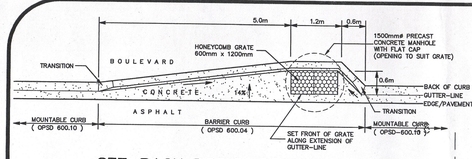
LAWRENCE ST. 0+360.0 TO 0+594.105

MTE Computer Dwg No. 03403107.DWG

December 3, 1996 — 3:38 p.m. — Plotted By: GEH

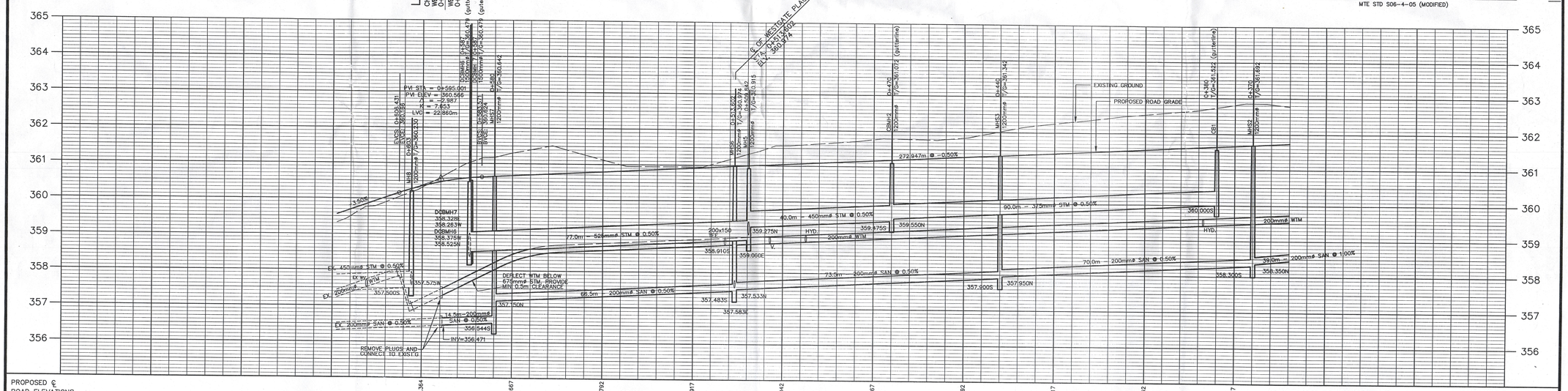
SET-BACK DCBMH DETAIL

N.T.S.



PIPE MATERIALS:

SIZE	ALLOWABLE MATERIALS	AS-BUILT MATERIAL	PIPE CLASSIFICATION (UNLESS NOTED OTHERWISE)	BEDDING CLASS
SANITARY				
100mmø	PVC (CSA B182.2)		SDR 28 (HOUSE CONNECTION)	"B"
200mmø to 250mmø	PVC (CSA B182.2)		SDR 35	"B"
	CONC. (CSA A257.1)		CLASS 3	"B"
300mmø and LARGER	PVC (CSA B182.2)		SDR 35	"B"
	CONC. (CSA A257.2)		100-D	"B"
STORM				
250mmø to 450mmø	CONC. (CSA A257.1)		CLASS 3	"B"
	RIBBED PVC (CSA B182.4)		>320 KpA STIFFNESS	"B"
	SMOOTHWALL HDPE gasketted (CSA B182.6)		AT < 5% PIPE DEFLECTION	"B"
525mmø to 600mmø	CONC. (CSA A257.2)		65-D	"B"
	RIBBED PVC (CSA B182.4)		>320 KpA STIFFNESS	"B"
	SMOOTHWALL HDPE gasketted (CSA B182.6)		AT < 5% PIPE DEFLECTION	"B"
675-900ø	CONC. (CSA A257.2)		65-D	"B"
975mmø >	CONC. (CSA A257.2)		50-D	"B"
WATER				
19mmø	COPPER		TYPE K (HOUSE CONNECTION)	SAND
150mmø and LARGER	DUCTILE IRON (CSA B131.13)		CLASS 52 (cement lined)	"B"
	PVC (CSA B157.3)		CLASS 150	"B"



GENERAL NOTES:

ALL STANDARDS ARE AS FOLLOWS, UNLESS INDICATED OTHERWISE ON THIS DRAWING. (SEE ALLOWABLE PIPE MATERIALS TABLE THIS SHEET.)

1. FACTORY MANUFACTURED TEES SHALL BE USED FOR ALL SANITARY SERVICE CONNECTIONS.
2. ALL CONCRETE STORM SEWERS SHALL USE RUBBER GASKETS ON JOINTS.
3. ALL WATERMAIN SHALL BE INSTALLED AT A DEPTH OF 2m COVER.
4. RESIDENTIAL SANITARY SEWER CONNECTIONS SHALL BE AT A MINIMUM GRADE OF 2% TO DEPTH AT PROPERTY LINE OF 2.6m.
5. RESIDENTIAL WATER SERVICE CONNECTIONS SHALL BE INSTALLED TO A DEPTH AT THE PROPERTY LINE OF 2.0m.
6. CATCHBASIN LEADS SHALL BE 250mm ø FOR SINGLE CB'S AND 300mm ø FOR DOUBLE CB'S, BOTH AT 2% GRADE.
7. ROAD STRUCTURE SHALL BE:

GBC CLASS B	450 mm
GBC CLASS A	150 mm
BINDER HL. 4	50 mm
SURFACE HL. 3 FINE	30 mm

8. CURB RADIUS AT INTERSECTIONS SHALL BE 9.0m.
9. TOWNSHIP OF WELLESLEY STANDARDS

SANITARY MANHOLES	OPSD 701.01
STORM MANHOLES	OPSD 701.01, OPSD 701.02
CATCH BASINS	OPSD 705.01, OPSD 705.02
PIPE BEDDINGS	FOR SAN. OPSD 1005.01 FOR STM. OPSD 802.03 FOR WTM. OPSD 1102.03
SANITARY SERVICE CONNECTIONS	OPSD 1006.01
WATER SERVICE CONNECTIONS	OPSD 1104.01
CONCRETE CURB AND GUTTER	OPSD 600.10, OPSD 600.04
STREET SECTION	110

No.	REVISIONS	BY	DATE
5.			
4.			
3.			
2.			
1.	1st Submission	G.E.H	96/12/03

BENCHMARK ELEV. = 353.136

DESCRIPTION

MTE BENCHMARK -- TOP OF MANHOLE CASTING LOCATED ON THE NORTH SIDE OF TOWNSHIP ROAD No.1 APPROXIMATELY 68m EAST OF PROPOSED TOWNSHIP ROAD No.1 AND LAWRENCE STREET INTERSECTION

MTE consultants inc. DEC 04 1996 PRINTED

OWNER
BOBAN DEVELOPMENTS
1201 RATCLIFFE, RR#21
CAMBRIDGE, ONTARIO

TWP. of WELLESLEY

PROJECT
WELLESLEY HEIGHTS III
R.P. # 0000

DRAWING
LAWRENCE STREET
STA 0+360.0 to STA 0+594.105

MTE consultants inc.
CONSULTING CIVIL ENGINEERS
650 Riverbend Dr., Kitchener Ont., N2K 3S2
Phone (519) 743-6500 Fax (519) 743-6513

Design By	MEC
Checked By	JEM
Drawn By	AVD/GEH
Date	DECEMBER 3, 1996
Scale	H 1:500 (M) V 1:50
City File No.	
MTE Drawing No.	340-107
SHEET	of

FOR APPROVAL ONLY

APPENDIX D

Water Distribution Analysis

Region of Waterloo

TRANSPORTATION AND
ENVIRONMENTAL SERVICES
Water Services

150 Frederick Street
Kitchener ON Canada N2G 4J3
Telephone: (519) 575-4426
Fax: (519) 575-4452
www.region.waterloo.on.ca

Date: December 16, 2021
File #: E18-50/WEL

Hitesh Ladd, M. Eng., P. Eng.
Stantec
100-300 Hagey Blvd
Waterloo, ON N2L 0A4
t. 519.585.7268
c. 519.498.2809
e. Hitesh.Ladd@stantec.com

Dear: Hitesh

Re: Strohvest Lands, Wellesley

Please find the results of the modeling simulations for boundary conditions requested on November 10, 2021. The results included a figure showing the locations of the node from the Region's model. Attached are a series of spreadsheets containing results for Average Day, Maximum Day demands and available fire flows for node JCT_01084 located at Gerber Rd and Lawrence St. The diurnal 24-hour demand distribution accounts for the minimum hour and peak hour peaking factors. The minimum hourly demand on the average day represents the minimum hour, and the maximum hourly demand on the maximum day represents the peak hour.

Table 2 summarizes the modeling results.

Table 2 – Demands and Fire Flow Results

Node	Location	Elevation (mASL)	Residential Demand (L/s)		Fire Flow Results	
			Ave Day	Max Day	Design Flow (L/s)	Design Pressure (m)
JCT_01084	Gerber Rd and Lawrence St	354.00	2.58	5.16	78.3	25.5

A fire flow analysis shows the maximum flow available at a node with an associated design pressure during the maximum day scenario while maintaining the minimum design pressure of 14 m (140 kPa) at all nodes within the pressure zone.

If you have any questions, please contact me.

Kevin Dolishny P.Eng.
Senior Engineer
Water Services
t. 519.575.4757 x 3862
c. 226.751.4551
e-mail: kdolishny@regionofwaterloo.ca

WEL Infowater Pro Gerber and Lawrence

JCT_ 01084 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	1.70	425.43	71.43
01:00 hrs	1.70	425.44	71.44
02:00 hrs	1.44	425.45	71.45
03:00 hrs	1.52	425.44	71.44
04:00 hrs	1.70	425.43	71.43
05:00 hrs	1.73	425.43	71.43
06:00 hrs	1.76	425.43	71.43
07:00 hrs	2.07	425.41	71.41
08:00 hrs	2.70	425.36	71.36
09:00 hrs	2.99	417.79	63.79
10:00 hrs	3.17	425.33	71.33
11:00 hrs	3.17	425.33	71.33
12:00 hrs	3.01	425.34	71.34
13:00 hrs	2.78	425.36	71.36
14:00 hrs	2.73	425.37	71.37
15:00 hrs	2.62	425.38	71.38
16:00 hrs	2.54	425.38	71.38
17:00 hrs	2.62	425.38	71.38
18:00 hrs	2.78	425.36	71.36
19:00 hrs	3.12	425.34	71.34
20:00 hrs	3.62	425.29	71.29
21:00 hrs	3.88	425.27	71.27
22:00 hrs	3.88	425.27	71.27
23:00 hrs	3.09	425.34	71.34

Average Day HGL: 425.06
Minimum Hour: 425.45

JCT_ 01084 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	3.40	417.96	63.96
01:00 hrs	3.40	425.35	71.35
02:00 hrs	2.88	425.39	71.39
03:00 hrs	3.03	425.38	71.38
04:00 hrs	3.40	425.35	71.35
05:00 hrs	3.45	425.35	71.35
06:00 hrs	3.50	425.34	71.34
07:00 hrs	4.13	425.29	71.29
08:00 hrs	5.39	421.67	67.67
09:00 hrs	5.96	420.66	66.66
10:00 hrs	6.33	420.01	66.01
11:00 hrs	6.33	419.93	65.93
12:00 hrs	6.01	420.40	66.40
13:00 hrs	5.54	421.22	67.22
14:00 hrs	5.44	421.61	67.61
15:00 hrs	5.23	421.30	67.30
16:00 hrs	5.07	425.38	71.38
17:00 hrs	5.23	425.37	71.37
18:00 hrs	5.54	421.53	67.53
19:00 hrs	6.22	420.31	66.31
20:00 hrs	7.22	418.63	64.63
21:00 hrs	7.74	417.84	63.84
22:00 hrs	7.74	417.93	63.93
23:00 hrs	6.17	420.54	66.54

Maximum Day HGL: 422.07
Peak Hour: 417.84

WEL Infowater Pro Gerber and Lawrence

Available Flow (L/s)	Residual Pressure (m)
0.0	69.5
20.0	62.3
40.0	56.4
60.0	44.4
78.3	25.5

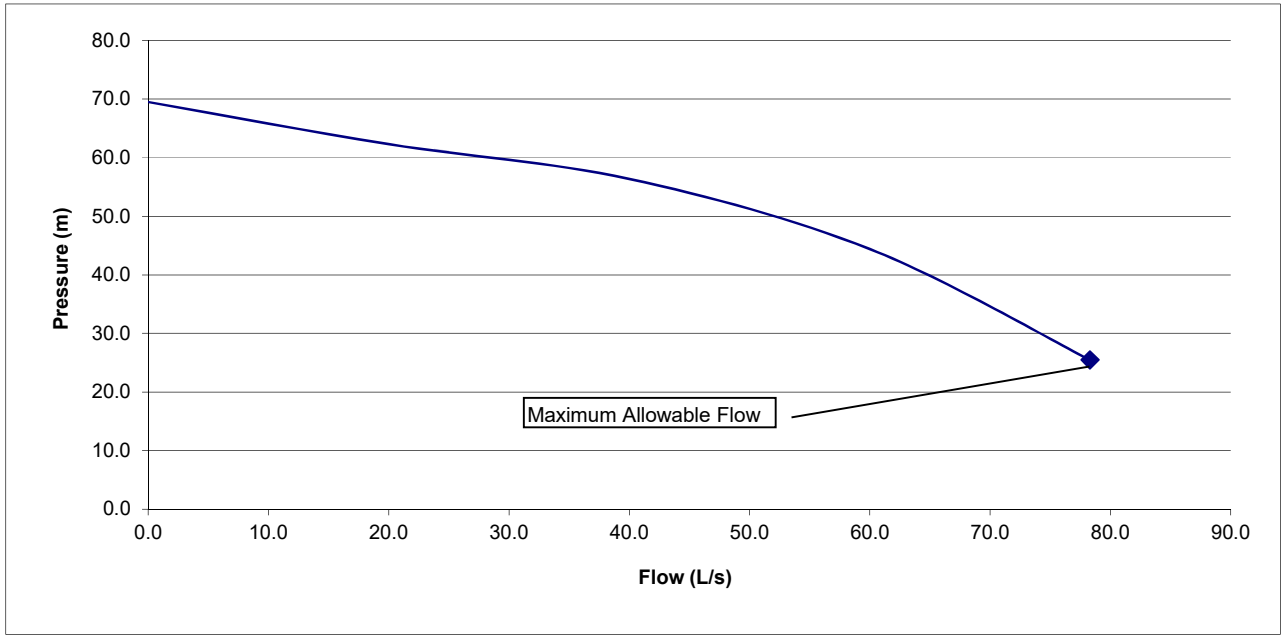
Fire Flow Analysis

Fire Flow Node:	JCT_01084
Design Flow (L/s):	78.3
Design Pressure (m)	25.5

The final adjusted flow at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The lowest allowable pressure at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The constraining node within the pressure zone that drops to the minimum design pressure of (14m (140 kPa)) during the design flow.



Author: ADing
Document Path: \\ahqfs1vp\water\InfoWater\Modeling Requests\2021\Stantec\Strohvest Lands\Strohvest Lands.aprx
Time: 3:48 PM Date: 2021-12-10

Region of Waterloo

TRANSPORTATION AND ENVIRONMENTAL SERVICES
Water Services
150 Frederick Street
Kitchener ON Canada N2G 4J3
Telephone: (519) 575-4426
Fax: (519) 575-4452
www.regionofwaterloo.ca

Assessment Parcels (MPAC) selection
Wellesley_Billing_2020
Junction
Type
Active
Domain
Inactive
<All other values>
Tank
Type
Active
Domain
Inactive
<All other values>
Reservoir
Type
Active
Domain
Inactive
<All other values>
Pump
Type
Active
Domain
Inactive
<All other values>
Valve
Type
Active
Domain
Inactive
<All other values>
Pipe
Type
Active
Domain
Inactive
<All other values>
Roads
Roads
Highway
Arterial/Collector
Local
Private
Proposed Roads
Non modelling data Layer
Assessment Parcels (MPAC)
Regional Municipal Boundaries

Strohvest Lands, Wellesley

1614-13217: Strohvest Lands - Gerber Road, Wellesley, Ontario

Nodal Data Input - Water Demand Calculation 9-Dec-21

Location	Node No.	Residential				Retail		External Demand	Avg Day Demand	Min. Hour Demand	Max Day Demand	Peak Hour Demand	Fire Flow Demand
		Single Family		Multi Family									
		Units	Demand (L/s)	Units (ha)	Demand (L/s)	Area (ha)	Demand (L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)
Supply Node	J1												
Entrance Node	J2												
Single Detached/Townhouse Lots	J3	20	0.17	4	0.03				0.20	0.10	0.40	0.60	133
Single Detached/Townhouse Lots	J4	17	0.15	32	0.21				0.36	0.18	0.72	1.08	133
Single Detached/Townhouse Lots	J5	9	0.08	12	0.08				0.16	0.08	0.32	0.48	133
Single Detached Lots	J6	12	0.10						0.10	0.05	0.20	0.30	100
Single Detached Lots	J7	25	0.21						0.21	0.11	0.42	0.63	100
Single Detached/Townhouse Lots	J8	2	0.02	18	0.12				0.14	0.07	0.28	0.42	133
Single Detached Lots	J9	29	0.25						0.25	0.13	0.50	0.75	100
Single Detached/Townhouse Lots	J10			12	0.08				0.08	0.04	0.16	0.24	133
Single Detached/Townhouse Lots	J11			12	0.08				0.08	0.04	0.16	0.24	133
Single Detached/Townhouse Lots	J12	52	0.45						0.45	0.23	0.90	1.35	133
Single Detached/Townhouse Lots	J13	34	0.29	42	0.27				0.56	0.28	1.12	1.68	133
TOTAL		200	1.72	132	0.87				2.59	1.30	5.18	7.77	

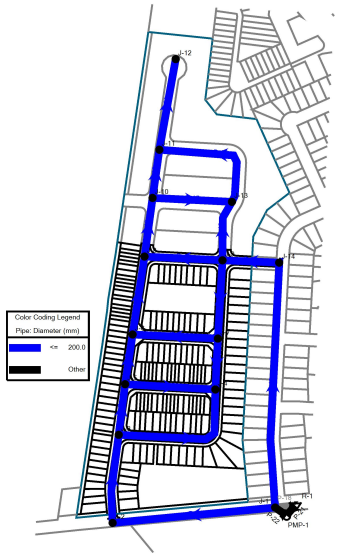
Specific Usage Rates

Land Use	Average Day		Source
Residential (Single Family)	3.30	c/units	Township of Wellesley Criterai and Region of Waterloo DGSSMS 2018
	225	L/c/d	
Residential (Multi-Unit Residential)	2.48	c/units	
	225	L/c/d	
Peaking Factors:			
Residential	min	0.50	Region of Waterloo DGSSMS 2018/MOECC Design Guidelines for Drinking Water Systems 2008 (3,000-10,000 people)
	avg	1.00	
	max	2.00	
	peak	3.00	

Strohvest Lands - Gerber Road, Wellesley

Scenario: Max_Day + 70L/s Fire Flow

Active Scenario: Max_Day + 70L/s Fire Flow



Strohvest Lands - Gerber Road, Wellesley

FlexTable: Junction Table

Active Scenario: Avg_Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	353.90	0.00	425.06	696
J-2	355.40	0.00	425.06	682
J-3	358.20	0.20	425.06	654
J-4	362.00	0.36	425.06	617
J-5	359.00	0.16	425.06	646
J-6	362.50	0.10	425.06	612
J-7	364.00	0.21	425.06	598
J-8	364.50	0.14	425.06	593
J-9	365.40	0.25	425.06	584
J-10	365.80	0.08	425.06	580
J-11	366.30	0.08	425.06	575
J-12	367.00	0.45	425.06	568
J-13	365.90	0.56	425.06	579
J-14	362.25	0.00	425.06	615

Strohvest Lands - Gerber Road, Wellesley

FlexTable: Junction Table

Active Scenario: Max_Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	353.90	0.00	422.07	667
J-2	355.40	0.00	422.06	652
J-3	358.20	0.40	422.06	625
J-4	362.00	0.72	422.06	588
J-5	359.00	0.32	422.06	617
J-6	362.50	0.20	422.06	583
J-7	364.00	0.42	422.06	568
J-8	364.50	0.28	422.06	563
J-9	365.40	0.50	422.06	555
J-10	365.80	0.16	422.06	551
J-11	366.30	0.16	422.06	546
J-12	367.00	0.90	422.06	539
J-13	365.90	1.12	422.06	550
J-14	362.25	0.00	422.07	585

Strohvest Lands - Gerber Road, Wellesley

FlexTable: Junction Table

Active Scenario: Min_Hour

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	353.90	0.00	425.45	700
J-2	355.40	0.00	425.45	686
J-3	358.20	0.10	425.45	658
J-4	362.00	0.18	425.45	621
J-5	359.00	0.08	425.45	650
J-6	362.50	0.05	425.45	616
J-7	364.00	0.11	425.45	601
J-8	364.50	0.07	425.45	597
J-9	365.40	0.13	425.45	588
J-10	365.80	0.04	425.45	584
J-11	366.30	0.04	425.45	579
J-12	367.00	0.23	425.45	572
J-13	365.90	0.28	425.45	583
J-14	362.25	0.00	425.45	619

Strohvest Lands - Gerber Road, Wellesley

FlexTable: Junction Table

Active Scenario: Peak_Hour

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	353.90	0.00	417.84	626
J-2	355.40	0.00	417.83	611
J-3	358.20	0.60	417.82	584
J-4	362.00	1.08	417.82	546
J-5	359.00	0.48	417.82	576
J-6	362.50	0.30	417.82	541
J-7	364.00	0.63	417.82	527
J-8	364.50	0.42	417.82	522
J-9	365.40	0.75	417.82	513
J-10	365.80	0.24	417.82	509
J-11	366.30	0.24	417.82	504
J-12	367.00	1.35	417.82	497
J-13	365.90	1.68	417.82	508
J-14	362.25	0.00	417.84	544

Strohvest Lands - Gerber Road, Wellesley
Fire Flow Node FlexTable: Fire Flow Report
Active Scenario: Max_Day + 70L/s Fire Flow

Label	Satisfies Fire Flow Constraints?	Flow (Total Needed) (L/s)	Flow (Total Available) (L/s)	Pressure (Residual Lower Limit) (kPa)	Pressure (Calculated Residual) (kPa)	Pressure (System Lower Limit) (kPa)	Pressure (Calculated System Lower Limit) (kPa)	Junction w/ Minimum Pressure (System)
J-1	True	70.00	72.06	140	268	140	140	J-12
J-2	True	70.00	71.41	140	242	140	140	J-12
J-3	True	70.40	71.48	140	219	140	140	J-12
J-4	True	70.72	71.69	140	182	140	140	J-12
J-5	True	70.32	71.30	140	212	140	140	J-12
J-6	True	70.20	71.07	140	179	140	140	J-12
J-7	True	70.42	71.34	140	165	140	140	J-12
J-8	True	70.28	70.88	140	163	140	140	J-12
J-9	True	70.50	71.35	140	156	140	140	J-12
J-10	True	70.16	70.24	140	151	140	140	J-12
J-11	False	70.16	69.61	140	147	140	140	J-12
J-12	False	70.90	67.56	140	140	140	175	J-11
J-13	True	71.12	71.30	140	150	140	140	J-12
J-14	True	70.00	72.04	140	187	140	140	J-12

Strohvest Lands - Gerber Road, Wellesley

FlexTable: Junction Table

Active Scenario: Max_Day + 70 L/s Fire Flow to J-8

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	353.90	0.00	383.36	288
J-2	355.40	0.00	382.69	267
J-3	358.20	0.40	382.31	236
J-4	362.00	0.72	382.22	198
J-5	359.00	0.32	382.21	227
J-6	362.50	0.20	382.11	192
J-7	364.00	0.42	382.19	178
J-8	364.50	70.28	381.73	169
J-9	365.40	0.50	382.20	164
J-10	365.80	0.16	381.90	158
J-11	366.30	0.16	381.92	153
J-12	367.00	0.90	381.92	146
J-13	365.90	1.12	381.99	157
J-14	362.25	0.00	383.35	207

Strohvest Lands - Gerber Road, Wellesley

FlexTable: Pipe Table

Active Scenario: Max_Day + 70 L/s Fire Flow to J-8

Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (L/s)	Velocity (m/s)	Has User Defined Length?	Length (User Defined) (m)
P-1	264	J-1	J-2	200.0	150.0	1.330	23.33	0.74	False	0
P-2	143	J-2	J-3	200.0	150.0	1.330	23.33	0.74	False	0
P-3	229	J-3	J-4	200.0	150.0	1.330	8.66	0.28	False	0
P-4	146	J-4	J-5	200.0	150.0	1.330	0.90	0.03	False	0
P-5	83	J-5	J-3	200.0	150.0	1.330	-14.27	0.45	False	0
P-6	81	J-5	J-6	200.0	150.0	1.330	14.86	0.47	False	0
P-7	138	J-6	J-7	200.0	150.0	1.330	-10.00	0.32	False	0
P-8	83	J-7	J-4	200.0	150.0	1.330	-7.04	0.22	False	0
P-9	128	J-6	J-8	200.0	150.0	1.330	24.66	0.78	False	0
P-10	126	J-8	J-9	200.0	150.0	1.330	-27.62	0.88	False	0
P-11	127	J-9	J-7	200.0	150.0	1.330	3.38	0.11	False	0
P-12	96	J-8	J-10	200.0	150.0	1.330	-18.00	0.57	False	0
P-13	79	J-10	J-11	200.0	150.0	1.330	-6.80	0.22	False	0
P-14	149	J-11	J-12	200.0	150.0	1.330	0.90	0.03	False	0
P-15	128	J-10	J-13	200.0	150.0	1.330	-11.36	0.36	False	0
P-16	98	J-13	J-9	200.0	150.0	1.330	-20.34	0.65	False	0
P-17	198	J-11	J-13	200.0	150.0	1.330	-7.86	0.25	False	0
P-18	32	R-1	J-1	200.0	150.0	0.000	(N/A)	(N/A)	True	1
P-19	397	J-1	J-14	200.0	150.0	0.000	51.85	1.65	True	1
P-20	92	J-14	J-9	200.0	150.0	1.330	51.85	1.65	False	0
P-21	21	R-1	PMP-1	1,000.0	150.0	0.000	75.18	0.10	True	1
P-22	22	PMP-1	J-1	1,000.0	150.0	0.000	75.18	0.10	True	1

Strohvest Lands - Gerber Road, Wellesley

FlexTable: Junction Table

Active Scenario: Max_Day + 70 L/s Fire Flow to J-12

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	353.90	0.00	383.36	288
J-2	355.40	0.00	382.71	267
J-3	358.20	0.40	382.34	236
J-4	362.00	0.72	382.24	198
J-5	359.00	0.32	382.25	227
J-6	362.50	0.20	382.18	193
J-7	364.00	0.42	382.20	178
J-8	364.50	0.28	381.99	171
J-9	365.40	0.50	382.19	164
J-10	365.80	0.16	381.44	153
J-11	366.30	0.16	380.75	141
J-12	367.00	70.90	377.60	104
J-13	365.90	1.12	381.50	153
J-14	362.25	0.00	383.35	207

Strohvest Lands - Gerber Road, Wellesley

FlexTable: Pipe Table

Active Scenario: Max_Day + 70 L/s Fire Flow to J-12

Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (L/s)	Velocity (m/s)	Has User Defined Length?	Length (User Defined) (m)
P-1	264	J-1	J-2	200.0	150.0	1.330	23.01	0.73	False	0
P-2	143	J-2	J-3	200.0	150.0	1.330	23.01	0.73	False	0
P-3	229	J-3	J-4	200.0	150.0	1.330	8.65	0.28	False	0
P-4	146	J-4	J-5	200.0	150.0	1.330	-1.57	0.05	False	0
P-5	83	J-5	J-3	200.0	150.0	1.330	-13.97	0.44	False	0
P-6	81	J-5	J-6	200.0	150.0	1.330	12.07	0.38	False	0
P-7	138	J-6	J-7	200.0	150.0	1.330	-5.07	0.16	False	0
P-8	83	J-7	J-4	200.0	150.0	1.330	-9.50	0.30	False	0
P-9	128	J-6	J-8	200.0	150.0	1.330	16.94	0.54	False	0
P-10	126	J-8	J-9	200.0	150.0	1.330	-17.45	0.56	False	0
P-11	127	J-9	J-7	200.0	150.0	1.330	-4.01	0.13	False	0
P-12	96	J-8	J-10	200.0	150.0	1.330	34.11	1.09	False	0
P-13	79	J-10	J-11	200.0	150.0	1.330	42.45	1.35	False	0
P-14	149	J-11	J-12	200.0	150.0	1.330	70.90	2.26	False	0
P-15	128	J-10	J-13	200.0	150.0	1.330	-8.49	0.27	False	0
P-16	98	J-13	J-9	200.0	150.0	1.330	-38.23	1.22	False	0
P-17	198	J-11	J-13	200.0	150.0	1.330	-28.61	0.91	False	0
P-18	32	R-1	J-1	200.0	150.0	0.000	(N/A)	(N/A)	True	1
P-19	397	J-1	J-14	200.0	150.0	0.000	52.17	1.66	True	1
P-20	92	J-14	J-9	200.0	150.0	1.330	52.17	1.66	False	0
P-21	21	R-1	PMP-1	1,000.0	150.0	0.000	75.18	0.10	True	1
P-22	22	PMP-1	J-1	1,000.0	150.0	0.000	75.18	0.10	True	1

APPENDIX E

MRCS (SCS) Curve Number Determination

STROHVEST LANDS SUBDIVISION-161413217
NRCS (SCS) Curve Number Determination

TABLE OF CURVE NUMBERS (CN's)									
		Hydrologic Soil Type							Manning's
Land Use		A	AB	B	BC	C	CD	D	'n'
Meadow	"Good"	30	44	58	64.5	71	74.5	78	0.40
Woodlot	"Fair"	36	48	60	66.5	73	76	79	0.40
Gravel		76	80.5	85	87	89	90	91	0.30
Lawns	"Good"	39	50	61	67.5	74	77	80	0.25
Pasture/Range		58	61.5	65	70.5	76	78.5	81	0.17
Crop		66	70	74	78	82	84	86	0.13
Fallow (Bare)		77	82	86	89	91	93	94	0.05
Impervious		98	98	98	98	98	98	98	0.01

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. Chin (2000), Water-Resources Engineering, Table 6.13-Curve Numbers for Various Urban Land Uses

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
	Hydrologic Soil Type							
Catchment	A	AB	B	BC	C	CD	D	TOTAL
Existing Conditions								
100			33		67			100
101			100					100
102			100					100
Proposed Conditions								
200			49		51			100
201			15		85			100
202					100			100
203					100			100
204			20		80			100
205			31		69			100
206			100					100
207			100					100
208			98		2			100
209			15		85			100
210			100					100

LAND USE (%) - Existing Conditions									
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Impervious (see note)	Total
Existing Conditions									
100						100			100
101						100			100
102						100			100
Proposed Conditions									
200				35				65	100
201	50							50	100
202				20				80	100
203						100			100
204						100			100
205				60				40	100
206				60				40	100
207				60				40	100
208				30				70	100
209				60				40	100
210				60				40	100

CURVE NUMBER (CN) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Impervious	Weighted CN	Pervious CN
Existing Conditions										
100	0	0	0	0	0	79	0	0	79	79
101	0	0	0	0	0	74	0	0	74	74
102	0	0	0	0	0	74	0	0	74	74
Proposed Conditions										
200	0	0	0	23	0	0	0	64	87	68
201	35	0	0	0	0	0	0	49	84	69
202	0	0	0	15	0	0	0	78	93	74
203	0	0	0	0	0	82	0	0	82	82
204	0	0	0	0	0	80	0	0	80	80
205	0	0	0	42	0	0	0	39	81	70
206	0	0	0	37	0	0	0	39	76	61
207	0	0	0	37	0	0	0	39	76	61
208	0	0	0	18	0	0	0	69	87	61
209	0	0	0	43	0	0	0	39	82	72
210	0	0	0	37	0	0	0	39	76	61

** AMC II assumed
** Hydrological Soil Group taken from MTO Drainage Manual for each soil type

APPENDIX F

Visual OTTHYMO Input and Output Files

STROHVEST LANDS SUBDIVISION-161413217
Visual OTTHYMO Parameters

Existing Conditions

Area Description	Catchment ID	SWMHYMO Command	Area (ha)	CN	TIMP	XIMP	Slope (%)	Length (m)	IA (mm)	Tc (hrs)	Tp (hrs)
Agricultural area draining to the south, including the southern portion of the site and the external agricultural lands	100	DESIGN NASHYD	17.97	79	0.00		1.9%	690	13.5	1.10	0.66
Agricultural area in the northern portion of the site draining to the north	101	DESIGN NASHYD	2.71	74	0.00		1.4%	180	17.8	0.62	0.37
Agricultural area draining east to the existing rear yard catchbasin behind the properties fronting Zinkann Crescent	102	DESIGN NASHYD	2.22	74	0.00		1.3%	195	17.8	0.66	0.40

Proposed Conditions

Area Description	Catchment ID	SWMHYMO Command	Area (ha)	CN	TIMP	XIMP	Slope (%)	Length (m)	IA (mm)	Tc (hrs)	Tp (hrs)
Proposed residential development draining to on site SWMF	200	DESIGN STANDHYD	6.31	68	0.65	0.52	2.0%				
SWMF Block	201	DESIGN STANDHYD/ROUTE RESERVOIR	1.16	69	0.50	0.50	2.0%				
Proposed residential development with minor flows contributing to onsite SWMF and major flows draining to the south	202	DESIGN STANDHYD	0.53	74	0.80	0.64	2.0%				
External agricultrual land draining downstream of the SWMF	203	DESIGN NASHYD	0.14	82	0.00	0.00	2.1%	120	11.2	0.44	0.27
External agricultrual land draining to site via sheet flow and contributing to the SWMF	204	DESIGN NASHYD	6.12	80	0.00	0.00	2.3%	395	12.4	0.78	0.47
Proposed development draining to SWMF (mostly rear yards and rooftops)	205	DESIGN STANDHYD	1.15	70	0.40	0.01	2.0%				
Future development draining to the northwest (mostly rear yards and rooftops)	206	DESIGN STANDHYD	0.22	61	0.40	0.01	2.0%				
Future development draining to the SWMF (mostly rear yards and rooftops)	207	DESIGN STANDHYD	1.43	61	0.40	0.01	2.0%				
Future residential development draining to the SWMF	208	DESIGN STANDHYD	4.02	61	0.70	0.56	2.0%				
Proposed development draining to SWMF (mostly rear yards and rooftops)	209	DESIGN STANDHYD	1.17	72	0.40	0.01	2.0%				
Future development draining to the SWMF (mostly rear yards and rooftops)	210	DESIGN STANDHYD	0.64	61	0.40	0.01	2.0%				
		Total to SWM Pond	22.53		43%						
		Total developed area to SWM pond	16.41		59%						

SWM Facility Block

Notes:

CN calculated for pervious areas only for DESIGN STANDHYD. CN is a weighted average for DESIGN NASHYD

TIMP ..... *Total percent impervious*

XIMP ..... *Percent impervious directly connected*

Time of Concentration calculated using the Airport Method ..... $Tc = [\,3.26\,(1.1-C)\,L^{0.5}\,] / S^{0.33}$

Where: *C = Runoff Coefficient according to MTO Design chart 1.07 for 'cultivated' on silt loam/loam soil*
L = Length of Overland Flow (m)
S = Slope (%)

Time to Peak (hr) ..... $Tp = 0.6Tc$

Storage ..... $S = (25400 / CN) - 254$

Initial Abstractions ..... $IA = 0.2\,S$

Existing Conditions VO6 Model:

Project Number: 1614113217

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     V   V  I   SSSSS  U   U   A   L          (v 6.2.2005)
     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 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 *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\b811e9c5-51b9-40e3-a15d-0444378e402e\s
  Summary filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\b811e9c5-51b9-40e3-a15d-0444378e402e\s


DATE: 03/17/2022                    TIME: 01:35:14

USER:


COMMENTS:
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  ************************************************
  ** SIMULATION : 1. 25mm 4-hr Chicago Storm    **
  ************************************************


--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 508.500
| Ptotal= 25.01 mm |                          B=   6.000
--------------------                          C=   0.799
                    used in:   INTENSITY =  A / (t + B)^C

                    Duration of storm  =  4.00 hrs
                    Storm time step    =  5.00 min
                    Time to peak ratio =  0.33

            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
            0.08    1.47 |  1.08    6.93 |  2.08    4.30 |  3.08    1.98
            0.17    1.56 |  1.17   10.85 |  2.17    3.90 |  3.17    1.90
            0.25    1.67 |  1.25   25.24 |  2.25    3.57 |  3.25    1.83
            0.33    1.80 |  1.33   74.87 |  2.33    3.29 |  3.33    1.76
            0.42    1.94 |  1.42   32.46 |  2.42    3.06 |  3.42    1.70
            0.50    2.12 |  1.50   18.05 |  2.50    2.86 |  3.50    1.64
            0.58    2.33 |  1.58   12.35 |  2.58    2.68 |  3.58    1.59
            0.67    2.60 |  1.67    9.37 |  2.67    2.53 |  3.67    1.54
            0.75    2.95 |  1.75    7.55 |  2.75    2.40 |  3.75    1.50
            0.83    3.42 |  1.83    6.33 |  2.83    2.28 |  3.83    1.45
            0.92    4.09 |  1.92    5.46 |  2.92    2.17 |  3.92    1.41
            1.00    5.13 |  2.00    4.81 |  3.00    2.07 |  4.00    1.37

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--------------------
| CALIB            |
| NASHYD   (  0100)|  Area    (ha)=  17.97   Curve Number   (CN)=
79.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=  13.50   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.66

    Unit Hyd Qpeak  (cms)=   1.040

    PEAK FLOW       (cms)=   0.033 (i)
    TIME TO PEAK    (hrs)=   2.833
    RUNOFF VOLUME   (mm)=   1.678
    TOTAL RAINFALL  (mm)=  25.015
    RUNOFF COEFFICIENT  =   0.067

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|  Area    (ha)=   2.71   Curve Number   (CN)=
74.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=  17.80   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.37

    Unit Hyd Qpeak  (cms)=   0.280

    PEAK FLOW       (cms)=   0.002 (i)
    TIME TO PEAK    (hrs)=   3.000
    RUNOFF VOLUME   (mm)=   0.539
    TOTAL RAINFALL  (mm)=  25.015
    RUNOFF COEFFICIENT  =   0.022

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

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--------------------
| CALIB            |
| NASHYD   (  0102)|  Area    (ha)=   2.22   Curve Number   (CN)=
74.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=  17.80   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.40

    Unit Hyd Qpeak  (cms)=   0.212

    PEAK FLOW       (cms)=   0.001 (i)
    TIME TO PEAK    (hrs)=   3.083
    RUNOFF VOLUME   (mm)=   0.539
    TOTAL RAINFALL  (mm)=  25.015
    RUNOFF COEFFICIENT  =   0.022

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

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     V   V  I   SSSSS  U   U   A   L          (v 6.2.2005)
     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
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     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
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\378fc09c-c8ad-41f1-aea5-aa8e75698360\s
Summary filename: C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\378fc09c-c8ad-41f1-aea5-aa8e75698360\s

DATE: 03/17/2022 TIME: 01:35:14

USER:

COMMENTS:
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****
** SIMULATION : 2. 2-yr 3-hr Chicago Storm **
****

| CHICAGO STORM | IDF curve parameters: A= 743.000
| Ptotal= 34.27 mm | B= 6.000

C= 0.799
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.08	2.84	0.83	15.85	1.58	7.98	2.33	3.70
0.17	3.09	0.92	36.89	1.67	7.03	2.42	3.50
0.25	3.41	1.00	109.40	1.75	6.29	2.50	3.33
0.33	3.80	1.08	47.44	1.83	5.69	2.58	3.17
0.42	4.31	1.17	26.38	1.92	5.21	2.67	3.03
0.50	5.00	1.25	18.05	2.00	4.81	2.75	2.90
0.58	5.98	1.33	13.69	2.08	4.47	2.83	2.78
0.67	7.49	1.42	11.03	2.17	4.17	2.92	2.68
0.75	10.13	1.50	9.25	2.25	3.92	3.00	2.58

| CALIB |
| NASHYD (0100)| Area (ha)= 17.97 Curve Number (CN)= 79.0
|ID= 1 DT= 5.0 min | Ia (mm)= 13.50 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.66

Unit Hyd Qpeak (cms)= 1.040

PEAK FLOW (cms)= 0.120 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 4.887
TOTAL RAINFALL (mm)= 34.271
RUNOFF COEFFICIENT = 0.143

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

| CALIB |
| NASHYD (0101)| Area (ha)= 2.71 Curve Number (CN)= 74.0
|ID= 1 DT= 5.0 min | Ia (mm)= 17.80 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.37

Unit Hyd Qpeak (cms)= 0.280

PEAK FLOW (cms)= 0.012 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 2.566
TOTAL RAINFALL (mm)= 34.271
RUNOFF COEFFICIENT = 0.075

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

| CALIB |
| NASHYD (0102)| Area (ha)= 2.22 Curve Number (CN)= 74.0
|ID= 1 DT= 5.0 min | Ia (mm)= 17.80 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.40

Unit Hyd Qpeak (cms)= 0.212

PEAK FLOW (cms)= 0.009 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 2.566
TOTAL RAINFALL (mm)= 34.271
RUNOFF COEFFICIENT = 0.075

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

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     V   V  I   SSSSS  U   U   A   L          (v 6.2.2005)
     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
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\bdd546d3-b30a-46dc-b6e8-c917d735d6f0\s

Summary filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\bdd546d3-b30a-46dc-b6e8-c917d735d6f0\s

DATE: 03/17/2022 TIME: 01:35:14

USER:

COMMENTS:
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****
** SIMULATION : 3. 5-yr 3-hr Chicago Storm **
****

| CHICAGO STORM | IDF curve parameters: A=1593.000
| Ptotal= 47.26 mm | B= 11.000

C= 0.879
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.08	3.03	0.83	24.60	1.58	11.05	2.33	4.23
0.17	3.38	0.92	57.39	1.67	9.46	2.42	3.95
0.25	3.82	1.00	139.29	1.75	8.24	2.50	3.70
0.33	4.39	1.08	72.74	1.83	7.29	2.58	3.48
0.42	5.14	1.17	42.12	1.92	6.52	2.67	3.29
0.50	6.20	1.25	28.38	2.00	5.89	2.75	3.11
0.58	7.75	1.33	20.88	2.08	5.37	2.83	2.96
0.67	10.24	1.42	16.28	2.17	4.93	2.92	2.82
0.75	14.73	1.50	13.22	2.25	4.55	3.00	2.69

| CALIB |
| NASHYD (0100)| Area (ha)= 17.97 Curve Number (CN)= 79.0
|ID= 1 DT= 5.0 min | Ia (mm)= 13.50 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.66

Unit Hyd Qpeak (cms)= 1.040

PEAK FLOW (cms)= 0.310 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 11.252
TOTAL RAINFALL (mm)= 47.258
RUNOFF COEFFICIENT = 0.238

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

| CALIB |
| NASHYD (0101)| Area (ha)= 2.71 Curve Number (CN)= 74.0
|ID= 1 DT= 5.0 min | Ia (mm)= 17.80 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.37

Unit Hyd Qpeak (cms)= 0.280

PEAK FLOW (cms)= 0.041 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 7.309
TOTAL RAINFALL (mm)= 47.258
RUNOFF COEFFICIENT = 0.155

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

| CALIB |
| NASHYD (0102)| Area (ha)= 2.22 Curve Number (CN)= 74.0
|ID= 1 DT= 5.0 min | Ia (mm)= 17.80 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.40

Unit Hyd Qpeak (cms)= 0.212

PEAK FLOW (cms)= 0.032 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 7.309
TOTAL RAINFALL (mm)= 47.258
RUNOFF COEFFICIENT = 0.155

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

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V V I SSSSS U U A L (v 6.2.2005)
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 *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\f3fe85b6-9705-41ee-bc3a-29fe790d709d\s
Summary filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\f3fe85b6-9705-41ee-bc3a-29fe790d709d\s

DATE: 03/17/2022 TIME: 01:35:14

USER:

COMMENTS:
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 ** SIMULATION : 4. 25-yr 3-hr Chicago Storm   **
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--------------------
| CHICAGO STORM    |   IDF curve parameters: A=3158.000
| Ptotal= 68.26 mm |                    B=  15.000
--------------------                    C=   0.936
                 used in:   INTENSITY =  A / (t + B)^C

                 Duration of storm  =  3.00 hrs
                 Storm time step    =  5.00 min
                 Time to peak ratio =  0.33

            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
            0.08    3.57 |  0.83   38.32 |  1.58   16.26 |  2.33    5.34
            0.17    4.07 |  0.92   87.43 |  1.67   13.65 |  2.42    4.91
            0.25    4.72 |  1.00  191.56 |  1.75   11.67 |  2.50    4.54
            0.33    5.57 |  1.08  109.32 |  1.83   10.13 |  2.58    4.22
            0.42    6.73 |  1.17   65.64 |  1.92    8.90 |  2.67    3.94
            0.50    8.39 |  1.25   44.39 |  2.00    7.91 |  2.75    3.69
            0.58   10.88 |  1.33   32.36 |  2.08    7.09 |  2.83    3.46
            0.67   14.93 |  1.42   24.85 |  2.17    6.41 |  2.92    3.26
            0.75   22.29 |  1.50   19.81 |  2.25    5.83 |  3.00    3.08


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0100)|   Area    (ha)=  17.97   Curve Number   (CN)=
79.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  13.50   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.66

    Unit Hyd Qpeak  (cms)=   1.040

    PEAK FLOW       (cms)=   0.728 (i)
    TIME TO PEAK    (hrs)=   1.917
    RUNOFF VOLUME    (mm)=  24.520
    TOTAL RAINFALL   (mm)=  68.257
    RUNOFF COEFFICIENT   =   0.359

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=   2.71   Curve Number   (CN)=
74.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  17.80   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.37

    Unit Hyd Qpeak  (cms)=   0.280

    PEAK FLOW       (cms)=   0.115 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  18.220
    TOTAL RAINFALL   (mm)=  68.257
    RUNOFF COEFFICIENT   =   0.267

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   2.22   Curve Number   (CN)=
74.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  17.80   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.40

    Unit Hyd Qpeak  (cms)=   0.212

    PEAK FLOW       (cms)=   0.090 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  18.221
    TOTAL RAINFALL   (mm)=  68.257
    RUNOFF COEFFICIENT   =   0.267

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

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     V   V  I   SSSSS  U   U    A    L           (v 6.2.2005)
     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 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 *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\bee44aba-8c14-4ae8-9017-d8dad82eea66\s
  Summary filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\bee44aba-8c14-4ae8-9017-d8dad82eea66\s


DATE: 03/17/2022                    TIME: 01:35:14

USER:


COMMENTS:
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 ************************************************
 ** SIMULATION : 5. 50-yr 3-hr Chicago Storm   **
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--------------------
| CHICAGO STORM    |   IDF curve parameters: A=3886.000
| Ptotal= 77.64 mm |                    B=  16.000
--------------------                    C=   0.950
                 used in:   INTENSITY =  A / (t + B)^C

                 Duration of storm  =  3.00 hrs
                 Storm time step    =  5.00 min
                 Time to peak ratio =  0.33

            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
            0.08    3.84 |  0.83   44.32 |  1.58   18.58 |  2.33    5.86
            0.17    4.41 |  0.92  100.50 |  1.67   15.53 |  2.42    5.37
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            0.25   5.15 |  1.00  215.80 |  1.75   13.21 |  2.50    4.95
            0.33   6.13 |  1.08  125.29 |  1.83   11.41 |  2.58    4.58
            0.42   7.47 |  1.17   75.84 |  1.92    9.99 |  2.67    4.26
            0.50   9.39 |  1.25   51.37 |  2.00    8.83 |  2.75    3.97
            0.58  12.29 |  1.33   37.40 |  2.08    7.88 |  2.83    3.72
            0.67  17.02 |  1.42   28.63 |  2.17    7.09 |  2.92    3.49
            0.75  25.64 |  1.50   22.74 |  2.25    6.43 |  3.00    3.28


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--------------------
| CALIB            |
| NASHYD  (  0100)|  Area    (ha)=  17.97   Curve Number   (CN)=
79.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=  13.50   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.66

    Unit Hyd Qpeak  (cms)=   1.040

    PEAK FLOW       (cms)=   0.942 (i)
    TIME TO PEAK    (hrs)=   1.833
    RUNOFF VOLUME    (mm)=  31.244
    TOTAL RAINFALL   (mm)=  77.637
    RUNOFF COEFFICIENT   =   0.402

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0101)|  Area    (ha)=   2.71   Curve Number   (CN)=
74.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=  17.80   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.37

    Unit Hyd Qpeak  (cms)=   0.280

    PEAK FLOW       (cms)=   0.156 (i)
    TIME TO PEAK    (hrs)=   1.500
    RUNOFF VOLUME    (mm)=  24.012
    TOTAL RAINFALL   (mm)=  77.637
    RUNOFF COEFFICIENT   =   0.309

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0102)|  Area    (ha)=   2.22   Curve Number   (CN)=
74.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=  17.80   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.40

    Unit Hyd Qpeak  (cms)=   0.212

    PEAK FLOW       (cms)=   0.122 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  24.013
    TOTAL RAINFALL   (mm)=  77.637
    RUNOFF COEFFICIENT   =   0.309

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

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     V   V  I   SSSSS  U   U   A   L           (v 6.2.2005)
     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 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 *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\3f1bd1d8-f78a-4535-b056-38a371f90249\s
  Summary filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\3f1bd1d8-f78a-4535-b056-38a371f90249\s


DATE: 03/17/2022                    TIME: 01:35:14

USER:


COMMENTS:
________________________________________________________________________
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  ************************************************
  ** SIMULATION : 6. 100-yr 3-hr Chicago Storm  **
  ************************************************


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| CHICAGO STORM    |   IDF curve parameters: A=4688.000
| Ptotal= 87.07 mm |                    B=  17.000
--------------------                    C=   0.962
                 used in:   INTENSITY =  A / (t + B)^C

                 Duration of storm  =  3.00 hrs
                 Storm time step    =  5.00 min
                 Time to peak ratio =  0.33

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.08    4.09 |  0.83   50.50 |  1.58   20.97 |  2.33    6.37
          0.17    4.73 |  0.92  113.67 |  1.67   17.46 |  2.42    5.82
          0.25    5.57 |  1.00  239.35 |  1.75   14.80 |  2.50    5.34
          0.33    6.68 |  1.08  141.25 |  1.83   12.73 |  2.58    4.93
          0.42    8.21 |  1.17   86.23 |  1.92   11.09 |  2.67    4.56
          0.50   10.40 |  1.25   58.55 |  2.00    9.76 |  2.75    4.24
          0.58   13.73 |  1.33   42.60 |  2.08    8.68 |  2.83    3.95
          0.67   19.18 |  1.42   32.53 |  2.17    7.78 |  2.92    3.70
          0.75   29.10 |  1.50   25.76 |  2.25    7.02 |  3.00    3.47


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| CALIB            |
| NASHYD  (  0100)|  Area    (ha)=  17.97   Curve Number   (CN)=
79.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=  13.50   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.66

    Unit Hyd Qpeak  (cms)=   1.040
```

PEAK FLOW (cms)= 1.174 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 38.360
TOTAL RAINFALL (mm)= 87.067
RUNOFF COEFFICIENT = 0.441

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

| CALIB |
| NASHYD (0101)| Area (ha)= 2.71 Curve Number (CN)= 74.0
|ID= 1 DT= 5.0 min | Ia (mm)= 17.80 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.37

Unit Hyd Qpeak (cms)= 0.280

PEAK FLOW (cms)= 0.201 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 30.264
TOTAL RAINFALL (mm)= 87.067
RUNOFF COEFFICIENT = 0.348

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

| CALIB |
| NASHYD (0102)| Area (ha)= 2.22 Curve Number (CN)= 74.0
|ID= 1 DT= 5.0 min | Ia (mm)= 17.80 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.40

Unit Hyd Qpeak (cms)= 0.212

PEAK FLOW (cms)= 0.157 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 30.265
TOTAL RAINFALL (mm)= 87.067
RUNOFF COEFFICIENT = 0.348

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

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V V I SSSSS U U A L (v 6.2.2005)
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 *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\00075fb6-62b2-494f-8b9d-56e92c866ec6\s
Summary filename: C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\00075fb6-62b2-494f-8b9d-56e92c866ec6\s

DATE: 03/17/2022 TIME: 01:35:14

USER:

COMMENTS:
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****
** SIMULATION : Hazel **
****

| READ STORM | Filename: C:\Users\MYavarikia\AppD
| | ata\Local\Temp\
| | 57c33a9a-61a9-4d17-b072-e18c63a3c67c\cf020c6b
| Ptotal=212.00 mm | Comments: Hazel

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
1.00	6.00	4.00	13.00	7.00	23.00	10.00	53.00
2.00	4.00	5.00	17.00	8.00	13.00	11.00	38.00
3.00	6.00	6.00	13.00	9.00	13.00	12.00	13.00

| CALIB |
| NASHYD (0100)| Area (ha)= 17.97 Curve Number (CN)= 79.0
|ID= 1 DT= 5.0 min | Ia (mm)= 13.50 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.66

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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00

1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.040

PEAK FLOW (cms)= 1.908 (i)
TIME TO PEAK (hrs)= 10.583
RUNOFF VOLUME (mm)= 148.116
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.699

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

CALIB							
NASHYD (0101)	Area (ha)= 2.71		Curve Number (CN)= 74.0				
ID= 1 DT= 5.0 min	Ia (mm)= 17.80		# 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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.280

PEAK FLOW (cms)= 0.310 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 133.033
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.628

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

CALIB							
NASHYD (0102)	Area (ha)= 2.22		Curve Number (CN)= 74.0				
ID= 1 DT= 5.0 min	Ia (mm)= 17.80		# of Linear Res.(N)= 3.00				
	U.H. Tp(hrs)= 0.40						

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.212

PEAK FLOW (cms)= 0.250 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 133.039

TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.628

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

FINISH

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Proposed Conditions VO6 Model:

Project Number: 1614113217

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     V   V  I   SSSSS  U  U   A   L          (v 6.2.2005)
     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 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 *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename:
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DATE: 12/23/2021                      TIME: 11:09:43

USER:



COMMENTS:
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  ************************************************
  ** SIMULATION : 1. 25mm 4hr Chicago Storm     **
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| CHICAGO STORM    |    IDF curve parameters: A= 508.500
| Ptotal= 25.01 mm |                          B=   6.000
--------------------                          C=   0.799
                    used in:   INTENSITY =  A / (t + B)^C

                    Duration of storm  =  4.00 hrs
                    Storm time step    =  5.00 min
                    Time to peak ratio =  0.33

            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
            0.08    1.47 |  1.08    6.93 |  2.08    4.30 |  3.08    1.98
            0.17    1.56 |  1.17   10.85 |  2.17    3.90 |  3.17    1.90
            0.25    1.67 |  1.25   25.24 |  2.25    3.57 |  3.25    1.83
            0.33    1.80 |  1.33   74.87 |  2.33    3.29 |  3.33    1.76
            0.42    1.94 |  1.42   32.46 |  2.42    3.06 |  3.42    1.70
            0.50    2.12 |  1.50   18.05 |  2.50    2.86 |  3.50    1.64
            0.58    2.33 |  1.58   12.35 |  2.58    2.68 |  3.58    1.59
            0.67    2.60 |  1.67    9.37 |  2.67    2.53 |  3.67    1.54
            0.75    2.95 |  1.75    7.55 |  2.75    2.40 |  3.75    1.50
            0.83    3.42 |  1.83    6.33 |  2.83    2.28 |  3.83    1.45
            0.92    4.09 |  1.92    5.46 |  2.92    2.17 |  3.92    1.41
            1.00    5.13 |  2.00    4.81 |  3.00    2.07 |  4.00    1.37


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| CALIB            |
| NASHYD  (  0204)|  Area    (ha)=   6.12   Curve Number   (CN)=
80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  12.40   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.47

    Unit Hyd Qpeak  (cms)=   0.497

    PEAK FLOW       (cms)=   0.017 (i)
    TIME TO PEAK    (hrs)=   2.333
    RUNOFF VOLUME   (mm)=   2.090
    TOTAL RAINFALL  (mm)=  25.015
    RUNOFF COEFFICIENT  =   0.084

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

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| CALIB            |
| STANDHYD (  0205)|  Area    (ha)=   1.15
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.46         0.69
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      87.56        40.00
    Mannings n            =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=      74.87        32.37
            over (min)        5.00        15.00
    Storage Coeff.  (min)=       2.15 (ii)   13.23 (ii)
    Unit Hyd. Tpeak (min)=       5.00        15.00
    Unit Hyd. peak  (cms)=       0.31         0.08
                                  *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.04         0.040 (iii)
    TIME TO PEAK    (hrs)=       1.33         1.58         1.58
    RUNOFF VOLUME   (mm)=      24.01        11.33         11.45
    TOTAL RAINFALL  (mm)=      25.01        25.01         25.01
    RUNOFF COEFFICIENT  =       0.96         0.45         0.46

***** 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*  =  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.

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

--------------------
| ADD HYD  (  0021)|
|  1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0204):     6.12   0.017     2.33     2.09
     + ID2= 2 (  0205):     1.15   0.040     1.58    11.45

================================================
       ID = 3 (  0021):     7.27   0.043     1.58     3.57

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
---------------
| CALIB            |
| STANDHYD (  0200)|  Area    (ha)=   6.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  52.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       4.10         2.21
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=     205.10        40.00
    Mannings n            =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=      74.87         9.73
            over (min)        5.00        25.00
```

```
    Storage Coeff.  (min)=       3.58 (ii)   21.51 (ii)
    Unit Hyd. Tpeak (min)=       5.00        25.00
    Unit Hyd. peak  (cms)=       0.26        0.05
                                *TOTALS*
    PEAK FLOW       (cms)=       0.56        0.03          0.567 (iii)
    TIME TO PEAK    (hrs)=       1.33        1.75          1.33
    RUNOFF VOLUME   (mm)=        24.01       5.15          14.96
    TOTAL RAINFALL  (mm)=        25.01       25.01         25.01
    RUNOFF COEFFICIENT  =        0.96        0.21          0.60

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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 (  0208)|   Area   (ha)=   4.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  56.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       2.81        1.21
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope    (%)=        2.00        2.00
    Length           (m)=      163.71       40.00
    Mannings n           =       0.013       0.250

    Max.Eff.Inten.(mm/hr)=       74.87       8.55
            over (min)           5.00        25.00
    Storage Coeff.  (min)=       3.13 (ii)   22.01 (ii)
    Unit Hyd. Tpeak (min)=       5.00        25.00
    Unit Hyd. peak  (cms)=       0.27        0.05
                                *TOTALS*
    PEAK FLOW       (cms)=       0.40        0.02          0.404 (iii)
    TIME TO PEAK    (hrs)=       1.33        1.75          1.33
    RUNOFF VOLUME   (mm)=        24.01       4.27          15.33
    TOTAL RAINFALL  (mm)=        25.01       25.01         25.01
    RUNOFF COEFFICIENT  =        0.96        0.17          0.61

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  61.0    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 (  0210)|   Area   (ha)=   0.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.26        0.38
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope    (%)=        2.00        2.00
    Length           (m)=       65.32       40.00
    Mannings n           =       0.013       0.250

    Max.Eff.Inten.(mm/hr)=       74.87       10.73
            over (min)           5.00        20.00
    Storage Coeff.  (min)=       1.80 (ii)   19.04 (ii)
    Unit Hyd. Tpeak (min)=       5.00        20.00
    Unit Hyd. peak  (cms)=       0.32        0.06
                                *TOTALS*
    PEAK FLOW       (cms)=       0.00        0.01          0.007 (iii)
    TIME TO PEAK    (hrs)=       1.33        1.67          1.67
    RUNOFF VOLUME   (mm)=        24.01       4.74          4.92
    TOTAL RAINFALL  (mm)=        25.01       25.01         25.01
    RUNOFF COEFFICIENT  =        0.96        0.19          0.20

***** 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*  =  61.0    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  (  0034)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0208):     4.02    0.404     1.33     15.33
     + ID2= 2 (  0210):     0.64    0.007     1.67      4.92

==================================================
       ID = 3 (  0034):     4.66    0.407     1.33     13.90

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

--------------------
| ADD HYD  (  0029)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     6.31    0.567     1.33     14.96
     + ID2= 2 (  0034):     4.66    0.407     1.33     13.90

==================================================
       ID = 3 (  0029):    10.97    0.973     1.33     14.51

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

--------------------
| ADD HYD  (  0032)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):     7.27    0.043     1.58      3.57
     + ID2= 2 (  0029):    10.97    0.973     1.33     14.51

==================================================
       ID = 3 (  0032):    18.24    0.989     1.33     10.15

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area   (ha)=   0.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  64.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.42        0.11
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope    (%)=        2.00        2.00
    Length           (m)=       59.44       40.00
    Mannings n           =       0.013       0.250

    Max.Eff.Inten.(mm/hr)=       74.87       28.91
            over (min)           5.00        10.00
    Storage Coeff.  (min)=       1.71 (ii)   6.68 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.32        0.14
                                *TOTALS*
    PEAK FLOW       (cms)=       0.07        0.01          0.071 (iii)
    TIME TO PEAK    (hrs)=       1.33        1.42          1.33
    RUNOFF VOLUME   (mm)=        24.01       7.93          18.22
    TOTAL RAINFALL  (mm)=        25.01       25.01         25.01
    RUNOFF COEFFICIENT  =        0.96        0.32          0.73

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  74.0    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    (  0016)|
| Inlet Cap.= 0.141|
| #of Inlets=     1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
    TOTAL HYD.(ID= 1):   0.53      0.07      1.33   18.22

==================================================
=
    MAJOR SYS.(ID= 2):   0.00      0.00      0.00    0.00
    MINOR SYS.(ID= 3):   0.53      0.07      1.33   18.22

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.58         0.58
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      87.94        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=      74.87         4.81
            over (min)        5.00        30.00
    Storage Coeff.  (min)=       2.16 (ii)   25.91 (ii)
    Unit Hyd. Tpeak (min)=       5.00        30.00
    Unit Hyd. peak  (cms)=       0.31         0.04
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.11         0.00          0.113 (iii)
    TIME TO PEAK    (hrs)=       1.33         1.83          1.33
    RUNOFF VOLUME    (mm)=      24.01         4.02          14.00
    TOTAL RAINFALL   (mm)=      25.01        25.01          25.01
    RUNOFF COEFFICIENT   =       0.96         0.16          0.56

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  69.0    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  (  0030)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     0.53   0.071     1.33    18.22
     + ID2= 2 (  0201):     1.16   0.113     1.33    14.00

==================================================
       ID = 3 (  0030):     1.69   0.184     1.33    15.32

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=   1.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.47         0.70
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      88.32        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=      74.87        18.76
            over (min)        5.00        20.00
    Storage Coeff.  (min)=       2.16 (ii)   15.95 (ii)
    Unit Hyd. Tpeak (min)=       5.00        20.00
    Unit Hyd. peak  (cms)=       0.31         0.07
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.02          0.021 (iii)
    TIME TO PEAK    (hrs)=       1.33         1.67          1.67
    RUNOFF VOLUME    (mm)=      24.01         6.92          7.08
    TOTAL RAINFALL   (mm)=      25.01        25.01          25.01
    RUNOFF COEFFICIENT   =       0.96         0.28          0.28

***** 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*  =  72.0    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 (  0207)|   Area    (ha)=   1.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.57         0.86
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      97.64        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=      74.87        10.73
            over (min)        5.00        20.00
    Storage Coeff.  (min)=       2.30 (ii)   19.53 (ii)
    Unit Hyd. Tpeak (min)=       5.00        20.00
    Unit Hyd. peak  (cms)=       0.30         0.06
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.02          0.016 (iii)
    TIME TO PEAK    (hrs)=       1.33         1.67          1.67
    RUNOFF VOLUME    (mm)=      24.01         4.74          4.93
    TOTAL RAINFALL   (mm)=      25.01        25.01          25.01
    RUNOFF COEFFICIENT   =       0.96         0.19          0.20

***** 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*  =  61.0    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  (  0028)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0207):     1.43   0.016     1.67     4.93
     + ID2= 2 (  0209):     1.17   0.021     1.67     7.08

==================================================
       ID = 3 (  0028):     2.60   0.037     1.67     5.90

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

--------------------
| ADD HYD  (  0031)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0028):     2.60   0.037     1.67     5.90
```

```
     + ID2= 2 (  0030):    1.69   0.184     1.33    15.32

================================================
       ID = 3 (  0031):    4.29   0.197     1.33     9.61

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

--------------------
| ADD HYD  (  0031)|
|  3 +  2 =  1   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0031):    4.29   0.197     1.33     9.61
     + ID2= 2 (  0032):   18.24   0.989     1.33    10.15

================================================
       ID = 1 (  0031):   22.53   1.186     1.33    10.05

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   | OUTFLOW
STORAGE
--------------------      (cms)     (ha.m.)  |  (cms)     (ha.m.)
    **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                    0.0050     0.0389   |  0.2800      0.5240
                    0.0080     0.0790   |  0.3140      0.5827
                    0.0100     0.1217   |  0.3440      0.6432
                    0.0120     0.1657   |  0.8660      0.7703
                    0.0140     0.2114   |  1.1340      0.8368
                    0.0300     0.2590   |  1.3630      1.1230
                    0.0700     0.3083   |  1.5120      1.3546
                    0.1340     0.3594   |  1.5590      1.4348
                    0.1960     0.4124   |  1.6040      1.5166
                    0.2420     0.4673   |  1.6480      1.6001

                        AREA     QPEAK     TPEAK      R.V.
                        (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0031)     22.530      1.186      1.33      10.05
  OUTFLOW: ID= 1 (  0008)     22.530      0.014      4.42       9.96
  OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

            TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
            CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
            PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.18
            TIME SHIFT OF PEAK FLOW         (min)=185.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.2106

------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0203)|   Area    (ha)=   0.14   Curve Number   (CN)=
82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  11.20   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.27

    Unit Hyd Qpeak  (cms)=   0.020

    PEAK FLOW      (cms)=   0.001 (i)
    TIME TO PEAK    (hrs)=   1.917
    RUNOFF VOLUME   (mm)=   2.736
    TOTAL RAINFALL  (mm)=  25.015
    RUNOFF COEFFICIENT   =   0.109

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

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

--------------------
| ADD HYD  (  0017)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0016 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0017 = HYDROGRAPH 0203
       ID1= 1 (  0016):    0.00   0.000     0.00     0.00
     + ID2= 2 (  0203):    0.14   0.001     1.92     2.74

================================================
       ID = 3 (  0017):    0.14   0.001     1.92     2.74

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

--------------------
| ADD HYD  (  0018)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):    0.14   0.001     1.92     2.74
     + ID2= 2 (  0008):   22.53   0.014     4.42     9.96

================================================
       ID = 3 (  0018):   22.67   0.014     4.08     9.91

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0206)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.09         0.13
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      38.30        40.00
    Mannings n            =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=      74.87        10.73
              over (min)        5.00        20.00
    Storage Coeff.  (min)=       1.31 (ii)   18.55 (ii)
    Unit Hyd. Tpeak (min)=       5.00        20.00
    Unit Hyd. peak  (cms)=       0.33         0.06
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.00          0.002 (iii)
    TIME TO PEAK    (hrs)=       1.33         1.67          1.67
    RUNOFF VOLUME   (mm)=      24.01         4.74          4.89
    TOTAL RAINFALL  (mm)=      25.01        25.01         25.01
    RUNOFF COEFFICIENT   =       0.96         0.19          0.20

***** 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*  =  61.0    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.

------------------------------------------------------------------------------
================================================================================
================================================
===

     V   V  I   SSSSS  U   U    A    L           (v 6.2.2005)
     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 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 *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
```

Output filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\0bddfc51-90d1-46c7-961f-c46062b91bf2\s
Summary filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\0bddfc51-90d1-46c7-961f-c46062b91bf2\s

DATE: 12/23/2021 TIME: 11:09:43

USER:

COMMENTS:

****
** SIMULATION : 2. 2-yr 3hr Chicago Storm **
****

| CHICAGO STORM | IDF curve parameters: A= 743.000
| Ptotal= 34.27 mm | B= 6.000
C= 0.799
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.08	2.84	0.83	15.85	1.58	7.98	2.33	3.70
0.17	3.09	0.92	36.89	1.67	7.03	2.42	3.50
0.25	3.41	1.00	109.40	1.75	6.29	2.50	3.33
0.33	3.80	1.08	47.44	1.83	5.69	2.58	3.17
0.42	4.31	1.17	26.38	1.92	5.21	2.67	3.03
0.50	5.00	1.25	18.05	2.00	4.81	2.75	2.90
0.58	5.98	1.33	13.69	2.08	4.47	2.83	2.78
0.67	7.49	1.42	11.03	2.17	4.17	2.92	2.68
0.75	10.13	1.50	9.25	2.25	3.92	3.00	2.58

| CALIB |
| NASHYD (0204)| Area (ha)= 6.12 Curve Number (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia (mm)= 12.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.47

Unit Hyd Qpeak (cms)= 0.497

PEAK FLOW (cms)= 0.057 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 5.603
TOTAL RAINFALL (mm)= 34.271
RUNOFF COEFFICIENT = 0.163

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

| CALIB |
| STANDHYD (0205)| Area (ha)= 1.15
|ID= 1 DT= 5.0 min | Total Imp(%)= 40.00 Dir. Conn.(%)= 1.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.46	0.69
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	2.00	2.00
Length (m)=	87.56	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 109.40 71.18
over (min) 5.00 10.00
Storage Coeff. (min)= 1.85 (ii) 9.93 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.32 0.11

TOTALS			
PEAK FLOW (cms)=	0.00	0.08	0.085 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.08
RUNOFF VOLUME (mm)=	33.27	18.39	18.53
TOTAL RAINFALL (mm)=	34.27	34.27	34.27
RUNOFF COEFFICIENT =	0.97	0.54	0.54

***** 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* = 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.

| ADD HYD (0021)|
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0204):	6.12	0.057	1.75	5.60
+ ID2= 2 (0205):	1.15	0.085	1.08	18.53
ID = 3 (0021):	7.27	0.097	1.17	7.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| STANDHYD (0200)| Area (ha)= 6.31
|ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 52.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.10	2.21
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	2.00	2.00
Length (m)=	205.10	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 109.40 22.17
over (min) 5.00 20.00
Storage Coeff. (min)= 3.08 (ii) 15.97 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.27 0.07

TOTALS			
PEAK FLOW (cms)=	0.86	0.08	0.875 (iii)
TIME TO PEAK (hrs)=	1.00	1.33	1.00
RUNOFF VOLUME (mm)=	33.27	9.15	21.69
TOTAL RAINFALL (mm)=	34.27	34.27	34.27
RUNOFF COEFFICIENT =	0.97	0.27	0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 68.0 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 (0208)| Area (ha)= 4.02
|ID= 1 DT= 5.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 56.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.81	1.21
Dep. Storage (mm)=	1.00	1.50

```
    Average Slope     (%)=       2.00         2.00
    Length            (m)=     163.71        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     109.40        19.67
             over (min)        5.00         20.00
    Storage Coeff.  (min)=       2.69 (ii)   16.22 (ii)
    Unit Hyd. Tpeak (min)=       5.00         20.00
    Unit Hyd. peak  (cms)=       0.29         0.06
                                      *TOTALS*
    PEAK FLOW       (cms)=       0.61         0.04          0.618 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.33          1.00
    RUNOFF VOLUME   (mm)=       33.27         7.68          22.01
    TOTAL RAINFALL  (mm)=       34.27        34.27          34.27
    RUNOFF COEFFICIENT  =        0.97         0.22          0.64

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  61.0    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 (  0210)|   Area    (ha)=   0.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
    Surface Area      (ha)=       0.26         0.38
    Dep. Storage      (mm)=       1.00         1.50
    Average Slope     (%)=        2.00         2.00
    Length            (m)=       65.32        40.00
    Mannings n          =        0.013        0.250

    Max.Eff.Inten.(mm/hr)=       109.40        24.49
             over (min)          5.00         15.00
    Storage Coeff.  (min)=         1.55 (ii)   13.94 (ii)
    Unit Hyd. Tpeak (min)=         5.00         15.00
    Unit Hyd. peak  (cms)=         0.33         0.08
                                      *TOTALS*
    PEAK FLOW       (cms)=         0.00         0.02          0.016 (iii)
    TIME TO PEAK    (hrs)=         1.00         1.25          1.25
    RUNOFF VOLUME   (mm)=        33.27         8.45          8.68
    TOTAL RAINFALL  (mm)=        34.27        34.27          34.27
    RUNOFF COEFFICIENT  =         0.97         0.25          0.25

***** 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*  =  61.0    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  (  0034)|
|  1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0208):     4.02   0.618     1.00    22.01
     + ID2= 2 (  0210):     0.64   0.016     1.25     8.68

==================================================
       ID = 3 (  0034):     4.66   0.624     1.00    20.18

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0029)|
|  1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     6.31   0.875     1.00    21.69
     + ID2= 2 (  0034):     4.66   0.624     1.00    20.18

==================================================
       ID = 3 (  0029):    10.97   1.499     1.00    21.05

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0032)|
|  1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):     7.27   0.097     1.17     7.65
     + ID2= 2 (  0029):    10.97   1.499     1.00    21.05

==================================================
       ID = 3 (  0032):    18.24   1.548     1.00    15.71

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   0.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  64.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
    Surface Area      (ha)=       0.42         0.11
    Dep. Storage      (mm)=       1.00         1.50
    Average Slope     (%)=        2.00         2.00
    Length            (m)=       59.44        40.00
    Mannings n          =        0.013        0.250

    Max.Eff.Inten.(mm/hr)=       109.40        54.22
             over (min)          5.00         10.00
    Storage Coeff.  (min)=         1.47 (ii)    5.74 (ii)
    Unit Hyd. Tpeak (min)=         5.00         10.00
    Unit Hyd. peak  (cms)=         0.33         0.15
                                      *TOTALS*
    PEAK FLOW       (cms)=         0.10         0.01          0.107 (iii)
    TIME TO PEAK    (hrs)=         1.00         1.08          1.00
    RUNOFF VOLUME   (mm)=        33.27        13.47          26.14
    TOTAL RAINFALL  (mm)=        34.27        34.27          34.27
    RUNOFF COEFFICIENT  =         0.97         0.39          0.76

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  74.0    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    (  0016)|
| Inlet Cap.= 0.141|
| #of Inlets=     1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK     R.V.
--------------------        (ha)     (cms)     (hrs)     (mm)
    TOTAL HYD.(ID= 1):    0.53      0.11      1.00    26.14

==================================================
=
    MAJOR SYS.(ID= 2):    0.00      0.00      0.00     0.00
    MINOR SYS.(ID= 3):    0.53      0.11      1.00    26.14

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
    Surface Area      (ha)=       0.58         0.58
    Dep. Storage      (mm)=       1.00         1.50
```

```
    Average Slope     (%)=       2.00         2.00
    Length            (m)=      87.94        40.00
    Mannings n          =       0.013        0.250

    Max.Eff.Inten.(mm/hr)=     109.40        10.92
             over (min)        5.00         20.00
    Storage Coeff.  (min)=       1.85 (ii)   18.97 (ii)
    Unit Hyd. Tpeak (min)=       5.00         20.00
    Unit Hyd. peak  (cms)=       0.32         0.06
                                      *TOTALS*
    PEAK FLOW       (cms)=       0.17         0.01          0.170 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.33          1.00
    RUNOFF VOLUME    (mm)=      33.27         7.31          20.28
    TOTAL RAINFALL   (mm)=      34.27        34.27          34.27
    RUNOFF COEFFICIENT  =        0.97         0.21          0.59

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  69.0    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  (  0030)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)   (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     0.53   0.107     1.00    26.14
     + ID2= 2 (  0201):     1.16   0.170     1.00    20.28

==================================================
       ID = 3 (  0030):     1.69   0.278     1.00    22.12

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=   1.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.47         0.70
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope    (%)=        2.00         2.00
    Length           (m)=       88.32        40.00
    Mannings n          =       0.013        0.250

    Max.Eff.Inten.(mm/hr)=     109.40        43.40
             over (min)        5.00         15.00
    Storage Coeff.  (min)=       1.86 (ii)   11.71 (ii)
    Unit Hyd. Tpeak (min)=       5.00         15.00
    Unit Hyd. peak  (cms)=       0.32         0.09
                                      *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.05          0.047 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.25          1.17
    RUNOFF VOLUME    (mm)=      33.27        11.94          12.15
    TOTAL RAINFALL   (mm)=      34.27        34.27          34.27
    RUNOFF COEFFICIENT  =        0.97         0.35          0.35

***** 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*  =  72.0    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 (  0207)|   Area    (ha)=   1.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.57         0.86
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope    (%)=        2.00         2.00
    Length           (m)=       97.64        40.00
    Mannings n          =       0.013        0.250

    Max.Eff.Inten.(mm/hr)=     109.40        24.49
             over (min)        5.00         15.00
    Storage Coeff.  (min)=       1.97 (ii)   14.36 (ii)
    Unit Hyd. Tpeak (min)=       5.00         15.00
    Unit Hyd. peak  (cms)=       0.31         0.08
                                      *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.04          0.036 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.25          1.25
    RUNOFF VOLUME    (mm)=      33.27         8.45          8.69
    TOTAL RAINFALL   (mm)=      34.27        34.27          34.27
    RUNOFF COEFFICIENT  =        0.97         0.25          0.25

***** 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*  =  61.0    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  (  0028)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)   (cms)    (hrs)     (mm)
       ID1= 1 (  0207):     1.43   0.036     1.25     8.69
     + ID2= 2 (  0209):     1.17   0.047     1.17    12.15

==================================================
       ID = 3 (  0028):     2.60   0.083     1.25    10.24

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

--------------------
| ADD HYD  (  0031)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)   (cms)    (hrs)     (mm)
       ID1= 1 (  0028):     2.60   0.083     1.25    10.24
     + ID2= 2 (  0030):     1.69   0.278     1.00    22.12

==================================================
       ID = 3 (  0031):     4.29   0.310     1.00    14.92

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

--------------------
| ADD HYD  (  0031)|
|  3 +  2 =  1   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)   (cms)    (hrs)     (mm)
       ID1= 3 (  0031):     4.29   0.310     1.00    14.92
     + ID2= 2 (  0032):    18.24   1.548     1.00    15.71

==================================================
       ID = 1 (  0031):    22.53   1.858     1.00    15.56

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW
STORAGE
--------------------      (cms)     (ha.m.)   |  (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                       0.0050     0.0389    |  0.2800     0.5240
```

```
                0.0080    0.0790  |  0.3140    0.5827
                0.0100    0.1217  |  0.3440    0.6432
                0.0120    0.1657  |  0.8660    0.7703
                0.0140    0.2114  |  1.1340    0.8368
                0.0300    0.2590  |  1.3630    1.1230
                0.0700    0.3083  |  1.5120    1.3546
                0.1340    0.3594  |  1.5590    1.4348
                0.1960    0.4124  |  1.6040    1.5166
                0.2420    0.4673  |  1.6480    1.6001

                     AREA    QPEAK    TPEAK     R.V.
                     (ha)    (cms)    (hrs)     (mm)
  INFLOW : ID= 2 (  0031)    22.530    1.858    1.00     15.56
  OUTFLOW: ID= 1 (  0008)    22.530    0.073    3.08     15.47
  OVERFLOW:ID= 3 (  0003)     0.000    0.000    0.00      0.00

          TOTAL NUMBER OF SIMULATION OVERFLOW  =    0
          CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
          PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

          PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.91
          TIME SHIFT OF PEAK FLOW        (min)=125.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.3104

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0203)|  Area    (ha)=   0.14   Curve Number   (CN)=
82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  11.20   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.27

    Unit Hyd Qpeak  (cms)=   0.020

    PEAK FLOW      (cms)=   0.002 (i)
    TIME TO PEAK   (hrs)=   1.417
    RUNOFF VOLUME  (mm)=   6.743
    TOTAL RAINFALL  (mm)=  34.271
    RUNOFF COEFFICIENT  =   0.197

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

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

--------------------
| ADD HYD  (  0017)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0016 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0017 = HYDROGRAPH 0203
       ID1= 1 (  0016):    0.00   0.000    0.00     0.00
     + ID2= 2 (  0203):    0.14   0.002    1.42     6.74

==================================================
       ID = 3 (  0017):    0.14   0.002    1.42     6.74

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

--------------------
| ADD HYD  (  0018)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):    0.14   0.002    1.42     6.74
     + ID2= 2 (  0008):   22.53   0.073    3.08    15.47

==================================================
       ID = 3 (  0018):   22.67   0.073    3.08    15.42

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0206)|  Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=    0.09        0.13
    Dep. Storage     (mm)=    1.00        1.50
    Average Slope     (%)=    2.00        2.00
    Length          (m)=   38.30       40.00
    Mannings n          =    0.013       0.250

    Max.Eff.Inten.(mm/hr)=   109.40      24.49
             over (min)      5.00       15.00
    Storage Coeff.  (min)=    1.13 (ii)  13.52 (ii)
    Unit Hyd. Tpeak (min)=    5.00       15.00
    Unit Hyd. peak  (cms)=    0.34        0.08
                              *TOTALS*
    PEAK FLOW      (cms)=     0.00        0.01        0.006 (iii)
    TIME TO PEAK    (hrs)=    1.00        1.25        1.25
    RUNOFF VOLUME   (mm)=    33.27        8.45        8.65
    TOTAL RAINFALL  (mm)=    34.27       34.27       34.27
    RUNOFF COEFFICIENT  =     0.97        0.25        0.25

***** 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*  =  61.0    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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     V   V  I   SSSSS  U   U   A   L           (v 6.2.2005)
     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 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 *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\7d94d57e-e2ff-42de-bfc4-98ea7591880c\s
  Summary filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\7d94d57e-e2ff-42de-bfc4-98ea7591880c\s


DATE: 12/23/2021                    TIME: 11:09:43

USER:


COMMENTS:
_____
_____


--------------------------------------------------------------------------------------------
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  ************************************************
  ** SIMULATION : 3. 5-yr 3hr Chicago Storm     **
  ************************************************


--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1593.000
```

```
| Ptotal= 47.26 mm |                    B=  11.000
-------------------                    C=   0.879
                  used in:   INTENSITY =  A / (t + B)^C

                  Duration of storm  =  3.00 hrs
                  Storm time step    =  5.00 min
                  Time to peak ratio =  0.33

            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
            0.08    3.03 |  0.83   24.60 |  1.58   11.05 |  2.33    4.23
            0.17    3.38 |  0.92   57.39 |  1.67    9.46 |  2.42    3.95
            0.25    3.82 |  1.00  139.29 |  1.75    8.24 |  2.50    3.70
            0.33    4.39 |  1.08   72.74 |  1.83    7.29 |  2.58    3.48
            0.42    5.14 |  1.17   42.12 |  1.92    6.52 |  2.67    3.29
            0.50    6.20 |  1.25   28.38 |  2.00    5.89 |  2.75    3.11
            0.58    7.75 |  1.33   20.88 |  2.08    5.37 |  2.83    2.96
            0.67   10.24 |  1.42   16.28 |  2.17    4.93 |  2.92    2.82
            0.75   14.73 |  1.50   13.22 |  2.25    4.55 |  3.00    2.69


--------------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0204)|   Area    (ha)=   6.12   Curve Number   (CN)=
80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  12.40   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.47

    Unit Hyd Qpeak  (cms)=   0.497

    PEAK FLOW       (cms)=   0.146 (i)
    TIME TO PEAK    (hrs)=   1.667
    RUNOFF VOLUME    (mm)=  12.353
    TOTAL RAINFALL   (mm)=  47.258
    RUNOFF COEFFICIENT   =   0.261

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

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0205)|   Area    (ha)=   1.15
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.46        0.69
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope     (%)=       2.00        2.00
    Length           (m)=      87.56       40.00
    Mannings n            =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     139.29      113.84
             over (min)        5.00       10.00
    Storage Coeff.  (min)=       1.68 (ii)    8.38 (ii)
    Unit Hyd. Tpeak (min)=       5.00       10.00
    Unit Hyd. peak  (cms)=       0.32        0.12
                                        *TOTALS*
    PEAK FLOW       (cms)=       0.00        0.15         0.150 (iii)
    TIME TO PEAK    (hrs)=       1.00        1.08         1.08
    RUNOFF VOLUME    (mm)=      46.26       29.22        29.39
    TOTAL RAINFALL   (mm)=      47.26       47.26        47.26
    RUNOFF COEFFICIENT   =       0.98        0.62         0.62

***** 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*  =  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.

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--------------------
| ADD HYD  (  0021)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0204):     6.12   0.146     1.67    12.35
     + ID2= 2 (  0205):     1.15   0.150     1.08    29.39

================================================
       ID = 3 (  0021):     7.27   0.194     1.33    15.05

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0200)|   Area    (ha)=   6.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  52.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       4.10        2.21
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope     (%)=       2.00        2.00
    Length           (m)=     205.10       40.00
    Mannings n            =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     139.29       47.56
             over (min)        5.00       15.00
    Storage Coeff.  (min)=       2.80 (ii)   12.30 (ii)
    Unit Hyd. Tpeak (min)=       5.00       15.00
    Unit Hyd. peak  (cms)=       0.28        0.09
                                        *TOTALS*
    PEAK FLOW       (cms)=       1.14        0.16         1.185 (iii)
    TIME TO PEAK    (hrs)=       1.00        1.25         1.00
    RUNOFF VOLUME    (mm)=      46.26       15.98        31.73
    TOTAL RAINFALL   (mm)=      47.26       47.26        47.26
    RUNOFF COEFFICIENT   =       0.98        0.34         0.67

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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 (  0208)|   Area    (ha)=   4.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  56.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       2.81        1.21
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope     (%)=       2.00        2.00
    Length           (m)=     163.71       40.00
    Mannings n            =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     139.29       42.62
             over (min)        5.00       10.00
    Storage Coeff.  (min)=       2.44 (ii)    7.26 (ii)
    Unit Hyd. Tpeak (min)=       5.00       10.00
    Unit Hyd. peak  (cms)=       0.30        0.14
                                        *TOTALS*
    PEAK FLOW       (cms)=       0.80        0.10         0.852 (iii)
    TIME TO PEAK    (hrs)=       1.00        1.17         1.00
    RUNOFF VOLUME    (mm)=      46.26       13.62        31.90
    TOTAL RAINFALL   (mm)=      47.26       47.26        47.26
    RUNOFF COEFFICIENT   =       0.98        0.29         0.67

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  61.0    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 (  0210)|   Area    (ha)=   0.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.26         0.38
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      65.32        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     139.29        52.69
            over (min)        5.00        15.00
    Storage Coeff.  (min)=       1.41 (ii)   10.53 (ii)
    Unit Hyd. Tpeak (min)=       5.00        15.00
    Unit Hyd. peak  (cms)=       0.33         0.09
                                  *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.03          0.034 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.25          1.25
    RUNOFF VOLUME    (mm)=      46.26        14.84          15.14
    TOTAL RAINFALL   (mm)=      47.26        47.26          47.26
    RUNOFF COEFFICIENT   =       0.98         0.31          0.32

***** 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*  =  61.0    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  (  0034)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0208):     4.02   0.852     1.00    31.90
     + ID2= 2 (  0210):     0.64   0.034     1.25    15.14

================================================
       ID = 3 (  0034):     4.66   0.865     1.00    29.60

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     6.31   1.185     1.00    31.73
     + ID2= 2 (  0034):     4.66   0.865     1.00    29.60

================================================
       ID = 3 (  0029):    10.97   2.049     1.00    30.82

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

--------------------
| ADD HYD  (  0032)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):     7.27   0.194     1.33    15.05
     + ID2= 2 (  0029):    10.97   2.049     1.00    30.82

================================================
       ID = 3 (  0032):    18.24   2.142     1.00    24.53

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0202)|   Area    (ha)=   0.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  64.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.42         0.11
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      59.44        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     139.29        91.55
            over (min)        5.00        10.00
    Storage Coeff.  (min)=       1.33 (ii)    5.21 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.33         0.16
                                  *TOTALS*
    PEAK FLOW       (cms)=       0.13         0.02          0.141 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08          1.00
    RUNOFF VOLUME    (mm)=      46.26        22.45          37.68
    TOTAL RAINFALL   (mm)=      47.26        47.26          47.26
    RUNOFF COEFFICIENT   =       0.98         0.48          0.80

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  74.0    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    (  0016)|
| Inlet Cap.= 0.141|
| #of Inlets=     1|
| Total(cms)=  0.1|      AREA     QPEAK     TPEAK     R.V.
--------------------         (ha)     (cms)     (hrs)     (mm)
    TOTAL HYD.(ID= 1):   0.53      0.14      1.00    37.68

================================================
=
    MAJOR SYS.(ID= 2):   0.00      0.00      1.00    37.68
    MINOR SYS.(ID= 3):   0.53      0.14      1.00    37.68

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0201)|   Area    (ha)=   1.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.58         0.58
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      87.94        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     139.29        23.74
            over (min)        5.00        15.00
    Storage Coeff.  (min)=       1.68 (ii)   14.23 (ii)
    Unit Hyd. Tpeak (min)=       5.00        15.00
    Unit Hyd. peak  (cms)=       0.32         0.08
                                  *TOTALS*
    PEAK FLOW       (cms)=       0.22         0.02          0.224 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.25          1.00
    RUNOFF VOLUME    (mm)=      46.26        13.10          29.67
    TOTAL RAINFALL   (mm)=      47.26        47.26          47.26
    RUNOFF COEFFICIENT   =       0.98         0.28          0.63

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  69.0    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  (  0030)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0016):     0.53   0.141     1.00    37.68
    + ID2= 2 (  0201):     1.16   0.224     1.00    29.67

================================================
      ID = 3 (  0030):     1.69   0.365     1.00    32.18

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=   1.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.47         0.70
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      88.32        40.00
    Mannings n            =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     139.29        74.53
             over (min)        5.00         10.00
    Storage Coeff.  (min)=       1.69 (ii)    9.63 (ii)
    Unit Hyd. Tpeak (min)=       5.00         10.00
    Unit Hyd. peak  (cms)=       0.32         0.11
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.09          0.095 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17          1.17
    RUNOFF VOLUME    (mm)=      46.26        20.23         20.48
    TOTAL RAINFALL   (mm)=      47.26        47.26         47.26
    RUNOFF COEFFICIENT   =       0.98         0.43          0.43

***** 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*  =  72.0    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 (  0207)|   Area    (ha)=   1.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.57         0.86
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      97.64        40.00
    Mannings n            =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     139.29        52.69
             over (min)        5.00         15.00
    Storage Coeff.  (min)=       1.79 (ii)   10.91 (ii)
    Unit Hyd. Tpeak (min)=       5.00         15.00
    Unit Hyd. peak  (cms)=       0.32         0.09
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.07          0.076 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.25          1.25
    RUNOFF VOLUME    (mm)=      46.26        14.84         15.15
    TOTAL RAINFALL   (mm)=      47.26        47.26         47.26
    RUNOFF COEFFICIENT   =       0.98         0.31          0.32

***** 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*  =  61.0    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  (  0028)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0207):     1.43   0.076     1.25    15.15
    + ID2= 2 (  0209):     1.17   0.095     1.17    20.48

================================================
      ID = 3 (  0028):     2.60   0.168     1.17    17.55

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

--------------------
| ADD HYD  (  0031)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0028):     2.60   0.168     1.17    17.55
    + ID2= 2 (  0030):     1.69   0.365     1.00    32.18

================================================
      ID = 3 (  0031):     4.29   0.444     1.00    23.31

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

--------------------
| ADD HYD  (  0031)|
|  3 +  2 =  1   |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0031):     4.29   0.444     1.00    23.31
    + ID2= 2 (  0032):    18.24   2.142     1.00    24.53

================================================
      ID = 1 (  0031):    22.53   2.585     1.00    24.30

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW
STORAGE
--------------------      (cms)     (ha.m.)  |  (cms)     (ha.m.)
    **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                    0.0050    0.0389   |  0.2800     0.5240
                    0.0080    0.0790   |  0.3140     0.5827
                    0.0100    0.1217   |  0.3440     0.6432
                    0.0120    0.1657   |  0.8660     0.7703
                    0.0140    0.2114   |  1.1340     0.8368
                    0.0300    0.2590   |  1.3630     1.1230
                    0.0700    0.3083   |  1.5120     1.3546
                    0.1340    0.3594   |  1.5590     1.4348
                    0.1960    0.4124   |  1.6040     1.5166
                    0.2420    0.4673   |  1.6480     1.6001

                         AREA     QPEAK     TPEAK      R.V.
                         (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0031)    22.530     2.585     1.00      24.30
  OUTFLOW: ID= 1 (  0008)    22.530     0.207     2.58      24.21
  OVERFLOW:ID= 3 (  0003)     0.000     0.000     0.00       0.00

            TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
            CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
            PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

            PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.01
            TIME SHIFT OF PEAK FLOW        (min)= 95.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.4259

------------------------------------------------------------------------------
--------------------
| CALIB            |
```

```
| NASHYD  (  0203)|  Area    (ha)=   0.14   Curve Number   (CN)=
82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  11.20   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.27

    Unit Hyd Qpeak  (cms)=   0.020

    PEAK FLOW      (cms)=   0.005 (i)
    TIME TO PEAK   (hrs)=   1.417
    RUNOFF VOLUME   (mm)=  14.147
    TOTAL RAINFALL  (mm)=  47.258
    RUNOFF COEFFICIENT  =   0.299

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

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

-------------------
| ADD HYD  (  0017)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)   (cms)   (hrs)     (mm)
      ID1= 1 (  0016):    0.00   0.000     1.00    37.68
    + ID2= 2 (  0203):    0.14   0.005     1.42    14.15

===================================================
      ID = 3 (  0017):    0.14   0.005     1.42    14.20

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

-------------------
| ADD HYD  (  0018)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)   (cms)   (hrs)     (mm)
      ID1= 1 (  0017):    0.14   0.005     1.42    14.20
    + ID2= 2 (  0008):   22.53   0.207     2.58    24.21

===================================================
      ID = 3 (  0018):   22.67   0.208     2.50    24.15

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0206)|  Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
-------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.09        0.13
    Dep. Storage     (mm)=      1.00        1.50
    Average Slope     (%)=      2.00        2.00
    Length           (m)=     38.30       40.00
    Mannings n          =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=    139.29       52.69
            over (min)        5.00       15.00
    Storage Coeff.  (min)=      1.02 (ii)   10.14 (ii)
    Unit Hyd. Tpeak (min)=      5.00       15.00
    Unit Hyd. peak  (cms)=      0.34        0.10
                                  *TOTALS*
    PEAK FLOW      (cms)=      0.00        0.01         0.012 (iii)
    TIME TO PEAK    (hrs)=     1.00        1.25         1.25
    RUNOFF VOLUME   (mm)=     46.26       14.84        15.12
    TOTAL RAINFALL  (mm)=     47.26       47.26        47.26
    RUNOFF COEFFICIENT  =      0.98        0.31         0.32

***** 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*  =  61.0    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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===

     V   V  I   SSSSS  U   U   A   L          (v 6.2.2005)
     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 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 *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\7157ab6b-2fa4-4633-bf94-97cd84f0b46e\s
  Summary filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\7157ab6b-2fa4-4633-bf94-97cd84f0b46e\s


DATE: 12/23/2021                      TIME: 11:09:43

USER:


COMMENTS:
_____
_____


---------------------------------------------------------------------------------------------------
---------------
  ************************************************
  ** SIMULATION : 4. 25-yr 3hr Chicago Storm    **
  ************************************************


--------------------
| CHICAGO STORM    |    IDF curve parameters: A=3158.000
| Ptotal= 68.26 mm |                          B=  15.000
--------------------                          C=   0.936
                    used in:   INTENSITY =  A / (t + B)^C

                    Duration of storm  =  3.00 hrs
                    Storm time step    =  5.00 min
                    Time to peak ratio =  0.33

           TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
            hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
           0.08    3.57 |  0.83   38.32 |  1.58   16.26 |  2.33    5.34
           0.17    4.07 |  0.92   87.43 |  1.67   13.65 |  2.42    4.91
           0.25    4.72 |  1.00  191.56 |  1.75   11.67 |  2.50    4.54
           0.33    5.57 |  1.08  109.32 |  1.83   10.13 |  2.58    4.22
           0.42    6.73 |  1.17   65.64 |  1.92    8.90 |  2.67    3.94
           0.50    8.39 |  1.25   44.39 |  2.00    7.91 |  2.75    3.69
           0.58   10.88 |  1.33   32.36 |  2.08    7.09 |  2.83    3.46
           0.67   14.93 |  1.42   24.85 |  2.17    6.41 |  2.92    3.26
           0.75   22.29 |  1.50   19.81 |  2.25    5.83 |  3.00    3.08


---------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD  (  0204)|  Area    (ha)=   6.12   Curve Number   (CN)=
80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  12.40   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.47
```

```
    Unit Hyd Qpeak  (cms)=   0.497

    PEAK FLOW      (cms)=   0.336 (i)
    TIME TO PEAK   (hrs)=   1.667
    RUNOFF VOLUME  (mm)=  26.138
    TOTAL RAINFALL  (mm)=  68.257
    RUNOFF COEFFICIENT  =   0.383

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0205)|   Area    (ha)=   1.15
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.46        0.69
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope     (%)=       2.00        2.00
    Length           (m)=      87.56       40.00
    Mannings n          =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     191.56      186.81
             over (min)        5.00       10.00
    Storage Coeff.  (min)=       1.48 (ii)    6.97 (ii)
    Unit Hyd. Tpeak (min)=       5.00       10.00
    Unit Hyd. peak  (cms)=       0.33        0.14
                                    *TOTALS*
    PEAK FLOW      (cms)=       0.01        0.27         0.273 (iii)
    TIME TO PEAK   (hrs)=       1.00        1.08          1.08
    RUNOFF VOLUME  (mm)=      67.26       47.99         48.18
    TOTAL RAINFALL  (mm)=     68.26       68.26         68.26
    RUNOFF COEFFICIENT  =      0.99        0.70          0.71

***** 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*  =  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.

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

--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0204):     6.12   0.336     1.67    26.14
     + ID2= 2 (  0205):     1.15   0.273     1.08    48.18

==================================================
       ID = 3 (  0021):     7.27   0.411     1.50    29.62

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   6.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  52.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       4.10        2.21
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope     (%)=       2.00        2.00
    Length           (m)=     205.10       40.00
    Mannings n          =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     191.56       88.14
             over (min)        5.00       10.00
    Storage Coeff.  (min)=       2.46 (ii)    7.11 (ii)
    Unit Hyd. Tpeak (min)=       5.00       10.00
    Unit Hyd. peak  (cms)=       0.30        0.14
                                    *TOTALS*
    PEAK FLOW      (cms)=       1.61        0.39         1.819 (iii)
    TIME TO PEAK   (hrs)=       1.00        1.17          1.00
    RUNOFF VOLUME  (mm)=      67.26       29.23         49.00
    TOTAL RAINFALL  (mm)=     68.26       68.26         68.26
    RUNOFF COEFFICIENT  =      0.99        0.43          0.72

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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 (  0208)|   Area    (ha)=   4.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  56.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       2.81        1.21
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope     (%)=       2.00        2.00
    Length           (m)=     163.71       40.00
    Mannings n          =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     191.56       80.46
             over (min)        5.00       10.00
    Storage Coeff.  (min)=       2.15 (ii)    6.39 (ii)
    Unit Hyd. Tpeak (min)=       5.00       10.00
    Unit Hyd. peak  (cms)=       0.31        0.15
                                    *TOTALS*
    PEAK FLOW      (cms)=       1.13        0.20         1.237 (iii)
    TIME TO PEAK   (hrs)=       1.00        1.17          1.00
    RUNOFF VOLUME  (mm)=      67.26       25.40         48.84
    TOTAL RAINFALL  (mm)=     68.26       68.26         68.26
    RUNOFF COEFFICIENT  =      0.99        0.37          0.72

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  61.0    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 (  0210)|   Area    (ha)=   0.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.26        0.38
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope     (%)=       2.00        2.00
    Length           (m)=      65.32       40.00
    Mannings n          =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     191.56       98.37
             over (min)        5.00       10.00
    Storage Coeff.  (min)=       1.24 (ii)    8.34 (ii)
    Unit Hyd. Tpeak (min)=       5.00       10.00
    Unit Hyd. peak  (cms)=       0.33        0.13
                                    *TOTALS*
    PEAK FLOW      (cms)=       0.00        0.07         0.074 (iii)
    TIME TO PEAK   (hrs)=       1.00        1.17          1.17
    RUNOFF VOLUME  (mm)=      67.26       27.36         27.75
    TOTAL RAINFALL  (mm)=     68.26       68.26         68.26
    RUNOFF COEFFICIENT  =      0.99        0.40          0.41

***** 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*  =  61.0    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  (  0034)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0208):     4.02   1.237     1.00    48.84
     + ID2= 2 (  0210):     0.64   0.074     1.17    27.75

==================================================
       ID = 3 (  0034):     4.66   1.277     1.00    45.94

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

--------------------
| ADD HYD  (  0029)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     6.31   1.819     1.00    49.00
     + ID2= 2 (  0034):     4.66   1.277     1.00    45.94

==================================================
       ID = 3 (  0029):    10.97   3.096     1.00    47.70

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

--------------------
| ADD HYD  (  0032)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):     7.27   0.411     1.50    29.62
     + ID2= 2 (  0029):    10.97   3.096     1.00    47.70

==================================================
       ID = 3 (  0032):    18.24   3.281     1.00    40.50

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   0.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  64.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.42         0.11
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      59.44        40.00
    Mannings n            =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     191.56       160.01
             over (min)        5.00         5.00
    Storage Coeff.  (min)=       1.17 (ii)    4.59 (ii)
    Unit Hyd. Tpeak (min)=       5.00         5.00
    Unit Hyd. peak  (cms)=       0.34         0.23
                                    *TOTALS*
    PEAK FLOW        (cms)=       0.18         0.04          0.220 (iii)
    TIME TO PEAK     (hrs)=       1.00         1.00          1.00
    RUNOFF VOLUME    (mm)=       67.26        38.85         57.03
    TOTAL RAINFALL   (mm)=       68.26        68.26         68.26
    RUNOFF COEFFICIENT   =        0.99         0.57          0.84

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  74.0    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    (  0016)|
| Inlet Cap.= 0.141|
| #of Inlets=     1|
| Total(cms)=   0.1|     AREA     QPEAK     TPEAK     R.V.
--------------------        (ha)     (cms)     (hrs)     (mm)
    TOTAL HYD.(ID= 1):    0.53      0.22      1.00    57.03

==================================================
=
    MAJOR SYS.(ID= 2):    0.04      0.08      1.00    57.03
    MINOR SYS.(ID= 3):    0.49      0.14      1.00    57.03

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.58         0.58
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      87.94        40.00
    Mannings n            =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     191.56        53.06
             over (min)        5.00         15.00
    Storage Coeff.  (min)=       1.48 (ii)    10.58 (ii)
    Unit Hyd. Tpeak (min)=       5.00         15.00
    Unit Hyd. peak  (cms)=       0.33         0.09
                                    *TOTALS*
    PEAK FLOW        (cms)=       0.30         0.05          0.319 (iii)
    TIME TO PEAK     (hrs)=       1.00         1.25          1.00
    RUNOFF VOLUME    (mm)=       67.26        24.64         45.94
    TOTAL RAINFALL   (mm)=       68.26        68.26         68.26
    RUNOFF COEFFICIENT   =        0.99         0.36          0.67

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  69.0    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  (  0030)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     0.49   0.141     1.00    57.03
     + ID2= 2 (  0201):     1.16   0.319     1.00    45.94

==================================================
       ID = 3 (  0030):     1.65   0.460     1.00    49.22

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=   1.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.47         0.70
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      88.32        40.00
    Mannings n            =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     191.56       132.94
             over (min)        5.00         10.00
    Storage Coeff.  (min)=       1.49 (ii)    7.78 (ii)
    Unit Hyd. Tpeak (min)=       5.00         10.00
    Unit Hyd. peak  (cms)=       0.33         0.13
```

```
                                   *TOTALS*
    PEAK FLOW      (cms)=      0.01        0.18         0.184 (iii)
    TIME TO PEAK   (hrs)=      1.00        1.17         1.17
    RUNOFF VOLUME  (mm)=      67.26       35.65        35.97
    TOTAL RAINFALL (mm)=      68.26       68.26        68.26
    RUNOFF COEFFICIENT  =      0.99        0.52         0.53

***** 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*  =  72.0    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 (  0207)|  Area    (ha)=   1.43
|ID= 1 DT= 5.0 min |  Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.57        0.86
    Dep. Storage     (mm)=      1.00        1.50
    Average Slope     (%)=      2.00        2.00
    Length           (m)=     97.64       40.00
    Mannings n          =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=    191.56       98.37
            over (min)        5.00       10.00
    Storage Coeff.  (min)=      1.58 (ii)   8.68 (ii)
    Unit Hyd. Tpeak (min)=      5.00       10.00
    Unit Hyd. peak  (cms)=      0.33        0.12
                                   *TOTALS*
    PEAK FLOW      (cms)=      0.01        0.16         0.163 (iii)
    TIME TO PEAK   (hrs)=      1.00        1.17         1.17
    RUNOFF VOLUME  (mm)=      67.26       27.36        27.76
    TOTAL RAINFALL (mm)=      68.26       68.26        68.26
    RUNOFF COEFFICIENT  =      0.99        0.40         0.41

***** 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*  =  61.0    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  (  0028)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0207):     1.43   0.163     1.17    27.76
    + ID2= 2 (  0209):     1.17   0.184     1.17    35.97

==================================================
      ID = 3 (  0028):     2.60   0.348     1.17    31.45

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

--------------------
| ADD HYD  (  0031)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0028):     2.60   0.348     1.17    31.45
    + ID2= 2 (  0030):     1.65   0.460     1.00    49.22

==================================================
      ID = 3 (  0031):     4.25   0.691     1.08    38.34

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

--------------------
| ADD HYD  (  0031)|
|  3 +  2 =  1    |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0031):     4.25   0.691     1.08    38.34
    + ID2= 2 (  0032):    18.24   3.281     1.00    40.50

==================================================
      ID = 1 (  0031):    22.49   3.932     1.00    40.09

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |    OUTFLOW    STORAGE   | OUTFLOW
STORAGE
--------------------      (cms)     (ha.m.)  |  (cms)     (ha.m.)
    **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                      0.0050     0.0389   |  0.2800     0.5240
                      0.0080     0.0790   |  0.3140     0.5827
                      0.0100     0.1217   |  0.3440     0.6432
                      0.0120     0.1657   |  0.8660     0.7703
                      0.0140     0.2114   |  1.1340     0.8368
                      0.0300     0.2590   |  1.3630     1.1230
                      0.0700     0.3083   |  1.5120     1.3546
                      0.1340     0.3594   |  1.5590     1.4348
                      0.1960     0.4124   |  1.6040     1.5166
                      0.2420     0.4673   |  1.6480     1.6001

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0031)    22.487     3.932     1.00      40.09
  OUTFLOW: ID= 1 (  0008)    22.487     0.441     2.25      40.00
  OVERFLOW:ID= 3 (  0003)     0.000     0.000     0.00       0.00

            TOTAL NUMBER OF SIMULATION OVERFLOW =     0
            CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
            PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

            PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.22
            TIME SHIFT OF PEAK FLOW         (min)= 75.00
            MAXIMUM  STORAGE   USED      (ha.m.)=  0.6669

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0203)|  Area    (ha)=   0.14   Curve Number   (CN)=
82.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=  11.20   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.27

    Unit Hyd Qpeak  (cms)=   0.020

    PEAK FLOW      (cms)=   0.012 (i)
    TIME TO PEAK   (hrs)=   1.333
    RUNOFF VOLUME  (mm)=  28.836
    TOTAL RAINFALL (mm)=  68.257
    RUNOFF COEFFICIENT  =   0.422

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

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

--------------------
| ADD HYD  (  0017)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0016):     0.04   0.079     1.00    57.03
    + ID2= 2 (  0203):     0.14   0.012     1.33    28.84

==================================================
      ID = 3 (  0017):     0.18   0.081     1.00    35.46

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

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--------------------
| ADD HYD  (  0018)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0017):     0.18   0.081     1.00    35.46
    + ID2= 2 (  0008):    22.49   0.441     2.25    40.00

==================================================
      ID = 3 (  0018):    22.67   0.444     2.25    39.97

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0206)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.09         0.13
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      38.30        40.00
    Mannings n            =     0.013        0.250

    Max.Eff.Inten.(mm/hr)=     191.56        98.37
              over (min)        5.00        10.00
    Storage Coeff.  (min)=       0.90 (ii)    8.00 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.34         0.13
                                      *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.03          0.026 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17          1.17
    RUNOFF VOLUME    (mm)=      67.26        27.36         27.74
    TOTAL RAINFALL   (mm)=      68.26        68.26         68.26
    RUNOFF COEFFICIENT   =       0.99         0.40          0.41

***** 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*  =  61.0    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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==================================================
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===

      V    V   I    SSSSS  U   U    A    L            (v 6.2.2005)
      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 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  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
  Output  filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\f86fcfd4-ae6d-41fd-a381-82259bfb5d0e\s
  Summary filename:
C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-
a808-84a804cb6cce\f86fcfd4-ae6d-41fd-a381-82259bfb5d0e\s

DATE: 12/23/2021                    TIME: 11:09:44

USER:


COMMENTS:
_____
_____


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  ************************************************
  ** SIMULATION : 5. 50-yr 3hr Chicago Storm    **
  ************************************************


--------------------
| CHICAGO STORM    |   IDF curve parameters: A=3886.000
| Ptotal= 77.64 mm |                    B=  16.000
--------------------                    C=   0.950
                  used in:   INTENSITY =  A / (t + B)^C

                  Duration of storm  =  3.00 hrs
                  Storm time step    =  5.00 min
                  Time to peak ratio =  0.33

            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME
RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
            0.08    3.84 |  0.83   44.32 |  1.58   18.58 |  2.33    5.86
            0.17    4.41 |  0.92  100.50 |  1.67   15.53 |  2.42    5.37
            0.25    5.15 |  1.00  215.80 |  1.75   13.21 |  2.50    4.95
            0.33    6.13 |  1.08  125.29 |  1.83   11.41 |  2.58    4.58
            0.42    7.47 |  1.17   75.84 |  1.92    9.99 |  2.67    4.26
            0.50    9.39 |  1.25   51.37 |  2.00    8.83 |  2.75    3.97
            0.58   12.29 |  1.33   37.40 |  2.08    7.88 |  2.83    3.72
            0.67   17.02 |  1.42   28.63 |  2.17    7.09 |  2.92    3.49
            0.75   25.64 |  1.50   22.74 |  2.25    6.43 |  3.00    3.28


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0204)|   Area    (ha)=   6.12   Curve Number   (CN)=
80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  12.40   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.47

    Unit Hyd Qpeak  (cms)=   0.497

    PEAK FLOW       (cms)=   0.432 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  33.056
    TOTAL RAINFALL   (mm)=  77.637
    RUNOFF COEFFICIENT   =   0.426

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0205)|   Area    (ha)=   1.15
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.46         0.69
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      87.56        40.00
    Mannings n            =     0.013        0.250

    Max.Eff.Inten.(mm/hr)=     215.80       220.60
              over (min)        5.00        10.00
    Storage Coeff.  (min)=       1.41 (ii)    6.55 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.33         0.14
                                      *TOTALS*
```

```
    PEAK FLOW      (cms)=      0.01        0.33         0.332 (iii)
    TIME TO PEAK   (hrs)=      1.00        1.08         1.08
    RUNOFF VOLUME  (mm)=      76.64       56.66        56.86
    TOTAL RAINFALL (mm)=      77.64       77.64        77.64
    RUNOFF COEFFICIENT  =      0.99        0.73         0.73

***** 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*  =  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.

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

--------------------
| ADD HYD  (  0021)|
|  1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0204):     6.12   0.432     1.58    33.06
     + ID2= 2 (  0205):     1.15   0.332     1.08    56.86

==================================================
       ID = 3 (  0021):     7.27   0.521     1.50    36.82

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   6.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  52.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      4.10        2.21
    Dep. Storage     (mm)=      1.00        1.50
    Average Slope     (%)=      2.00        2.00
    Length           (m)=    205.10       40.00
    Mannings n            =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=    215.80      108.66
            over (min)        5.00       10.00
    Storage Coeff.  (min)=     2.35 (ii)   6.78 (ii)
    Unit Hyd. Tpeak (min)=     5.00       10.00
    Unit Hyd. peak  (cms)=     0.30        0.14
                                    *TOTALS*
    PEAK FLOW      (cms)=      1.83        0.49         2.099 (iii)
    TIME TO PEAK   (hrs)=      1.00        1.17         1.00
    RUNOFF VOLUME  (mm)=     76.64       35.79        57.03
    TOTAL RAINFALL (mm)=     77.64       77.64        77.64
    RUNOFF COEFFICIENT  =     0.99        0.46         0.73

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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 (  0208)|   Area    (ha)=   4.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  56.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      2.81        1.21
    Dep. Storage     (mm)=      1.00        1.50
    Average Slope     (%)=      2.00        2.00
    Length           (m)=    163.71       40.00
    Mannings n            =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=    215.80       99.94
            over (min)        5.00       10.00
    Storage Coeff.  (min)=     2.05 (ii)   6.09 (ii)
    Unit Hyd. Tpeak (min)=     5.00       10.00
    Unit Hyd. peak  (cms)=     0.31        0.15
                                    *TOTALS*
    PEAK FLOW      (cms)=      1.28        0.25         1.420 (iii)
    TIME TO PEAK   (hrs)=      1.00        1.17         1.00
    RUNOFF VOLUME  (mm)=     76.64       31.33        56.70
    TOTAL RAINFALL (mm)=     77.64       77.64        77.64
    RUNOFF COEFFICIENT  =     0.99        0.40         0.73

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  61.0    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 (  0210)|   Area    (ha)=   0.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.26        0.38
    Dep. Storage     (mm)=      1.00        1.50
    Average Slope     (%)=      2.00        2.00
    Length           (m)=     65.32       40.00
    Mannings n            =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=    215.80      121.67
            over (min)        5.00       10.00
    Storage Coeff.  (min)=     1.18 (ii)   7.71 (ii)
    Unit Hyd. Tpeak (min)=     5.00       10.00
    Unit Hyd. peak  (cms)=     0.33        0.13
                                    *TOTALS*
    PEAK FLOW      (cms)=      0.00        0.09         0.094 (iii)
    TIME TO PEAK   (hrs)=      1.00        1.17         1.17
    RUNOFF VOLUME  (mm)=     76.64       33.61        34.04
    TOTAL RAINFALL (mm)=     77.64       77.64        77.64
    RUNOFF COEFFICIENT  =     0.99        0.43         0.44

***** 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*  =  61.0    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  (  0034)|
|  1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0208):     4.02   1.420     1.00    56.70
     + ID2= 2 (  0210):     0.64   0.094     1.17    34.04

==================================================
       ID = 3 (  0034):     4.66   1.472     1.00    53.59

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

--------------------
| ADD HYD  (  0029)|
|  1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     6.31   2.099     1.00    57.03
     + ID2= 2 (  0034):     4.66   1.472     1.00    53.59

==================================================
       ID = 3 (  0029):    10.97   3.571     1.00    55.57
```

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


--------------------
| ADD HYD  (  0032)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):     7.27   0.521     1.50    36.82
     + ID2= 2 (  0029):    10.97   3.571     1.00    55.57

====================================================
       ID = 3 (  0032):    18.24   3.804     1.00    48.10

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   0.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  64.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.42         0.11
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      59.44        40.00
    Mannings n           =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     215.80       193.11
             over (min)        5.00         5.00
    Storage Coeff.  (min)=       1.12 (ii)    4.37 (ii)
    Unit Hyd. Tpeak (min)=       5.00         5.00
    Unit Hyd. peak  (cms)=       0.34         0.23
                                  *TOTALS*
    PEAK FLOW       (cms)=       0.20         0.05          0.253 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00          1.00
    RUNOFF VOLUME    (mm)=      76.64        46.67         65.85
    TOTAL RAINFALL   (mm)=      77.64        77.64         77.64
    RUNOFF COEFFICIENT   =       0.99         0.60          0.85

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  74.0    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    (  0016)|
| Inlet Cap.= 0.141|
| #of Inlets=     1|
| Total(cms)=   0.1|     AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
    TOTAL HYD.(ID= 1):   0.53      0.25      1.00   65.85

====================================================
=
    MAJOR SYS.(ID= 2):   0.06      0.11      1.00   65.85
    MINOR SYS.(ID= 3):   0.47      0.14      1.00   65.85

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.58         0.58
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      87.94        40.00
    Mannings n           =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     215.80        66.09
             over (min)        5.00         10.00
    Storage Coeff.  (min)=       1.41 (ii)    9.74 (ii)
    Unit Hyd. Tpeak (min)=       5.00         10.00
    Unit Hyd. peak  (cms)=       0.33         0.11
                                  *TOTALS*
    PEAK FLOW       (cms)=       0.34         0.07          0.376 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17          1.00
    RUNOFF VOLUME    (mm)=      76.64        30.47         53.55
    TOTAL RAINFALL   (mm)=      77.64        77.64         77.64
    RUNOFF COEFFICIENT   =       0.99         0.39          0.69

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  69.0    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  (  0030)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     0.47   0.141     1.00    65.85
     + ID2= 2 (  0201):     1.16   0.376     1.00    53.55

====================================================
       ID = 3 (  0030):     1.63   0.517     1.00    57.08

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=   1.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.47         0.70
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      88.32        40.00
    Mannings n           =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     215.80       161.61
             over (min)        5.00         10.00
    Storage Coeff.  (min)=       1.42 (ii)    7.24 (ii)
    Unit Hyd. Tpeak (min)=       5.00         10.00
    Unit Hyd. peak  (cms)=       0.33         0.14
                                  *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.23          0.230 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17          1.08
    RUNOFF VOLUME    (mm)=      76.64        43.10         43.43
    TOTAL RAINFALL   (mm)=      77.64        77.64         77.64
    RUNOFF COEFFICIENT   =       0.99         0.56          0.56

***** 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*  =  72.0    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 (  0207)|   Area    (ha)=   1.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.57         0.86
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      97.64        40.00
```

```
    Mannings n          =      0.013       0.250

    Max.Eff.Inten.(mm/hr)=     215.80      121.67
          over (min)        5.00        10.00
    Storage Coeff.  (min)=       1.50 (ii)   8.03 (ii)
    Unit Hyd. Tpeak (min)=       5.00       10.00
    Unit Hyd. peak  (cms)=       0.33        0.13
                                  *TOTALS*
    PEAK FLOW      (cms)=        0.01        0.20         0.208 (iii)
    TIME TO PEAK   (hrs)=        1.00        1.17         1.17
    RUNOFF VOLUME  (mm)=        76.64       33.61        34.04
    TOTAL RAINFALL (mm)=        77.64       77.64        77.64
    RUNOFF COEFFICIENT  =        0.99        0.43         0.44

***** 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*  =  61.0    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  (  0028)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)   (cms)   (hrs)     (mm)
      ID1= 1 (  0207):     1.43   0.208     1.17    34.04
    + ID2= 2 (  0209):     1.17   0.230     1.08    43.43

==================================================
      ID = 3 (  0028):     2.60   0.437     1.17    38.27

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

--------------------
| ADD HYD  (  0031)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)   (cms)   (hrs)     (mm)
      ID1= 1 (  0028):     2.60   0.437     1.17    38.27
    + ID2= 2 (  0030):     1.63   0.517     1.00    57.08

==================================================
      ID = 3 (  0031):     4.23   0.840     1.08    45.51

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

--------------------
| ADD HYD  (  0031)|
|  3 +  2 =  1   |        AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)   (cms)   (hrs)     (mm)
      ID1= 3 (  0031):     4.23   0.840     1.08    45.51
    + ID2= 2 (  0032):    18.24   3.804     1.00    48.10

==================================================
      ID = 1 (  0031):    22.47   4.568     1.00    47.61

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|    OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min    |    OUTFLOW    STORAGE   |  OUTFLOW
STORAGE
--------------------      (cms)     (ha.m.)  |   (cms)     (ha.m.)
    **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                    0.0050    0.0389   |  0.2800     0.5240
                    0.0080    0.0790   |  0.3140     0.5827
                    0.0100    0.1217   |  0.3440     0.6432
                    0.0120    0.1657   |  0.8660     0.7703
                    0.0140    0.2114   |  1.1340     0.8368
                    0.0300    0.2590   |  1.3630     1.1230
                    0.0700    0.3083   |  1.5120     1.3546
                    0.1340    0.3594   |  1.5590     1.4348
                    0.1960    0.4124   |  1.6040     1.5166
                    0.2420    0.4673   |  1.6480     1.6001

                        AREA     QPEAK     TPEAK      R.V.
                        (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0031)     22.467     4.568      1.00      47.61
  OUTFLOW: ID= 1 (  0008)     22.467     0.733      2.00      47.52
  OVERFLOW:ID= 3 (  0003)      0.000     0.000      0.00       0.00

          TOTAL NUMBER OF SIMULATION OVERFLOW =     0
          CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
          PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

          PEAK   FLOW   REDUCTION [Qout/Qin](%)= 16.04
          TIME SHIFT OF PEAK FLOW        (min)= 60.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.7380

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0203)|  Area    (ha)=   0.14   Curve Number   (CN)=
82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  11.20   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.27

    Unit Hyd Qpeak  (cms)=   0.020

    PEAK FLOW      (cms)=   0.016 (i)
    TIME TO PEAK   (hrs)=   1.333
    RUNOFF VOLUME  (mm)=  36.096
    TOTAL RAINFALL (mm)=  77.637
    RUNOFF COEFFICIENT  =   0.465

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

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

--------------------
| ADD HYD  (  0017)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)   (cms)   (hrs)     (mm)
      ID1= 1 (  0016):     0.06   0.112     1.00    65.85
    + ID2= 2 (  0203):     0.14   0.016     1.33    36.10

==================================================
      ID = 3 (  0017):     0.20   0.115     1.00    45.31

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

--------------------
| ADD HYD  (  0018)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)   (cms)   (hrs)     (mm)
      ID1= 1 (  0017):     0.20   0.115     1.00    45.31
    + ID2= 2 (  0008):    22.47   0.733     2.00    47.52

==================================================
      ID = 3 (  0018):    22.67   0.738     2.00    47.50

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD (  0206)|  Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.09         0.13
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length            (m)=      38.30        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     215.80       121.67
          over (min)        5.00        10.00
    Storage Coeff.  (min)=       0.86 (ii)   7.38 (ii)
    Unit Hyd. Tpeak (min)=       5.00       10.00
    Unit Hyd. peak  (cms)=       0.34        0.13
```

```
                                *TOTALS*
    PEAK FLOW      (cms)=      0.00        0.03         0.033 (iii)
    TIME TO PEAK   (hrs)=      1.00        1.17         1.17
    RUNOFF VOLUME  (mm)=      76.64       33.61        34.02
    TOTAL RAINFALL (mm)=      77.64       77.64        77.64
    RUNOFF COEFFICIENT  =      0.99        0.43         0.44

***** 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*  =  61.0    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.

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

 FINISH
================================================================================

================================================================================

     V   V  I   SSSSS  U   U   A    L          (v 6.2.2005)
     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 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 *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\1d7143f6-e1de-476b-817b-890c51ec04a8\s
  Summary filename: C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\1d7143f6-e1de-476b-817b-890c51ec04a8\s

DATE: 12/23/2021                      TIME: 11:09:43

USER:


COMMENTS:
_____
_____


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  ************************************************
  ** SIMULATION : 6. 100-yr 3hr Chicago Storm   **
  ************************************************

--------------------
| CHICAGO STORM    |   IDF curve parameters: A=4688.000
| Ptotal= 87.07 mm |                    B=  17.000
--------------------                    C=   0.962
                    used in:   INTENSITY =  A / (t + B)^C
                               Duration of storm  =  3.00 hrs
                               Storm time step    =  5.00 min
                               Time to peak ratio =  0.33

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.08    4.09 |  0.83   50.50 |  1.58   20.97 |  2.33    6.37
          0.17    4.73 |  0.92  113.67 |  1.67   17.46 |  2.42    5.82
          0.25    5.57 |  1.00  239.35 |  1.75   14.80 |  2.50    5.34
          0.33    6.68 |  1.08  141.25 |  1.83   12.73 |  2.58    4.93
          0.42    8.21 |  1.17   86.23 |  1.92   11.09 |  2.67    4.56
          0.50   10.40 |  1.25   58.55 |  2.00    9.76 |  2.75    4.24
          0.58   13.73 |  1.33   42.60 |  2.08    8.68 |  2.83    3.95
          0.67   19.18 |  1.42   32.53 |  2.17    7.78 |  2.92    3.70
          0.75   29.10 |  1.50   25.76 |  2.25    7.02 |  3.00    3.47


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0204)|  Area    (ha)=   6.12   Curve Number   (CN)=  80.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=  12.40   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.47

    Unit Hyd Qpeak  (cms)=   0.497

    PEAK FLOW      (cms)=   0.536 (i)
    TIME TO PEAK   (hrs)=   1.583
    RUNOFF VOLUME  (mm)=  40.348
    TOTAL RAINFALL (mm)=  87.067
    RUNOFF COEFFICIENT  =   0.463

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0205)|  Area    (ha)=   1.15
|ID= 1 DT= 5.0 min |  Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.46        0.69
    Dep. Storage     (mm)=      1.00        1.50
    Average Slope    (%)=      2.00        2.00
    Length           (m)=     87.56       40.00
    Mannings n           =     0.013       0.250

    Max.Eff.Inten.(mm/hr)=    239.35      254.26
          over (min)       5.00       10.00
    Storage Coeff.  (min)=      1.35 (ii)    6.21 (ii)
    Unit Hyd. Tpeak (min)=      5.00       10.00
    Unit Hyd. peak  (cms)=      0.33       0.15
                                *TOTALS*
    PEAK FLOW      (cms)=      0.01       0.39         0.393 (iii)
    TIME TO PEAK   (hrs)=      1.00       1.08         1.08
    RUNOFF VOLUME  (mm)=     86.07      65.50        65.71
    TOTAL RAINFALL (mm)=     87.07      87.07        87.07
    RUNOFF COEFFICIENT  =     0.99       0.75         0.75

***** 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*  =  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.

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

--------------------
| ADD HYD  (  0021)|
|  1 +  2 =  3     |      AREA    QPEAK    TPEAK     R.V.
--------------------       (ha)    (cms)    (hrs)     (mm)
```

```
      ID1= 1 (  0204):    6.12   0.536    1.58    40.35
    + ID2= 2 (  0205):    1.15   0.393    1.08    65.71

================================================
      ID = 3 (  0021):    7.27   0.637    1.50    44.36

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   6.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  52.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       4.10         2.21
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=     205.10        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     239.35       130.07
            over (min)        5.00        10.00
    Storage Coeff.  (min)=       2.25 (ii)    6.50 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.30         0.14
                                    *TOTALS*
    PEAK FLOW       (cms)=       2.05         0.59         2.379 (iii)
    TIME TO PEAK     (hrs)=      1.00         1.17          1.00
    RUNOFF VOLUME    (mm)=      86.07        42.69         65.25
    TOTAL RAINFALL   (mm)=      87.07        87.07         87.07
    RUNOFF COEFFICIENT   =       0.99         0.49          0.75

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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 (  0208)|   Area    (ha)=   4.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  56.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       2.81         1.21
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=     163.71        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     239.35       120.46
            over (min)        5.00        10.00
    Storage Coeff.  (min)=       1.97 (ii)    5.85 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.31         0.15
                                    *TOTALS*
    PEAK FLOW       (cms)=       1.43         0.31         1.603 (iii)
    TIME TO PEAK     (hrs)=      1.00         1.08          1.00
    RUNOFF VOLUME    (mm)=      86.07        37.63         64.75
    TOTAL RAINFALL   (mm)=      87.07        87.07         87.07
    RUNOFF COEFFICIENT   =       0.99         0.43          0.74

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  61.0    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 (  0210)|   Area    (ha)=   0.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.26         0.38
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      65.32        40.00
    Mannings n          =      0.013        0.250

    Max.Eff.Inten.(mm/hr)=     239.35       146.10
            over (min)        5.00        10.00
    Storage Coeff.  (min)=       1.13 (ii)    7.20 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.34         0.14
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.11         0.115 (iii)
    TIME TO PEAK     (hrs)=      1.00         1.17          1.17
    RUNOFF VOLUME    (mm)=      86.07        40.22         40.67
    TOTAL RAINFALL   (mm)=      87.07        87.07         87.07
    RUNOFF COEFFICIENT   =       0.99         0.46          0.47

***** 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*  =  61.0    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  (  0034)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0208):     4.02   1.603     1.00    64.75
    + ID2= 2 (  0210):     0.64   0.115     1.17    40.67

================================================
      ID = 3 (  0034):     4.66   1.667     1.00    61.45

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

--------------------
| ADD HYD  (  0029)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0200):     6.31   2.379     1.00    65.25
    + ID2= 2 (  0034):     4.66   1.667     1.00    61.45

================================================
      ID = 3 (  0029):    10.97   4.046     1.00    63.63

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

--------------------
| ADD HYD  (  0032)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0021):     7.27   0.637     1.50    44.36
    + ID2= 2 (  0029):    10.97   4.046     1.00    63.63

================================================
      ID = 3 (  0032):    18.24   4.331     1.00    55.95

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   0.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  64.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.42         0.11
    Dep. Storage     (mm)=       1.00         1.50
```

```
    Average Slope     (%)=       2.00         2.00
    Length            (m)=      59.44        40.00
    Mannings n          =       0.013        0.250

    Max.Eff.Inten.(mm/hr)=     239.35       226.82
             over (min)        5.00         5.00
    Storage Coeff.  (min)=       1.07 (ii)    4.20 (ii)
    Unit Hyd. Tpeak (min)=       5.00         5.00
    Unit Hyd. peak  (cms)=       0.34         0.24
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.22         0.06         0.285 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00          1.00
    RUNOFF VOLUME    (mm)=      86.07        54.75         74.79
    TOTAL RAINFALL   (mm)=      87.07        87.07         87.07
    RUNOFF COEFFICIENT  =        0.99         0.63          0.86

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  74.0    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    (  0016)|
| Inlet Cap.= 0.141|
| #of Inlets=     1|
| Total(cms)=   0.1|     AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)      (cms)     (hrs)     (mm)
    TOTAL HYD.(ID= 1):   0.53      0.29      1.00   74.79

================================================
=
    MAJOR SYS.(ID= 2):   0.08      0.14      1.00   74.79
    MINOR SYS.(ID= 3):   0.45      0.14      1.00   74.79

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.58         0.58
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length            (m)=      87.94        40.00
    Mannings n          =       0.013        0.250

    Max.Eff.Inten.(mm/hr)=     239.35        79.86
             over (min)        5.00        10.00
    Storage Coeff.  (min)=       1.35 (ii)    6.33 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.33         0.15
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.38         0.10         0.432 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17          1.00
    RUNOFF VOLUME    (mm)=      86.07        36.67         61.36
    TOTAL RAINFALL   (mm)=      87.07        87.07         87.07
    RUNOFF COEFFICIENT  =        0.99         0.42          0.70

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  69.0    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  (  0030)|
|  1 +  2 =  3     |       AREA     QPEAK     TPEAK     R.V.
--------------------       (ha)      (cms)     (hrs)     (mm)
      ID1= 1 (  0016):     0.45   0.141     1.00    74.79
    + ID2= 2 (  0201):     1.16   0.432     1.00    61.36

================================================
      ID = 3 (  0030):     1.61   0.573     1.00    65.13

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=   1.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.47         0.70
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length            (m)=      88.32        40.00
    Mannings n          =       0.013        0.250

    Max.Eff.Inten.(mm/hr)=     239.35       191.04
             over (min)        5.00        10.00
    Storage Coeff.  (min)=       1.36 (ii)    6.81 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.33         0.14
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.28         0.281 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08          1.08
    RUNOFF VOLUME    (mm)=      86.07        50.84         51.18
    TOTAL RAINFALL   (mm)=      87.07        87.07         87.07
    RUNOFF COEFFICIENT  =        0.99         0.58          0.59

***** 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*  =  72.0    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 (  0207)|   Area    (ha)=   1.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.57         0.86
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length            (m)=      97.64        40.00
    Mannings n          =       0.013        0.250

    Max.Eff.Inten.(mm/hr)=     239.35       146.10
             over (min)        5.00        10.00
    Storage Coeff.  (min)=       1.44 (ii)    7.51 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.33         0.13
                                    *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.25         0.255 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17          1.17
    RUNOFF VOLUME    (mm)=      86.07        40.22         40.67
    TOTAL RAINFALL   (mm)=      87.07        87.07         87.07
    RUNOFF COEFFICIENT  =        0.99         0.46          0.47

***** 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*  =  61.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
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    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0028)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)   (cms)   (hrs)     (mm)
       ID1= 1 (  0207):     1.43   0.255     1.17    40.67
     + ID2= 2 (  0209):     1.17   0.281     1.08    51.18

==================================================
       ID = 3 (  0028):     2.60   0.530     1.17    45.40

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0031)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)   (cms)   (hrs)     (mm)
       ID1= 1 (  0028):     2.60   0.530     1.17    45.40
     + ID2= 2 (  0030):     1.61   0.573     1.00    65.13

==================================================
       ID = 3 (  0031):     4.21   0.996     1.08    52.95

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

--------------------
| ADD HYD  (  0031)|
|  3 +  2 =  1   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)   (cms)   (hrs)     (mm)
       ID1= 3 (  0031):     4.21   0.996     1.08    52.95
     + ID2= 2 (  0032):    18.24   4.331     1.00    55.95

==================================================
       ID = 1 (  0031):    22.45   5.212     1.00    55.39

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   | OUTFLOW
STORAGE
--------------------       (cms)     (ha.m.)  |  (cms)     (ha.m.)
    **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                     0.0050     0.0389   |  0.2800      0.5240
                     0.0080     0.0790   |  0.3140      0.5827
                     0.0100     0.1217   |  0.3440      0.6432
                     0.0120     0.1657   |  0.8660      0.7703
                     0.0140     0.2114   |  1.1340      0.8368
                     0.0300     0.2590   |  1.3630      1.1230
                     0.0700     0.3083   |  1.5120      1.3546
                     0.1340     0.3594   |  1.5590      1.4348
                     0.1960     0.4124   |  1.6040      1.5166
                     0.2420     0.4673   |  1.6480      1.6001

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
  INFLOW : ID= 2 (  0031)     22.452      5.212      1.00      55.39
  OUTFLOW: ID= 1 (  0008)     22.452      1.018      1.83      55.30
  OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

             TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
             CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
             PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

             PEAK   FLOW   REDUCTION [Qout/Qin](%)= 19.53
             TIME SHIFT OF PEAK FLOW         (min)= 50.00
             MAXIMUM  STORAGE   USED       (ha.m.)=  0.8087

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--------------------
| CALIB            |
| NASHYD  (  0203)|   Area    (ha)=   0.14   Curve Number   (CN)=
82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  11.20   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.27

    Unit Hyd Qpeak  (cms)=   0.020

    PEAK FLOW       (cms)=   0.019 (i)
    TIME TO PEAK    (hrs)=   1.333
    RUNOFF VOLUME   (mm)=  43.699
    TOTAL RAINFALL  (mm)=  87.067
    RUNOFF COEFFICIENT   =   0.502

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

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--------------------
| ADD HYD  (  0017)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)   (cms)   (hrs)     (mm)
       ID1= 1 (  0016):     0.08   0.144     1.00    74.79
     + ID2= 2 (  0203):     0.14   0.019     1.33    43.70

==================================================
       ID = 3 (  0017):     0.22   0.148     1.00    54.80

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0018)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)   (cms)   (hrs)     (mm)
       ID1= 1 (  0017):     0.22   0.148     1.00    54.80
     + ID2= 2 (  0008):    22.45   1.018     1.83    55.30

==================================================
       ID = 3 (  0018):    22.67   1.027     1.83    55.30

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0206)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------

                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.09         0.13
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope    (%)=        2.00         2.00
    Length           (m)=       38.30        40.00
    Mannings n           =       0.013        0.250

    Max.Eff.Inten.(mm/hr)=      239.35       146.10
            over (min)          5.00        10.00
    Storage Coeff.  (min)=       0.82 (ii)    6.89 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.34         0.14
                                      *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.04         0.040 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17         1.17
    RUNOFF VOLUME   (mm)=       86.07        40.22        40.66
    TOTAL RAINFALL  (mm)=       87.07        87.07        87.07
    RUNOFF COEFFICIENT   =       0.99         0.46         0.47

***** 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*  =  61.0    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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 V   V  I   SSSSS  U   U   A   L          (v 6.2.2005)
 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 M  O   O
  OOO     T      T    H   H    Y    M   M   OOO
```


***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\16e87b47-389c-48a7-b82c-52572e19d987\s
Summary filename: C:\Users\MYavarikia\AppData\Local\Civica\VH5\4aff2f07-f9c0-4d18-a808-84a804cb6cce\16e87b47-389c-48a7-b82c-52572e19d987\s

DATE: 12/23/2021 TIME: 11:09:43

USER:

COMMENTS:

** SIMULATION : Hazel **

| READ STORM | Filename: C:\Users\MYavarikia\AppData\Local\Temp\5afc9574-ceb7-4d1e-b0e4-eb72bc658a10\cf020c6b
| Ptotal=212.00 mm | Comments: Hazel

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
1.00	6.00	4.00	13.00	7.00	23.00	10.00	53.00
2.00	4.00	5.00	17.00	8.00	13.00	11.00	38.00
3.00	6.00	6.00	13.00	9.00	13.00	12.00	13.00

CALIB	
NASHYD (0204)	Area (ha)= 6.12 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min	Ia (mm)= 12.40 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.47

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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.497

PEAK FLOW (cms)= 0.718 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 151.416
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.714

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

CALIB	
STANDHYD (0205)	Area (ha)= 1.15
ID= 1 DT= 5.0 min	Total Imp(%)= 40.00 Dir. Conn.(%)= 1.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.46	0.69
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	2.00	2.00
Length (m)=	87.56	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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00

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          1.333   4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
          1.417   4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
          1.500   4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
          1.583   4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
          1.667   4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
          1.750   4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
          1.833   4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
          1.917   4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
          2.000   4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
          2.083   6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
          2.167   6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
          2.250   6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
          2.333   6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
          2.417   6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
          2.500   6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
          2.583   6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
          2.667   6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
          2.750   6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
          2.833   6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
          2.917   6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
          3.000   6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00       85.52
            over (min)        5.00       10.00
    Storage Coeff.  (min)=      2.47 (ii)   9.98 (ii)
    Unit Hyd. Tpeak (min)=      5.00       10.00
    Unit Hyd. peak  (cms)=      0.29        0.11
                                  *TOTALS*
    PEAK FLOW       (cms)=      0.00        0.16        0.165 (iii)
    TIME TO PEAK    (hrs)=      9.50       10.00       10.00
    RUNOFF VOLUME   (mm)=     211.00      187.02      187.26
    TOTAL RAINFALL  (mm)=     212.00      212.00      212.00
    RUNOFF COEFFICIENT  =       1.00        0.88        0.88

***** 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*  =  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.

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--------------------
| ADD HYD  (  0021)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
-------------------       (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0204):    6.12   0.718    10.25   151.42
     + ID2= 2 (  0205):    1.15   0.165    10.00   187.26

==================================================
       ID = 3 (  0021):    7.27   0.862    10.08   157.09

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   6.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  52.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      4.10        2.21
    Dep. Storage     (mm)=      1.00        1.50
    Average Slope     (%)=      2.00        2.00
    Length           (m)=    205.10       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   6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
          0.167   6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
          0.250   6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
          0.333   6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
          0.417   6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
          0.500   6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
          0.583   6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
          0.667   6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
          0.750   6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
          0.833   6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
          0.917   6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
          1.000   6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
          1.083   4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
          1.167   4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
          1.250   4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
          1.333   4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
          1.417   4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
          1.500   4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
          1.583   4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
          1.667   4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
          1.750   4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
          1.833   4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
          1.917   4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
          2.000   4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
          2.083   6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
          2.167   6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
          2.250   6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
          2.333   6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
          2.417   6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
          2.500   6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
          2.583   6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
          2.667   6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
          2.750   6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
          2.833   6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
          2.917   6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
          3.000   6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00       63.30
            over (min)        5.00       15.00
    Storage Coeff.  (min)=      4.12 (ii)   12.59 (ii)
    Unit Hyd. Tpeak (min)=      5.00       15.00
    Unit Hyd. peak  (cms)=      0.24        0.08
                                  *TOTALS*
    PEAK FLOW       (cms)=      0.48        0.38        0.861 (iii)
    TIME TO PEAK    (hrs)=     10.00       10.00       10.00
    RUNOFF VOLUME   (mm)=     211.00      149.23      181.35
    TOTAL RAINFALL  (mm)=     212.00      212.00      212.00
    RUNOFF COEFFICIENT  =       1.00        0.70        0.86

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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 (  0208)|   Area    (ha)=   4.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  56.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      2.81        1.21
    Dep. Storage     (mm)=      1.00        1.50
    Average Slope     (%)=      2.00        2.00
    Length           (m)=    163.71       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   6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
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0.167   6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
0.250   6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
0.333   6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
0.417   6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
0.500   6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
0.583   6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
0.667   6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
0.750   6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
0.833   6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
0.917   6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
1.000   6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
1.083   4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
1.167   4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
1.250   4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
1.333   4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
1.417   4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
1.500   4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
1.583   4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
1.667   4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
1.750   4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
1.833   4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
1.917   4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
2.000   4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
2.083   6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
2.167   6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
2.250   6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
2.333   6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
2.417   6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
2.500   6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
2.583   6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
2.667   6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
2.750   6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
2.833   6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
2.917   6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
3.000   6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

  Max.Eff.Inten.(mm/hr)=      53.00       64.29
        over (min)        5.00        15.00
  Storage Coeff.  (min)=      3.60 (ii)   12.02 (ii)
  Unit Hyd. Tpeak (min)=      5.00        15.00
  Unit Hyd. peak  (cms)=      0.26        0.09
                              *TOTALS*
  PEAK FLOW      (cms)=       0.33        0.21        0.541 (iii)
  TIME TO PEAK   (hrs)=       9.00        10.00       10.00
  RUNOFF VOLUME  (mm)=      211.00      138.36      179.04
  TOTAL RAINFALL (mm)=      212.00      212.00      212.00
  RUNOFF COEFFICIENT  =       1.00        0.65        0.84

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

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  61.0    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 (  0210)|   Area    (ha)=   0.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                       IMPERVIOUS    PERVIOUS (i)
  Surface Area     (ha)=       0.26        0.38
  Dep. Storage     (mm)=       1.00        1.50
  Average Slope     (%)=       2.00        2.00
  Length           (m)=      65.32       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   6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
         0.167   6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
         0.250   6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
         0.333   6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
         0.417   6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
         0.500   6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
         0.583   6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
         0.667   6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
         0.750   6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
         0.833   6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
         0.917   6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
         1.000   6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
         1.083   4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
         1.167   4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
         1.250   4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
         1.333   4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
         1.417   4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
         1.500   4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
         1.583   4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
         1.667   4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
         1.750   4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
         1.833   4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
         1.917   4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
         2.000   4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
         2.083   6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
         2.167   6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
         2.250   6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
         2.333   6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
         2.417   6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
         2.500   6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
         2.583   6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
         2.667   6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
         2.750   6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
         2.833   6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
         2.917   6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
         3.000   6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

  Max.Eff.Inten.(mm/hr)=      53.00       74.33
        over (min)        5.00        15.00
  Storage Coeff.  (min)=      2.07 (ii)   10.02 (ii)
  Unit Hyd. Tpeak (min)=      5.00        15.00
  Unit Hyd. peak  (cms)=      0.31        0.10
                              *TOTALS*
  PEAK FLOW      (cms)=       0.00        0.08        0.079 (iii)
  TIME TO PEAK   (hrs)=       9.42        10.00       10.00
  RUNOFF VOLUME  (mm)=      211.00      143.97      144.63
  TOTAL RAINFALL (mm)=      212.00      212.00      212.00
  RUNOFF COEFFICIENT  =       1.00        0.68        0.68

***** 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*  =  61.0    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  (  0034)|
|  1 +  2 =  3     |       AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0208):     4.02   0.541    10.00   179.04
    + ID2= 2 (  0210):     0.64   0.079    10.00   144.63

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      ID = 3 (  0034):     4.66   0.619    10.00   174.31

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| ADD HYD  (  0029)|
|  1 +  2 =  3     |       AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0200):     6.31   0.861    10.00   181.35
    + ID2= 2 (  0034):     4.66   0.619    10.00   174.31
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      ID = 3 (  0029):    10.97   1.481    10.00   178.36

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| ADD HYD  (  0032)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):     7.27   0.862    10.08   157.09
     + ID2= 2 (  0029):    10.97   1.481    10.00   178.36

==================================================
      ID = 3 (  0032):    18.24   2.328    10.00   169.88

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   0.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  64.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.42         0.11
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      59.44        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    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
         0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
         0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
         0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
         0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
         0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
         0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
         0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
         0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
         0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
         0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
         1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
         1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
         1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
         1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
         1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
         1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
         1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
         1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
         1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
         1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
         1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
         1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
         2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
         2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
         2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
         2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
         2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
         2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
         2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
         2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
         2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
         2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
         2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
         2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
         3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00        89.84
            over (min)        5.00        10.00
    Storage Coeff.  (min)=      1.96 (ii)    9.32 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.31        0.12
                              *TOTALS*
    PEAK FLOW      (cms)=       0.05        0.03         0.076 (iii)
    TIME TO PEAK   (hrs)=       9.50       10.00        10.00
    RUNOFF VOLUME  (mm)=      211.00      171.01       196.60
    TOTAL RAINFALL (mm)=      212.00      212.00       212.00
    RUNOFF COEFFICIENT  =       1.00        0.81         0.93

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  74.0    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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--------------------
| DUHYD    (  0016)|
| Inlet Cap.= 0.141|
| #of Inlets=     1|
| Total(cms)=  0.1|     AREA     QPEAK     TPEAK     R.V.
--------------------        (ha)     (cms)     (hrs)     (mm)
    TOTAL HYD.(ID= 1):   0.53      0.08      10.00  196.60

==================================================
=
    MAJOR SYS.(ID= 2):   0.00      0.00      0.00    0.00
    MINOR SYS.(ID= 3):   0.53      0.08      10.00  196.60

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   1.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.58         0.58
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       2.00         2.00
    Length           (m)=      87.94        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    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
         0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
         0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
         0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
         0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
         0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
         0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
         0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
         0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
         0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
         0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
         1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
         1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
         1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
         1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
         1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
         1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
         1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
         1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
         1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
         1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
         1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
         1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
         2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
         2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
         2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
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          2.250   6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
          2.333   6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
          2.417   6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
          2.500   6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
          2.583   6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
          2.667   6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
          2.750   6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
          2.833   6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
          2.917   6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
          3.000   6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00       43.47
          over (min)        5.00        15.00
    Storage Coeff.  (min)=      2.48 (ii)   12.33 (ii)
    Unit Hyd. Tpeak (min)=      5.00        15.00
    Unit Hyd. peak  (cms)=      0.29        0.08
                                *TOTALS*
    PEAK FLOW       (cms)=      0.09        0.07        0.153 (iii)
    TIME TO PEAK    (hrs)=      9.67        10.00       10.00
    RUNOFF VOLUME   (mm)=     211.00      136.50      173.74
    TOTAL RAINFALL  (mm)=     212.00      212.00      212.00
    RUNOFF COEFFICIENT  =       1.00        0.64        0.82

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  69.0    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  (  0030)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     0.53   0.076    10.00   196.60
     + ID2= 2 (  0201):     1.16   0.153    10.00   173.74

==================================================
       ID = 3 (  0030):     1.69   0.230    10.00   180.91

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=   1.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.47        0.70
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope     (%)=       2.00        2.00
    Length           (m)=      88.32       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    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
         0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
         0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
         0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
         0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
         0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
         0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
         0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
         0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
         0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
         0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
         1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
         1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
         1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
         1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
         1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
         1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
         1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
         1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
         1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
         1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
         1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
         1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
         2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
         2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
         2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
         2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
         2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
         2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
         2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
         2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
         2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
         2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
         2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
         2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
         3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00       80.70
          over (min)        5.00        15.00
    Storage Coeff.  (min)=      2.48 (ii)   10.17 (ii)
    Unit Hyd. Tpeak (min)=      5.00        15.00
    Unit Hyd. peak  (cms)=      0.29        0.10
                                *TOTALS*
    PEAK FLOW       (cms)=      0.00        0.16        0.157 (iii)
    TIME TO PEAK    (hrs)=      9.50        10.00       10.00
    RUNOFF VOLUME   (mm)=     211.00      164.45      164.91
    TOTAL RAINFALL  (mm)=     212.00      212.00      212.00
    RUNOFF COEFFICIENT  =       1.00        0.78        0.78

***** 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*  =  72.0    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 (  0207)|   Area    (ha)=   1.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=   1.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.57        0.86
    Dep. Storage     (mm)=       1.00        1.50
    Average Slope     (%)=       2.00        2.00
    Length           (m)=      97.64       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    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
         0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
         0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
         0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
         0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
         0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
         0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
         0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
         0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
         0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
         0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
         1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
```

1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 74.33
over (min) 5.00 15.00
Storage Coeff. (min)= 2.64 (ii) 10.58 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.29 0.09

TOTALS

PEAK FLOW (cms)= 0.00 0.17 0.176 (iii)
TIME TO PEAK (hrs)= 9.50 10.00 10.00
RUNOFF VOLUME (mm)= 211.00 143.97 144.63
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.68 0.68

***** 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* = 61.0 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 (0028)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0207):	1.43	0.176	10.00	144.63	
+ ID2= 2 (0209):	1.17	0.157	10.00	164.91	
ID = 3 (0028):	2.60	0.333	10.00	153.76	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0031)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0028):	2.60	0.333	10.00	153.76	
+ ID2= 2 (0030):	1.69	0.230	10.00	180.91	
ID = 3 (0031):	4.29	0.562	10.00	164.46	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0031)					
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 3 (0031):	4.29	0.562	10.00	164.46	
+ ID2= 2 (0032):	18.24	2.328	10.00	169.88	
ID = 1 (0031):	22.53	2.890	10.00	168.85	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)

**** WARNING : FIRST OUTFLOW IS NOT ZERO.

0.0050	0.0389	0.2800	0.5240
0.0080	0.0790	0.3140	0.5827
0.0100	0.1217	0.3440	0.6432
0.0120	0.1657	0.8660	0.7703
0.0140	0.2114	1.1340	0.8368
0.0300	0.2590	1.3630	1.1230
0.0700	0.3083	1.5120	1.3546
0.1340	0.3594	1.5590	1.4348
0.1960	0.4124	1.6040	1.5166
0.2420	0.4673	1.6480	1.6001

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0031)	22.530	2.890	10.00	168.85
OUTFLOW: ID= 1 (0008)	22.530	1.596	11.17	168.76
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 55.21
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 1.5248

CALIB					
NASHYD (0203)	Area	(ha)=	0.14	Curve Number	(CN)= 82.0
ID= 1 DT= 5.0 min	Ia	(mm)=	11.20	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.27				

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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00

2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.020

PEAK FLOW (cms)= 0.019 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 157.064
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.741

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

ADD HYD (0017)
1 + 2 = 3	AREA QPEAK TPEAK R.V.
---	(ha) (cms) (hrs) (mm)
*** W A R N I N G : HYDROGRAPH 0016 <ID= 1> IS DRY.	
*** W A R N I N G : HYDROGRAPH 0017 = HYDROGRAPH 0203	
ID1= 1 (0016):	0.00 0.000 0.00 0.00
+ ID2= 2 (0203):	0.14 0.019 10.00 157.06

==========
ID = 3 (0017): 0.14 0.019 10.00 157.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018)
1 + 2 = 3	AREA QPEAK TPEAK R.V.
---	(ha) (cms) (hrs) (mm)
ID1= 1 (0017):	0.14 0.019 10.00 157.06
+ ID2= 2 (0008):	22.53 1.596 11.17 168.76

==========
ID = 3 (0018): 22.67 1.608 11.17 168.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0206)|	Area (ha)= 0.22
ID= 1 DT= 5.0 min		Total Imp(%)= 40.00 Dir. Conn.(%)= 1.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.13
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	2.00	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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	74.33	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.50 (ii)	9.45 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.12	
		TOTALS	
PEAK FLOW (cms)=	0.00	0.03	0.027 (iii)
TIME TO PEAK (hrs)=	9.33	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	143.97	144.61
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.68	0.68

***** 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* = 61.0 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.

APPENDIX G

SWMF Characteristics

STROHVEST LANDS SUBDIVISION-161413217
Stormwater Management Facility Design Calculations

	Rating Curve				Estimated Detention	Volume Estimation						Active Storage		Outlet Structure Controls							
			Storage				Forebay	Total Pond	Active Storage	Total				Ext. Detention	Orifice #2	DICB	Orifice #3	Control	Emergency	Total Flow	Parameters	
	Elevation (m)	Discharge (m³/s)	Active (m³)	Total (m³)	Time (hrs)	Elevation (m)	Volume (m³)	Volume (m³)	Volume (m³)	Volume ha.m	Volume (excl. sediment) (m³)	Depth (m)	Elevation (m)	Orifice #1 (m³/s)		Inlet (m³/s)	(m³/s)	(m³/s)	Spillway (m³/s)			
	350.60					350.6							350.6								Water Quality Extended Detention Orifice #1
	350.70			65		350.7	71.92	137.05			65		350.7								Orifice #1 Elev (m) / Orifice Coeff.
	350.80			138		350.8	150.24	287.81			138		350.8								352.10 / 0.600
	350.90			218		350.9	235.16	452.67			218		350.9								Orifice #1-Midpoint (m) / Perimeter (m)
	351.00			305		351.0	326.91	632.06			305		351.0								352.15 / 0.314
Max. Sed. Storage	351.10			401		351.1	425.70	826.38			401		351.1								Orifice Diameter (mm) / Area (m²)
	351.20			610		351.2	531.75	1036.07			610		351.2								100 / 0.008
	351.30			836		351.3	645.27	1261.53			836		351.3								Weir Coeff. (Sharp) / Orientation
	351.40			1,077		351.4	766.49	1503.19			1,077		351.4								1.80 / Vertical
	351.50			1,336		351.5	895.61	1761.46			1,336		351.5								Orifice #2
	351.60			1,611		351.6	1032.87	2036.77			1,611		351.6								Orifice #2 Elev (m) / Orifice Coeff.
	351.70			1,904		351.7	1178.49	2329.54			1,904		351.7								352.60 / 0.600
	351.80			2,214		351.8	1332.69	2640.19			2,214		351.8								Orifice #2-Midpoint (m) / Perimeter (m)
	351.90			2,543		351.9	1495.69	2969.15			2,543		351.9								352.83 / 1.885
	352.00			2,891		352.0	1667.73	3316.85			2,891		352.0								Orifice Diameter (mm) / Area (m²)
PP	352.10			3,258		352.1	1849.02	3683.71			3,258		352.1								450 / 0.159
	352.20	0.005	389	3,647		352.2		4072.45	389	0.0389	3,647	0.1	352.2	0.005					0.005		Weir Coeff. (Sharp) / Orientation
	352.30	0.008	794	4,052	8.8	352.3		4478.05	794	0.0794	4,052	0.2	352.3	0.008					0.008		1.80 / Vertical
	352.40	0.010	1,217	4,475	15.2	352.4		4900.72	1,217	0.1217	4,475	0.3	352.4	0.010					0.010		Orifice #3
	352.50	0.012	1,657	4,915	20.5	352.5		5340.69	1,657	0.1657	4,915	0.4	352.5	0.012					0.012		Orifice #3 Elev (m) / Orifice Coeff.
	352.60	0.014	2,114	5,372	25.4	352.6		5798.18	2,114	0.2114	5,372	0.5	352.6	0.014					0.014		352.50 / 0.600
	352.70	0.030	2,590	5,848	28.4	352.7		6273.43	2,590	0.2590	5,848	0.6	352.7	0.015	0.014				0.030		Orifice #3-Midpoint (m) / Perimeter (m)
	352.80	0.070	3,083	6,341	29.7	352.8		6766.65	3,083	0.3083	6,341	0.7	352.8	0.017	0.053				0.070		352.80 / 1.885
	352.90	0.134	3,594	6,852	30.4	352.9		7278.08	3,594	0.3594	6,852	0.8	352.9	0.018	0.116				0.134		Orifice Diameter (mm) / Area (m²)
	353.00	0.196	4,124	7,382	30.9	353.0		7807.93	4,124	0.4124	7,382	0.9	353.0	0.019	0.177				0.196		600 / 0.283
	353.10	0.242	4,673	7,931	31.2	353.1		8356.44	4,673	0.4673	7,931	1.0	353.1	0.020	0.222				0.242		Weir Coeff. (Sharp) / Orientation
	353.20	0.280	5,240	8,498	31.5	353.2		8923.82	5,240	0.5240	8,498	1.1	353.2	0.021	0.259				0.280		1.80 / Vertical
	353.30	0.314	5,827	9,085	31.8	353.3		9510.31	5,827	0.5827	9,085	1.2	353.3	0.022	0.291				0.314		Emergency Overflow Weir
	353.40	0.344	6,432	9,690	32.1	353.4		10116.13	6,432	0.6432	9,690	1.3	353.4	0.023	0.321				0.344		Spillway Invert (m) / Top of Berm (m)
	353.50	0.531	7,058	10,316	32.3	353.5		10741.50	7,058	0.7058	10,316	1.4	353.5	0.024	0.347	0.160	0.629	0.160		0.531		354.70 / 355.00
	353.60	0.866	7,703	10,961	32.4	353.6		11386.66	7,703	0.7703	10,961	1.5	353.6	0.025	0.372	0.468	0.672	0.468		0.866		Spillway Length @ Invert (m) / Max. Flow Depth (m)
	353.70	1.134	8,368	11,626	32.5	353.7		12051.82	8,368	0.8368	11,626	1.6	353.7	0.026	0.395	0.983	0.713	0.713		1.134		10 / 0.30
	353.80	1.196	9,054	12,312	32.6	353.8		12737.22	9,054	0.9054	12,312	1.7	353.8	0.027	0.417	1.710	0.751	0.751		1.196		Side Slopes (ratio of H:V) / Topwidth
	353.90	1.254	9,759	13,017	32.6	353.9		13443.07	9,759	0.9759	13,017	1.8	353.9	0.028	0.438	2.402	0.788	0.788		1.254		10.00 / 16.00
	354.00	1.310	10,486	13,744	32.7	354.0		14169.59	10,486	1.0486	13,744	1.9	354.0	0.028	0.458	2.962	0.823	0.823		1.310		Weir Coefficient (Rectangle) / Weir Coeff. (Triangle)
Top of Active Storage	354.10	1.363	11,230	14,488	32.8	354.1		14913.39	11,230	1.1230	14,488	2.0	354.1	0.029	0.477	3.583	0.857	0.857		1.363		1.70 / 1.30
	354.20	1.415	11,987	15,245	32.9	354.2		15670.90	11,987	1.1987	15,245	2.1	354.2	0.030	0.496	4.229	0.889	0.889		1.415		
	354.30	1.464	12,759	16,017	32.9	354.3		16442.63	12,759	1.2759	16,017	2.2	354.3	0.031	0.513		0.920	0.920		1.464		DICB invert (m) / 353.40
	354.40	1.512	13,546	16,804	33.0	354.4		17229.42	13,546	1.3546	16,804	2.3	354.4	0.031	0.530		0.951	0.951		1.512		
	354.50	1.559	14,348	17,606	33.1	354.5		18031.63	14,348	1.4348	17,606	2.4	354.5	0.032	0.547		0.980	0.980		1.559		
	354.60	1.604	15,166	18,424	33.2	354.6		18849.23	15,166	1.5166	18,424	2.5	354.6	0.033	0.563		1.008	1.008		1.604		
	354.70	1.648	16,001	19,259	33.2	354.7		19684.57	16,001	1.6001	19,259	2.6	354.7	0.033	0.579		1.036	1.036	0.000	1.648		
	354.80	2.269	16,834	20,092	33.3	354.8		20517.72	16,834	1.6834	20,092	2.7	354.8	0.034	0.594		1.063	1.063	0.579	2.269		
	354.90	3.485	17,669	20,927	33.3	354.9		21352.81	17,669	1.7669	20,927	2.8	354.9	0.035	0.609		1.089	1.089	1.753	3.485		
	355.00	5.207	18,504	21,762		355		22187.90	18,504	1.8504	21,762	2.9	355.0	0.035	0.623		1.115	1.115	3.434	5.207		

Drawdown Time Calculations Greater than 0.1 m above the permanent pool

$T=[v_2-v_1]/[(Q_2+Q_1)/2]/3600$

where

T=drawdown time in hours

v_2=starting pond volume

v_2=ending pond volume

Q_2=starting flow

Q_1=ending flow

From 0.0 to 0.1 m above the permanent pool

$T=[v_2-v_1]/[(Q_2)]/3600$

where

T=drawdown time in hours

v_2=starting pond volume

v_2=ending pond volume

Q_2=starting flow

Weir Equation Used: $Q = C_{wb}*L*H^{1.5} + C_{wt}*S*H^{2.5}$

where

L = bottom width of spillway

H = head above weir invert

S = side slopes (ratio of H:V)

C_{wt} = weir coefficient (triangular)

C_{wb} = weir coefficient (broad-crested)

Sharp crested semi-circular weir equation

Sharp crested semi-circular weir equation

$Q=C*D^{2.5}*(H/D)^{1.88}$

where

C = sharp crested semi-circular weir coefficient

D = diameter of orifice

H = head above orifice invert

Note: used when water elevation is below 3/4 of the orifice diameter

Orifice Flow Calculations: Orifice flow equation

$Q = C \cdot A \cdot (2 \cdot g \cdot H)^{0.5}$

where

C = orifice coefficient

A = area of orifice

g = acceleration due to gravity

H = head above centre line of orifice

Note: used when water elevation is above 3/4 of the orifice diameter

Ditch Inlet Capacity Calculation (OPSD Type 705.030, Grate Type 403.010)
MTO Design Chart 4.20

Ditch Inlet Width 1.2 m 5 :1 grate slope

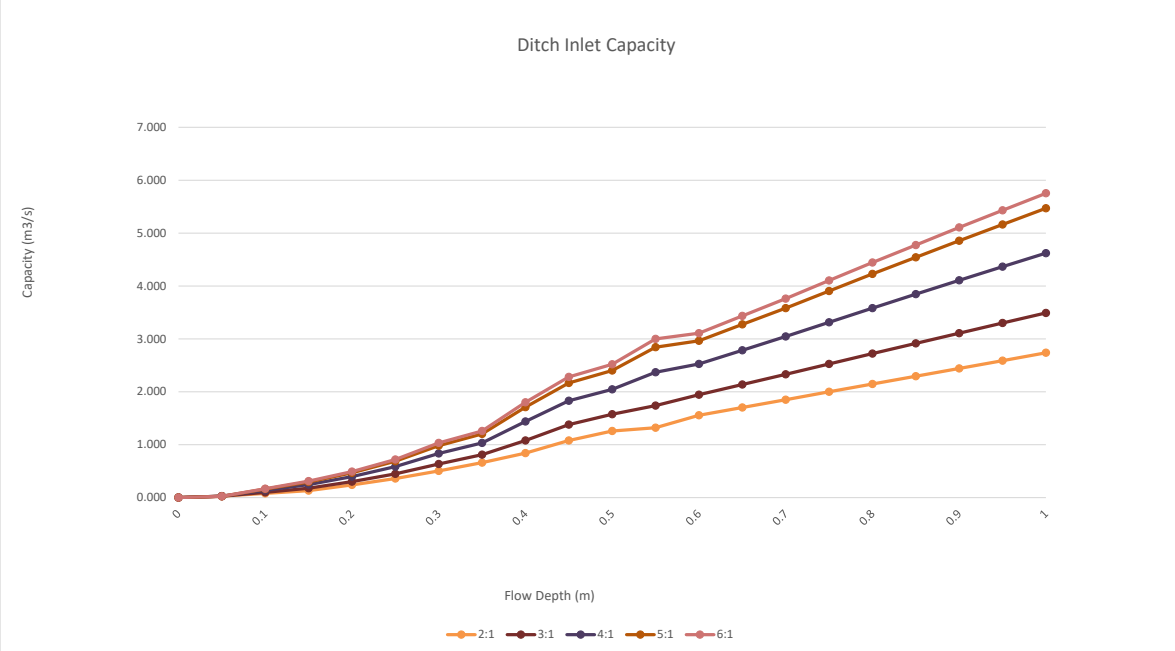
	Capacity (m^3/s) per meter width						Actual Inlet Flow m^3/s				
Flow Depth	2:1	3:1	4:1	5:1	6:1	Head	2:1	3:1	4:1	5:1	6:1
0	0.000	0.000	0.000	0.000	0.000	0	0.000	0.000	0.000	0.000	0.000
0.05	0.024	0.023	0.022	0.021	0.021	0.05	0.029	0.028	0.027	0.026	0.025
0.1	0.065	0.084	0.112	0.133	0.140	0.1	0.078	0.101	0.134	0.160	0.168
0.15	0.110	0.148	0.204	0.246	0.260	0.15	0.132	0.177	0.245	0.295	0.312
0.2	0.200	0.253	0.331	0.390	0.410	0.2	0.240	0.303	0.398	0.468	0.492
0.25	0.300	0.375	0.488	0.572	0.600	0.25	0.360	0.450	0.585	0.686	0.720
0.3	0.420	0.530	0.695	0.819	0.860	0.3	0.504	0.636	0.834	0.983	1.032
0.35	0.550	0.675	0.863	1.003	1.050	0.35	0.660	0.810	1.035	1.204	1.260
0.4	0.700	0.900	1.200	1.425	1.500	0.4	0.840	1.080	1.440	1.710	1.800
0.45	0.900	1.150	1.525	1.806	1.900	0.45	1.080	1.380	1.830	2.168	2.280
0.5	1.050	1.313	1.706	2.002	2.100	0.5	1.260	1.575	2.048	2.402	2.520
0.55	1.100	1.450	1.975	2.369	2.500	0.55	1.320	1.740	2.370	2.843	3.000
0.6	1.296	1.620	2.105	2.469	2.590	0.6	1.556	1.944	2.526	2.962	3.108
0.65	1.419	1.780	2.321	2.727	2.863	0.65	1.703	2.136	2.786	3.273	3.435
0.7	1.543	1.941	2.538	2.986	3.135	0.7	1.851	2.329	3.045	3.583	3.762
0.75	1.666	2.104	2.762	3.255	3.419	0.75	1.999	2.525	3.314	3.906	4.103
0.8	1.789	2.268	2.986	3.524	3.704	0.8	2.147	2.721	3.583	4.229	4.445
0.85	1.912	2.429	3.204	3.785	3.979	0.85	2.294	2.914	3.845	4.542	4.775
0.9	2.035	2.590	3.422	4.047	4.255	0.9	2.442	3.108	4.107	4.856	5.106
0.95	2.158	2.750	3.637	4.302	4.524	0.95	2.590	3.300	4.364	5.163	5.429
1	2.281	2.909	3.851	4.558	4.793	1	2.738	3.491	4.622	5.469	5.752
1.05	2.404	3.061	4.045	4.784	5.030	1.05	2.885	3.673	4.854	5.741	6.036

#REF!

top rim @ 2.24 m

3 mm

low rim @ 2 m



STROHVEST LANDS SUBDIVISION-161413217

Sediment Forebay Sizing Calculations

Using MOE - SWMPD Manual (2003)

Settling

Dist = sqrt(r*Q_p/v_s)

= **12.0** **m**

r : 1 = l to w ratio	r =	3.1	
Q_p = peak SWM outflow during quality storm	Q_p =	0.014	Note 1.
v_s = settling velocity for 0.15 mm particles (m/s)	v_s =	0.0003	

Dispersion Length

Dist = 8Q/dv

= **41.4** **m**

y_s = total depth of sediment in forebay (m)	y_s =	0.5	
Q = inlet flow (m^3/s)	Q =	2.585	Note 2.
d = depth of perm pool in forebay above y_s (m)	d =	1.0	
v_f = desired vel in forebay (m/s)	v_f =	0.5	

Velocity Checks

v = Q/A

= **0.10** **m/s**

Therefore, **Velocity Target Satisfied**

y = total depth above sediment storage	y =	1	Note 3.
b = bottom width of (avg) of forebay (m)	b =	15	
Q = inlet flow (m^3/s)	Q =	2.585	Note 2.
A = cross-sectional area (m^2)	A =	25.00	Note 3.
Target velocity (m/s)	V_{targ} =	0.15	

Cleanout Frequency

Table 5.3 MOEE SWMPP Guidelines

cleanout = Vol/(load*A_{sew}*effic)

= **21.1** **years**

Therefore, **Cleanout Frequency Satisfied**

A_{sew} = Contributing Sewer Area (ha)	A_{sew} =	22.53	
Imp = Percent Impervious (%)	Imp =	43%	
load = Sediment Loading (m^3/ha)	load =	1.1	
effic = Removal Efficiency (%) - Level 1	effic =	80%	
Targ = Cleanout Frequency Target (years)	Targ =	7	
Vol = Sediment volume (m^3)	Vol =	426	Note 4.

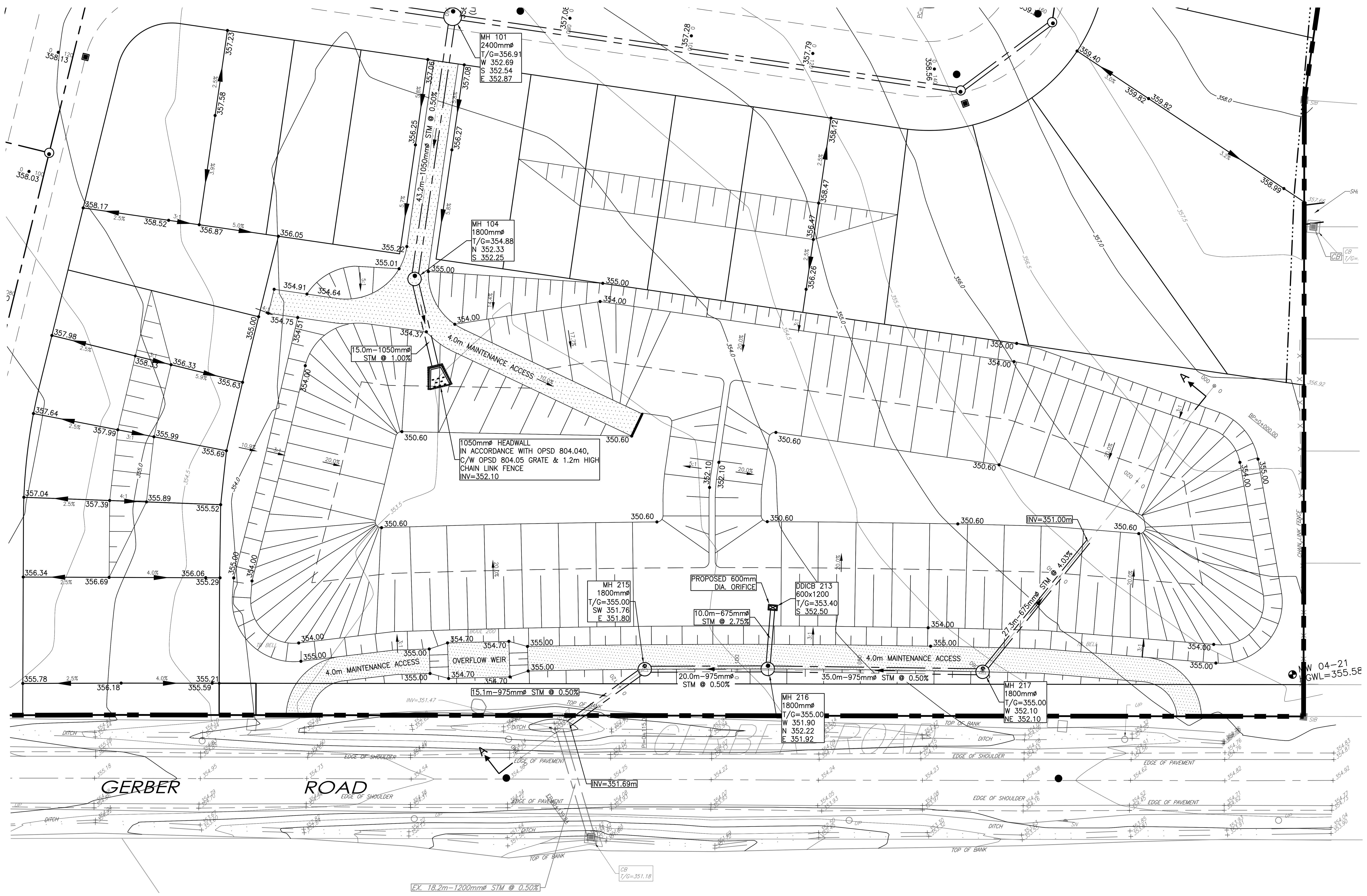
Surface Area Check

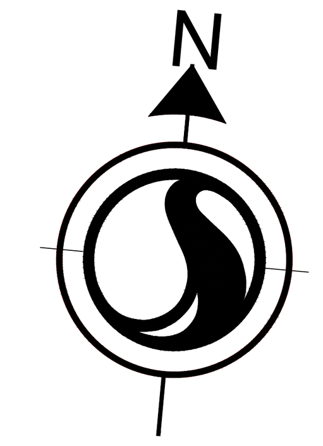
SA_f/SA_{pp} = **53.7%**

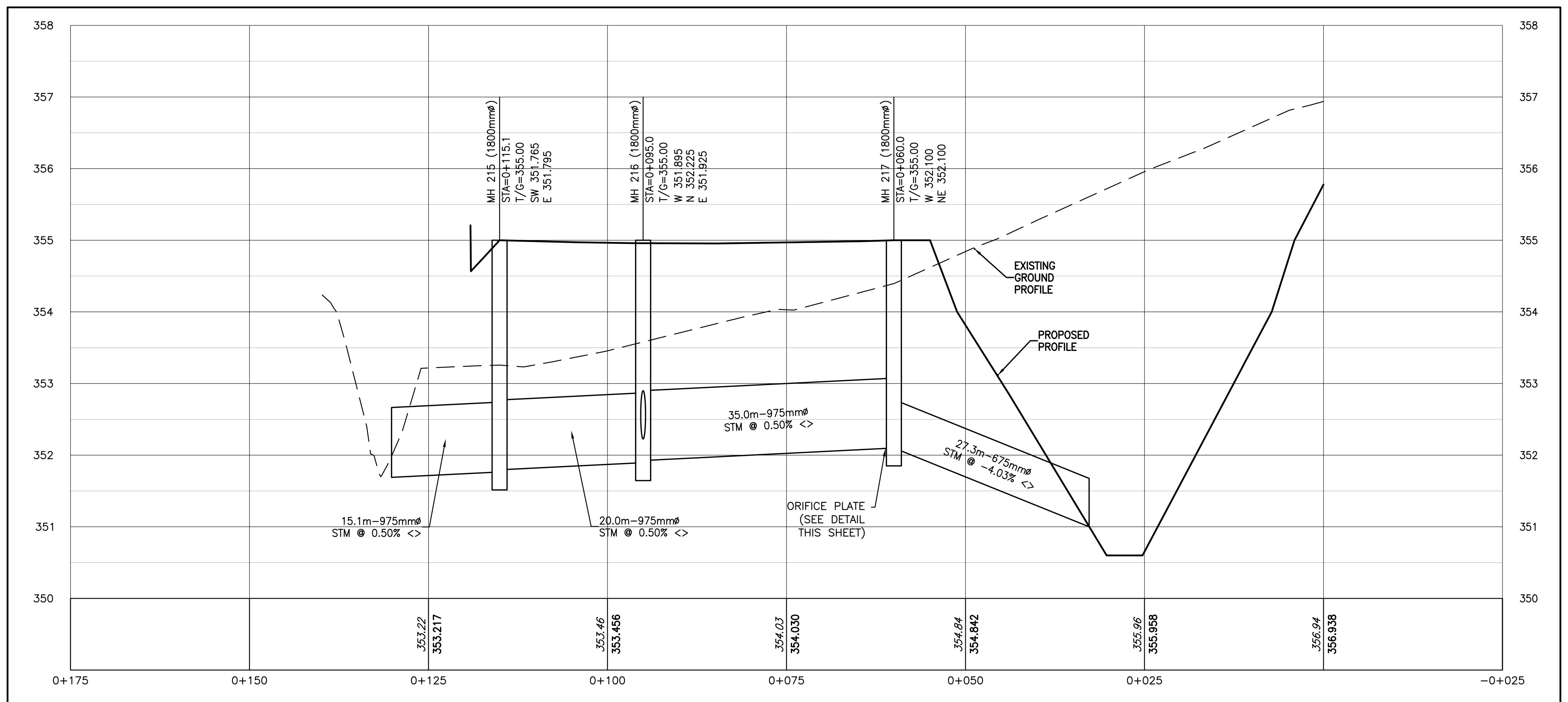
SA_f = Forebay Surface Area (m^2)	SA_f =	1,830	
SA_{pp} = Total Permanent Pool Surface Area (m^2)	SA_{pp} =	3,410	
Targ = Forebay size (as % of Permanent Pool Area)	Targ =	33%	

Notes

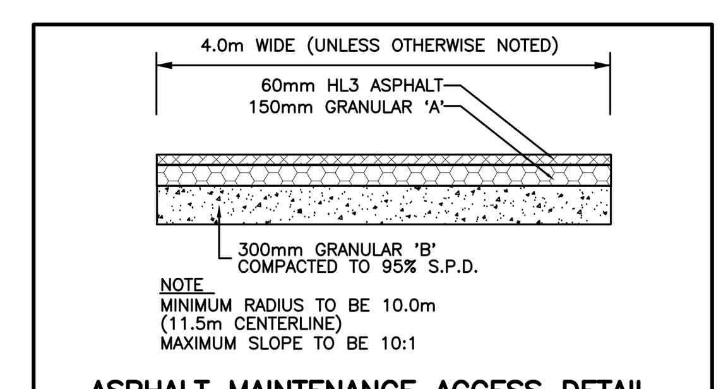
1. Taken as the peak outflow of the Water Quality Extended Detention Volume
2. Peak inlet flows to SWM facility based on VO6 modelling (5-year storm)
3. Cross-sectional area based on depth above maximum sedimentation depth (0.5 m)
4. Volume of bottom 0.5 m depth, the maximum sediment accumulation depth



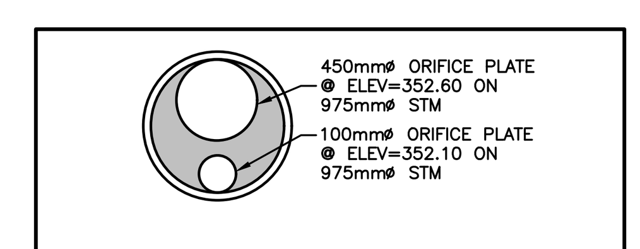




SWM POND OUTLET SECTION A–A



ASPHALT MAINTENANCE ACCESS DETAIL
NTS



VERTICAL VIEW ORIFICE DETAIL
NTS

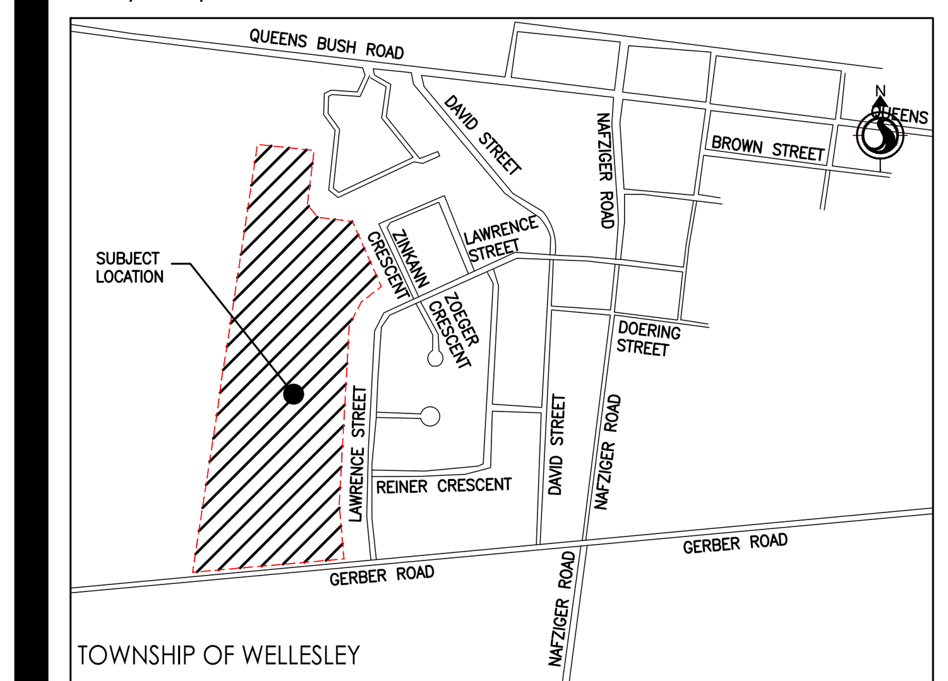
Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
2. DRAFT PLAN PREPARED BY XXX, DATED XXX.
3. CALCULATED PLAN PREPARED BY XXX, DATED XXX.
4. TOPOGRAPHICAL SURVEY PREPARED BY STANTEC CONSULTING LTD., DATED NOV 18, 2021. CONTOURS OUTSIDE OF THE PROPERTY LINE, AND WITHIN THE HEAVILY WOODED AREA OF THE SITE, HAVE BEEN OBTAINED FROM S.W.O.O.P TOPOGRAPHIC INFORMATION (2015).

Key Map NTS.

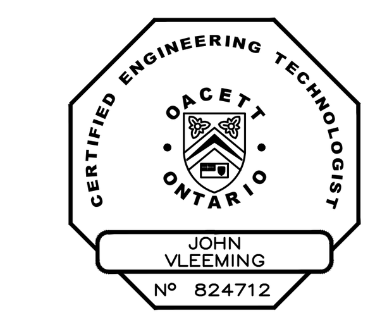


Legend

Revision	By	Appd	YYYY.MM.DD

File Name:	161413217_C-HX				2022.03.18
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal



Professional Engineers Ontario

Licensed Engineering Technologist
Name: J. R. K. BROUSSEAU
Number: 100227228
Limitations: Preparation of municipal servicing design and specifications for gravity sanitary sewer, storm sewer watermain layout, site grading, development erosion contr and development of local roads.
Association of Professional Engineers of Ontario

Client/Project
STROHVEST ONTARIO INC.

WELLESLEY PROPERTY
GERBER ROAD

TOWNSHIP OF WELLESLEY, ON

Title

STORMWATER MANAGEMENT FACILITY

Project No.	Scale
161413217	1:400

Revision	Sheet	Drawing No.
0	of	C-800

ORIGINAL SHEET - ARCH D

APPENDIX H

Water Balance Calculations

Monthly Water Balance Analysis - Main Site

161413217 - Strohvest Ontario

Pre-Development

Land Cover Descriptions

Shallow rooted crops | Glacial till with non-cohesive sands and silts | Relatively flat with gentle undulating rolling hill features

3111 B | Topsoil: Sandy silt

Main Site Area (ha)	16.6	
Land Description Factors		
Topography	0.15	
Soils	0.15	
Cover[1]	0.05	
Sum (Infiltration Factor)	0.35	
Soil Moisture Capacity (mm)[2]	75	
Site Area	16.6	
Percentage of Total Site Area	100%	

100% **OK**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Comment
Climate Data (Data from Waterloo Wellington A - Climate Normals from 1981-2010)														
Average Daily Temperature (°C)	-6.5	-5.5	-1.0	6.2	12.5	17.6	20.0	18.9	14.5	8.2	2.5	-3.3		Daily average temperature in each month
Precipitation (mm)	65.2	54.9	61.0	74.5	82.3	82.4	98.6	83.9	87.8	67.4	87.1	71.2	**916.3**	
Evapotranspiration Analysis														
Saturation Vapour Pressure (mb)	3.75	4.05	5.68	9.49	14.52	20.17	23.45	21.89	16.55	10.89	7.32	4.79		
PET (Malstrom, 1969) (mm/month)	0.00	0.00	0.00	38.82	59.39	82.51	95.89	89.54	67.67	44.54	29.93	0.00	**508.3**	
Infiltration - PET (mm)	65.20	54.90	61.00	35.68	22.91	-0.11	2.71	-5.64	20.13	22.86	57.17	71.20		
Weighted Soil Storage Capacity (mm)	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00		
Actual Soil Moisture (mm)	75.00	75.00	75.00	75.00	75.00	74.89	75.00	69.36	75.00	75.00	75.00	75.00		Assume April soil moisture is at max capacity (i.e., saturated)
Change in Soil Moisture (mm)	0.00	0.00	0.00	0.00	0.00	-0.11	0.11	-5.64	5.64	0.00	0.00	0.00		
Actual Evapotranspiration (mm)	**0.00**	**0.00**	**0.00**	**38.82**	**59.39**	**82.51**	**95.89**	**89.54**	**67.67**	**44.54**	**29.93**	**0.00**	**508.3**	
Recharge/Runoff Analysis														
Surplus	65.2	54.9	61.0	35.7	22.9	0.0	2.6	0.0	14.5	22.9	57.2	71.2	**408.0**	
Deficit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
Weighted Infiltration Factor	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35		Based on MOE SWM Manual (2003)
Runoff (mm)	**0.00**	**0.00**	**0.00**	**187.19**	**14.89**	**0.00**	**1.69**	**0.00**	**9.42**	**14.86**	**37.16**	**0.00**	**265.2**	Assume no runoff in sub-zero months
Recharge (mm)	**0.00**	**0.00**	**0.00**	**100.79**	**8.02**	**0.00**	**0.91**	**0.00**	**5.07**	**8.00**	**20.01**	**0.00**	**142.8**	
													0	Balance Check

Volume-Based Balance (m^3)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	
Precipitation	10,843	9,130	10,144	12,389	13,686	13,703	16,397	13,953	14,601	11,209	14,485	11,841	152,381	916 mm/year
Evapotranspiration	0	0	0	6,456	9,877	13,722	15,947	14,891	11,254	7,406	4,977	0	84,530	508 mm/year
Runoff	0	0	0	31,129	2,476	0	280	0	1,566	2,471	6,180	0	44,103	265 mm/year
Groundwater Recharge	0	0	0	16,762	1,333	0	151	0	843	1,331	3,328	0	23,748	143 mm/year

Notes:
1 - cover for the whole subject site is agricultural land
2 - soil moisture capacity is based on coverage

Monthly Water Balance Analysis - Main Site

161413217 - Strohvest Ontario

Post-Development

Land Cover Descriptions

Urban lawn — Glacial till with non-cohesive sands and silts — Relatively flat with gentle undulating rolling hill features

3111 B urban lawn

Main Site Area (ha)	16.6					
Impervious Cover	59%					
Land Description Factors			**Impervious**	**Perm. Pool**		
Topography	0.15		-	-		
Soils	0.15		-	-		
Cover[3]	0.05		-	-		
Sum (Infiltration Factor)	0.35		-	-		
Soil Moisture Capacity (mm)[4]	75		-	-		
Site Area	6.8		9.61	0.2		
Percentage of Total Site Area	41%		58%	1%	**100%**	**OK**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Comment
Climate Data (Data from Waterloo Wellington A - Climate Normals from 1981-2010)														
Average Daily Temperature (°C)	-6.5	-5.5	-1.0	6.2	12.5	17.6	20.0	18.9	14.5	8.2	2.5	-3.3		Daily average temperature in each month
Precipitation (mm)	65.2	54.9	61.0	74.5	82.3	82.4	98.6	83.9	87.8	67.4	87.1	71.2	**916.3**	
Evapotranspiration Analysis														
Saturation Vapour Pressure (mb)	3.75	4.05	5.68	9.49	14.52	20.17	23.45	21.89	16.55	10.89	7.32	4.79		
PET (Malstrom, 1969) (mm/month)	0.00	0.00	0.00	38.82	59.39	82.51	95.89	89.54	67.67	44.54	29.93	0.00	**508.3**	
Infiltration - PET (mm)	65.20	54.90	61.00	35.68	22.91	-0.11	2.71	-5.64	20.13	22.86	57.17	71.20		
Weighted Soil Storage Capacity (mm)	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00		
Actual Soil Moisture (mm)	75.00	75.00	75.00	75.00	75.00	74.89	75.00	69.36	75.00	75.00	75.00	75.00		Assume April soil moisture is at max capacity (i.e., saturated)
Change in Soil Moisture (mm)	0.00	0.00	0.00	0.00	0.00	-0.11	0.11	-5.64	5.64	0.00	0.00	0.00		
Actual Evapotranspiration (mm)	**0.00**	**0.00**	**0.00**	**38.82**	**59.39**	**82.51**	**95.89**	**89.54**	**67.67**	**44.54**	**29.93**	**0.00**	**508.3**	
Recharge/Runoff Analysis - Pervious Areas														
Surplus	65.2	54.9	61.0	35.7	22.9	0.0	2.6	0.0	14.5	22.9	57.2	71.2	**408.0**	
Deficit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
Weighted Infiltration Factor	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35		Based on MOE SWM Manual (2003)
Runoff (mm)	**0.00**	**0.00**	**0.00**	**187.19**	**14.89**	**0.00**	**1.69**	**0.00**	**9.42**	**14.86**	**37.16**	**0.00**	**265.2**	Assume no runoff in sub-zero months
Recharge (mm)	**0.00**	**0.00**	**0.00**	**100.79**	**8.02**	**0.00**	**0.91**	**0.00**	**5.07**	**8.00**	**20.01**	**0.00**	**142.8**	
													0	Balance Check
Pond														
Pond Evaporation (mm)	0.00	0.00	0.00	75.00	105.40	123.00	133.30	108.50	66.00	27.00	0.00	0.00	**638.2**	
Runoff (mm)	0.0	0.0	0.0	251.8	-23.1	-40.6	-34.7	-24.6	21.8	40.4	87.1	0.0	**278.1**	

Volume-Based Balance (m^3)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	
Precipitation	**10,843**	**9,130**	**10,144**	**12,389**	**13,686**	**13,703**	**16,397**	**13,953**	**14,601**	**11,209**	**14,485**	**11,841**	**152,381**	
Evapotranspiration	0	0	0	2,647	4,050	5,626	6,538	6,105	4,614	3,037	2,041	0	34,657	
Pond Evaporation	0	0	0	150	211	246	267	217	132	54	0	0	1,276	
Total Evap	**0**	**0**	**0**	**2,797**	**4,260**	**5,872**	**6,805**	**6,322**	**4,746**	**3,091**	**2,041**	**0**	**35,934**	216 mm/year
Pervious Runoff	0	0	0	12,763	1,015	0	115	0	642	1,013	2,534	0	18,082	109 mm/year
Impervious Runoff	0	0	0	31,411	7,910	7,920	9,477	8,064	8,439	6,478	8,372	0	88,072	530 mm/year
Pond Runoff	0	0	0	504	-46	-81	-69	-49	44	81	174	0	556	3 mm/year
Total Runoff	**0**	**0**	**0**	**44,678**	**8,879**	**7,839**	**9,523**	**8,015**	**9,125**	**7,572**	**11,080**	**0**	**106,710**	642 mm/year
Groundwater Recharge from Pervious Areas	**0**	**0**	**0**	**6,872**	**547**	**0**	**62**	**0**	**346**	**546**	**1,364**	**0**	**9,737**	59 mm/year
													0	Balance Check
Infiltration Augmentation														
Rooftop Recharge[5]	0	0	0	8,163	2,056	2,058	2,463	2,096	2,193	1,684	2,176	0	22,887	138 mm/year - Assuming 80% of roof top runoff is captured and infiltrated and the first 25 mm of rainfall accounts for 80% of the annual rainfall volume
Final Recharge	**0**	**0**	**0**	**15,035**	**2,602**	**2,058**	**2,525**	**2,096**	**2,539**	**2,229**	**3,540**	**0**	**32,624**	196 mm/year - Including infiltration from pervious and rooftop areas
Final Runoff	**0**	**0**	**0**	**36,515**	**6,824**	**5,781**	**7,060**	**5,919**	**6,932**	**5,889**	**8,904**	**0**	**83,823**	504 mm/year - assuming infiltration of rooftop areas
Final Recharge Surplus	0	0	0	-1,727	1,269	2,058	2,374	2,096	1,696	898	212	0	8,876	53 mm/year
Final Runoff Surplus	0	0	0	5,386	4,348	5,781	6,779	5,919	5,366	3,417	2,724	0	39,720	239 mm/year

Notes:

1 - cover for the whole subject site is agricultural land

2 - soil moisture capacity is based on coverage

3 - cover is considered to be fully developed as the northern portion of the subject site is planned to be developed in future (and is modeled as a developed area)

4 - soil moisture capacity, based on coverage

5 - singles have small, medium, and large rooftop areas corresponding to 113 sq m, 143 sq m, and 180 sq m, respectively; 80% of rooftop reaches infiltration and the 25 mm rainfall event accounts for 80% of the average annual rainfall;