STORMWATER MANAGEMENT BRIEF

900 County Road 6 South

Proposed Plan of Subdivision

Part of North Half of Lot 14, Concession 4

TOWNSHIP OF TINY

COUNTY OF SIMCOE

August 2023

Prepared by:

ConSALtech

1249 Marshall Road, Tiny, Ontario, L0K 2E1

705-322-1878

Executive Summary

This Stormwater Management Brief has been commissioned by West Ridge Development Corporation to consider runoff controls for a proposed residential development.

The West Ridge Development Corporation proposal includes for the development of 14 single family residential lots and 1 hamlet commercial lot on 5.42 hectares of land situated west of County Road 6 South and south of McKenzie Street in the hamlet of Wyevale.

This brief has derived pre-development and post development runoff based on sound engineering principals and has development appropriate controls to be implemented during the development of the site. In keeping with the Township policies, runoff from the proposed individual lots will be controlled on each individual lot resulting in no net impact to the roadside drainage works. Runoff from the proposed roadside ditch system will be captured within a proposed stormwater detention and infiltration pond designed to ensure no impact on adjacent lands or drainage systems.

Table of Contents

LIST OF TABLES

LIST OF FIGURES and DRAWINGS

APPENDICES

Stormwater Management Brief
Proposed Plan of Subdivision
900 County Road 6 South

Part of Lot 23
Concession 4
Township of Tiny

1.0 Introduction

1.1 Background and Site Description

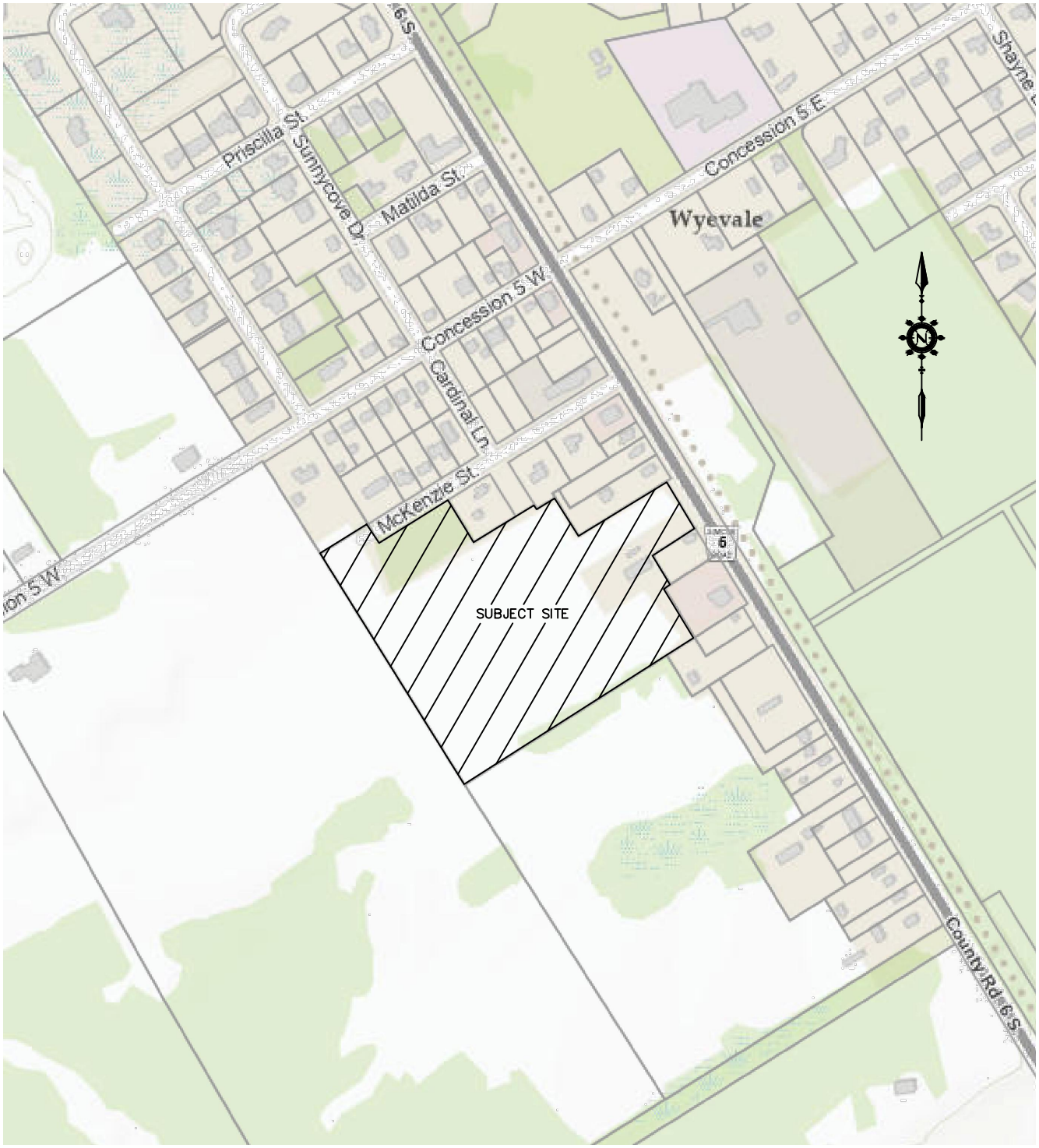
The subject development proposes the creation of 14 single family residential lots and 1 hamlet commercial lot on approximately 5.42 hectares of land situated west of County Road 6 South and south of McKenzie Street in the hamlet of Wyevale, Township of Tiny. The subject lands are legally described as Part of William Street and Part of Albert Street and Part of Firstbrook Avenue, west side of King Street, Registered Plan 327 and Part of North Half of Lot 14, Concession 4, Township of Tiny, County of Simcoe.

This report will be submitted to the Township of Tiny and the County of Simcoe in support of an Application for Plan of Subdivision.

Figure No.1, included overleaf depicts the site location.

The following information was used in the preparation of the stormwater management scheme presented in this report:

- Topographic information was obtained DEMTech Services.
- Ontario Base Mapping and the County of Simcoe's on-line Geographical Information Systems.
- Standard engineering practices were considered to ensure the design satisfies the requirements and criteria of the Township of Tiny.
- Stormwater Management Planning and Design Manual, March 2003 prepared by the Ministry of Environment, Conservation and Parks (MECP)



SITE LOCATION PLAN

900 COUNTY ROAD 6 SOUTH

Checked		Drawn	
Date	OCT 2012	Proj. No.	
Scale	N.T.S.	Figure No.	FIGURE No.1

ConSALtech
Engineering Solutions

1249 Marshall Road, Tiny, Ontario, L0K 2E1
705-722-1878

1.2 Terms of Reference

In preparing this report the following Terms of Reference were applied:

1. Describe the existing site characteristics and review pre-development drainage characteristics.
2. Examine increases in runoff resulting from development of the site and describe works to be implemented to control post development runoff. The stormwater management plan developed shall be consistent the Township of Tiny's Policies which require a no net impact to municipal roadside ditches.
3. Describe methods to be implemented control erosion and sedimentation during construction.
4. Prepare a report detailing the findings and submit to the Township of Tiny.

2.0 Site Characteristics and Hydrologic Modeling

2.1 General

The topography of the subject site is relatively flat. Review of available topographic mapping, field surveys and in field site observation has confirmed that storm drainage is limited by the low slope topography. The topographic survey indicates that the site falls gently to the northwest at a slope of approximately 0.5% or less.

The subject lands consist primarily of vacant agricultural land currently used for rotational crops. A narrow band of coniferous trees is present along the southern boundary of the property as well as a portion of the northern boundary adjacent to McKenzie Street.

The Soil Map of Simcoe County (North Sheet) indicates that the soils at this location are predominantly Wyevale - Gravelly Sandy Loam, a grey non-calcareous gravel outwash of the Podzol Great Soil Group with good drainage (Hoffman and Richards 1984).

Considering the existing land use, the high permeability of the in-situ soils and the low slope topography it is reasonable to conclude that at present (pre-development) the majority of rainfall at the subject site infiltrates without leaving the site.

Rainfall which does not infiltrate on-site will flow west, northwest over existing agricultural lands where further infiltration and uptake by crops minimizes or eliminates any further migration.

On this basis, and in consultation with the Township Staff early in the development approval process it is proposed that on-site infiltration be developed as the primary means of addressing site runoff. Runoff from individual lots will be controlled on each lot utilizing low impact development infiltration techniques. Low slope grass swales and soakaway pits/infiltration galleries will be utilized to capture and infiltrate runoff on each individual lot.

It is further proposed that roof leaders from the future homes be directed to individual soak-away pits on each lot. Additional soak-away pits may also be provided to capture runoff from landscaped areas and driveways as warranted. The sizing of the soak-away will be discussed in further detail in later sections.

The typical Township Lot Grading Standards will be minimized to ensure that the existing level of site infiltration is maintained to the highest degree possible.

Roadside ditches will be established in accordance with the Township Design Standards to drain the road base and control runoff from the road surface and boulevard. Runoff collected in the roadside ditches will be conveyed by gravity drainage to a stormwater facility to be constructed with Block 1 situated in the northwest corner of the site. Based on the soil conditions at the site, storm runoff will be detained and infiltrated within Block 1. All post development runoff will be captured and infiltrated resulting in no increase in runoff.

2.2 Approach and Methodology

As noted above, the stormwater management approach for the subject development will involve two separate systems. Runoff from individual lots will be controlled internal to each individual lot using infiltration/soakaway pits. Runoff is not intended to be directed to the roadside ditch or adjacent properties. Roof drains will be connected to soakaway

pits and low slope swales will be utilized to capture and direct surface runoff to soakaway pits as well. This approach is consistent with the Township's policy to maintain a no net impact approach with respect to runoff from individual lots.

Roadside ditches in accordance with the Township Engineering standards will capture runoff from the road surface, driveway aprons and boulevards and will direct runoff to a stormwater pond situated on Block 1 in the northwest corner of the development. The stormwater pond will be sized to retain and infiltrate all runoff from the 2 through 100yr storm return frequencies.

Based on the foregoing, the internal lots and the road network have been modelled separately to determine the appropriate runoff rates/volumes and size the stormwater pond and soakaway pits. The average lot has been used to assess the requirements for individual lots. Final soakaway sizes for each lot will be confirmed as part of the detailed lot grading plan prepared for each lot at the building permit stage based on the proposed lot development.

Note that the approach adopted assumes no release of runoff post development. Therefore, the typical control of post development release rates to pre-development levels becomes a moot consideration.

2.3 Hydrologic Modelling

Based on the relatively small size of the subject site, the peak runoff for the pre and post development schemes has been derived using the computer program "Hydrologic Studio 2023, Ver 3.0.0.27. Hydrologic Studio utilities the rational method (pre) and modified rational method (post) to calculate runoff for the various storm return frequencies.

The Modified Rational Method uses the peak flow calculating capability of the Rational Method paired with assumptions about the inflow and outflow hydrographs to compute an approximation of storage volumes for detention calculations.

The runoff hydrograph is assumed to be trapezoidal in shape with a peak runoff rate calculated using the rational formula. Hydrology Studio develops a Storm Duration Factor (SDF) which maximizes the required storage of an anticipated detention pond routing. In other words, the rising and falling limbs of the inflow hydrograph have a duration equal to the time of concentration, Tc. A target outflow is set (Qo) based on pre-

development conditions. The storm duration is increased until the required detention volume is maximized.

2.4 Rainfall Data

Intensity-duration frequency (IDF) data for the subject site has been derived from the Ontario Ministry of Transportation website. The MTO IDF data has been extrapolated to 2023 to account for climate change using a function of the MTO's website. A copy of the rainfall data has been included in Appendix "A".

2.5 Soil Type

The Soil Map of Simcoe County (North Sheet) indicates that the soils at this location are predominantly Wyevale - Gravelly Sandy Loam, a grey non-calcareous gravel outwash of the Podzol Great Soil Group with good drainage (Hoffman and Richards 1984).

Test pitting and sampling completed by Tatham Engineering in preparation of the Hydrogeological Assessment confirmed that the native soils at the site consist of sand and silty sand. The soil was characterized as soil groups SP (sand), SM (silty sand) and MH-SP (silt and sand).

The percolation rate was estimated to be 10 min/cm or higher. For design purposes, a conservative 10min/cm (60mm/hr) has been used hereinafter as the infiltration capacity of the existing soils.

2.6 Existing Conditions (Pre-development)

2.6.1 General

As noted previously, based on the high permeability of the in-situ sand soils together with the low slope topography, it has been assumed that the majority of rainfall infiltrates without leaving the site. This assumption is supported by the absence of roadside ditches along existing McKenzie Street and the lack of historical drainage or ponding issue as a result of the absence of ditches.

2.6.2 Pre- Development Modelling Parameters

The following input parameters have been utilized by the software to estimated peak runoff rates based on the rational method.

Internal Road

Site Area = 1.13 hectares

Runoff Coefficient = 0.28 (pasture, <0.5% slope)

Time of Concentration : C less than 0.4 – Use Airport Method

T.C. = (3.26(1.1-C)L^0.5)/ S^0.33

= 62.95 min

Flow Path Length (L) = 280m

Slope (%) = 0.36 %

Individual Lots (Average)

Lot Area = 0.30 hectares

Runoff Coefficient = 0.25 (pasture, <0.5% slope)

Time of Concentration : C less than 0.4 – Use Airport Method

T.C. = (3.26(1.1-C)L^0.5)/ S^0.33

= 27.53 min

Flow Path Length (L) = 50m

Slope (%) = 0.36 %

Detailed calculations to support the above values have been included in Appendix ‘B”

2.6.3 Pre-Development Peak Flows

The 2, 5, 25, 50 and 100 year return period storms were applied to the pre-development computer model.

The Pre-Development flows have been summarized in Table 1 and 2.

A copy of the model output can be found in Appendix “C”.

TABLE 1 – Internal Road SUMMARY – Pre Development PEAK FLOWS (cms)	
Return Frequency	Pre Development
2 YEAR	0.0185
5 YEAR	0.0246
10 YEAR	0.0287
25 YEAR	0.0371
50 YEAR	0.0451
100 YEAR	0.0517

TABLE 2 – Individual Lot SUMMARY – Pre Development PEAK FLOWS (cms)	
Return Frequency	Pre Development
2 YEAR	0.0077
5 YEAR	0.0103
10 YEAR	0.0120
25 YEAR	0.0155
50 YEAR	0.0189
100 YEAR	0.0216

2.7 Proposed Conditions (Post-Development)

2.7.1 Post- Development Modelling Parameters

The following input parameters have been utilized by the software to estimated peak runoff rates based on the modified rational method.

Internal Road

Site Area = 1.13 hectares

Runoff Coefficient = 0.36 (weighed – impervious to pervious)

Time of Concentration : C less than 0.4 – Use Airport Method

T.C. = (3.26(1.1-C)L^0.5)/ S^0.33

= 51.10 min

Flow Path Length (L) = 280m

Slope (%) = 0.50 %

Individual Lots (Average)

Lot Area = 0.30 hectares

Runoff Coefficient = 0.25 (weighed – impervious to pervious)

Time of Concentration : C less than 0.4 – Use Airport Method

T.C. = (3.26(1.1-C)L^0.5)/ S^0.33

= 24.55 min

Flow Path Length (L) = 50m

Slope (%) = 0.50 %

Detailed calculations to support the above values have been included in Appendix ‘B”

2.7.2 Post Development Peak Flows

The 2, 5, 25, 50 and 100 year return period storms were applied to the post-development computer model.

The Post-Development flows have been summarized in Table 3 and 4.

A copy of the model output can be found in Appendix “C”.

TABLE 3 – Internal Road SUMMARY – Post Development PEAK FLOWS (cms)	
Return Frequency	Post Development
2 YEAR	0.0259
5 YEAR	0.0344
10 YEAR	0.0401
25 YEAR	0.0518
50 YEAR	0.0630
100 YEAR	0.0721

TABLE 4 – Individual Lot SUMMARY – Post Development PEAK FLOWS (cms)	
Return Frequency	Post Development
2 YEAR	0.0082
5 YEAR	0.0109
10 YEAR	0.0126
25 YEAR	0.0163
50 YEAR	0.0199
100 YEAR	0.0227

3.0 Stormwater Management Plan

3.1 Quantity Controls

Control of the post development runoff is proposed to be accomplished by the provision of a stormwater detention/infiltration facility located on Block 1 to serve runoff from the internal road. The stormwater detention pond will have bottom dimensions of 25m long and 15m wide. The overall depth will be 0.75m with 3:1 side slopes. The side slopes will be vegetated with 100mm topsoil and seeded. The bottom of the facility will be maintained as native sand to promote infiltration and provide for ease of maintenance.

Runoff from individual lots will be captured and contained within each lot. Low impact development techniques including reduced slopes, rain barrels, rain gardens and soakaway pits will be employed to infiltrate all runoff.

All works will be designed in accordance with the MECP Stormwater Management Planning and Design Manual.

Preliminary details of the stormwater controls developed further modelling have been included in Appendix “D “and construction details for these facilities will be included as part of the engineering design and construction drawings for the development.

3.2 Quality Controls

As noted previously, it has been concluded that little or no runoff leaves the subject site. As a result, there is little or no potential for sediment and contaminants that original from the subject site impacting down gradient water bodies.

Reduced lot grading and direction of runoff to natural areas will promote nutrient uptake by natural vegetation and provide a reasonable degree of protection for the shallow groundwater.

Within the roadside ditch system, pre-treatment of runoff will be provided by the low slope vegetated ditch system. Low slopes ensure reduced velocities and in turn reduce

sediment transport and promote disposition of solids in the ditch network upstream of the infiltration facility.

Based on Table 3.2 (MECP SWMPDM), for infiltration a quality control volume of 25m3/Ha is required for an imperviousness of 35%. The road network is comprised of 1.113 Ha thereby equating to a volume of 27.8m3. The stormwater detention/infiltration pond proposed provides a total usable volume of 354m3.

3.3 Erosion and Sediment Controls during Construction

Erosion and sediment controls during construction shall consist of the silt control fences, check dams and sediment traps as deemed necessary by the Engineer. All sediment and erosion control measures described above shall conform to the Township standard details incorporated in the design drawings for the development.

Efforts shall be taken to reduce the limit and duration of disturbed areas. Disturbed areas shall be re-vegetated as soon as reasonably possible following work in that area. Runoff shall be controlled at all times and the incorporation of additional swales and check dams may be required to reduce/eliminate the transportation of sediment.

Regular inspection and replacement of these works will be required to ensure their continued functionality.

Prior to construction, the Township of Tiny will be advised of the persons responsible for supervision, inspections and maintenance of the control measures. Contact numbers will be provided at a preconstruction meeting. All works/measures shall be in place prior to commencing topsoil stripping and or earthworks in a specific area.

During construction, care shall be taken to ensure that work proceeds in conformance with the approved Erosions and sediment Control Plan. Deviations or changes to the plan should be approved by the Township prior to implementation. The erosion and sediment control measures shall be inspected on a weekly basis and maintained as necessary.

4.0 Maintenance

Routine maintenance of the stormwater detention/infiltration facility will be required to ensure continued functionality. The depth of the pond should be confirmed semi-annually, and removal of deposited silt should occur if the depth of the facility has been reduced by 0.15m or more.

5.0 Conclusions

The proposed stormwater management scheme has been designed to meet the MECP, and the Township of Tiny stormwater management and water quality criteria. When undertaking the detailed SWM calculations, conservative factors have been used. Based on the preceding analyses, it is our opinion that the post-development peak flows from the subject site can be adequately controlled and will not cause any adverse effects on adjacent lands.

All of which is respectfully submitted,

ConSALtech Engineering Solutions

Shayne A. Large, CET

Robin Smith, P.Eng.

SL/sl

Appendix “A”

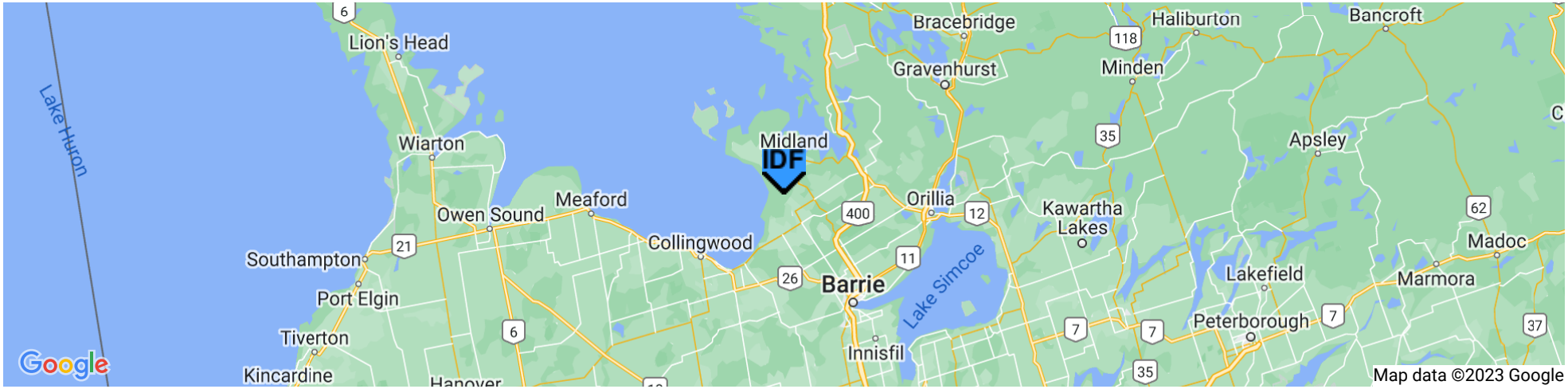
Rainfall Data

Ontario IDF CURVE LOOKUP

Active coordinate

44° 39' 15" N, 79° 55' 45" W (44.654167,-79.929167)

Retrieved: Sat, 11 Mar 2023 19:32:23 GMT



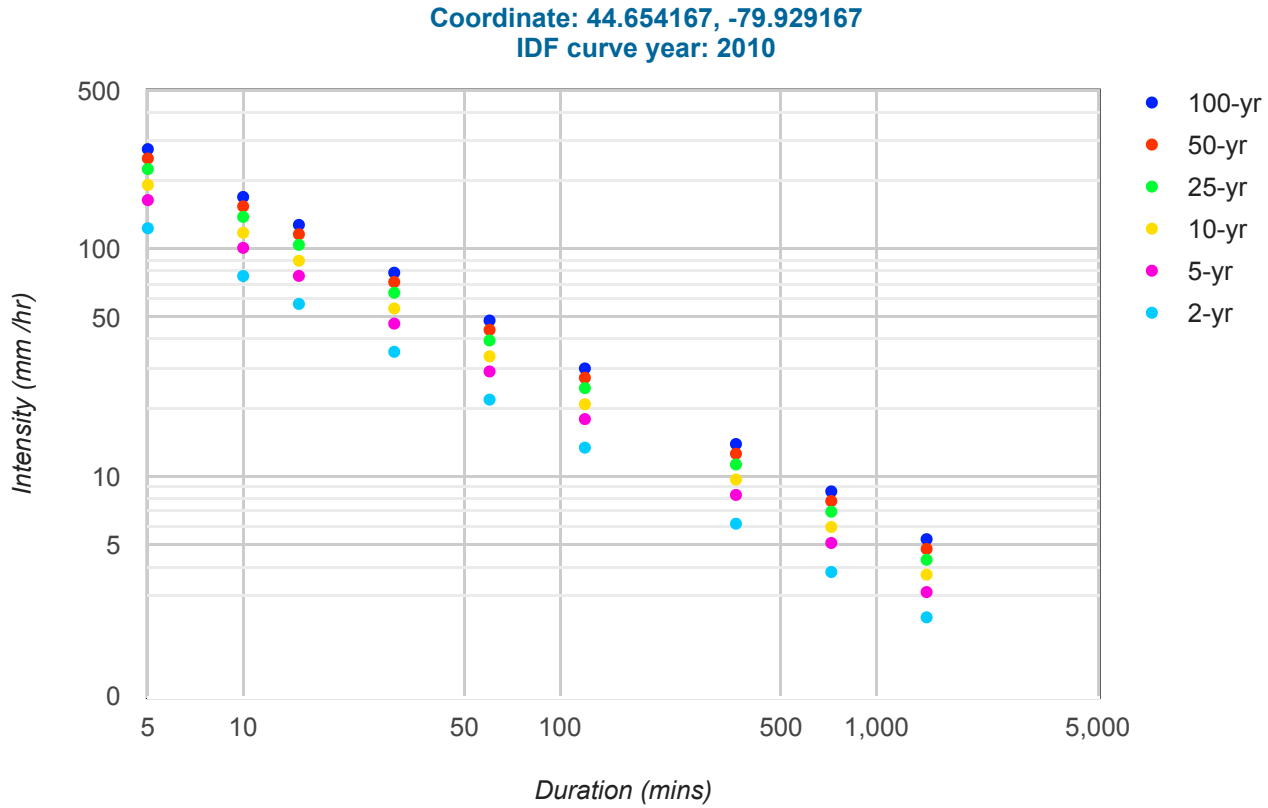
Location summary

These are the locations in the selection.

IDF Curve: 44° 39' 15" N, 79° 55' 45" W (44.654167,-79.929167)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 39' 15" N, 79° 55' 45" W (44.654167,-79.929167)

Retrieved: Sat, 11 Mar 2023 19:32:23 GMT

Data year: 2010
IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	21.8	29.0	33.8	39.7	44.2	48.6
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	123.8	76.3	57.5	35.4	21.8	13.4	6.2	3.8	2.4
5-yr	164.7	101.5	76.4	47.1	29.0	17.9	8.3	5.1	3.1
10-yr	192.0	118.3	89.1	54.9	33.8	20.8	9.7	6.0	3.7
25-yr	225.5	138.9	104.6	64.4	39.7	24.5	11.3	7.0	4.3
50-yr	251.1	154.6	116.5	71.8	44.2	27.2	12.6	7.8	4.8
100-yr	276.0	170.0	128.1	78.9	48.6	29.9	13.9	8.6	5.3

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	10.3	12.7	14.4	17.7	21.8	26.9	37.4	46.1	56.7
5-yr	13.7	16.9	19.1	23.5	29.0	35.7	49.7	61.3	75.5
10-yr	16.0	19.7	22.3	27.4	33.8	41.6	58.0	71.4	88.0
25-yr	18.8	23.2	26.2	32.2	39.7	48.9	68.1	83.9	103.3
50-yr	20.9	25.8	29.1	35.9	44.2	54.5	75.8	93.4	115.0
100-yr	23.0	28.3	32.0	39.4	48.6	59.9	83.3	102.7	126.5

Terms of Use

Ontario Ministry of Transportation | Terms and Conditions | About
Last Modified: September 2016

Appendix “B”

Detailed Calculations – Model Input Data

CATCHMENT ID# = 101 Predevelopment - Internal Road

AREA = 11325.1 m2 1.13 ha

TIME OF CONCENTRATION

Soils - Simcoe County Soils Maps indicate the soils at the site to be Wyevale - Gravelly Sandy loam.

WEIGHTED RATIONAL "C"

	Soil Texture					
Land Use a& Toposgraphy	Open Sand Loam	Loam or Silt Loam	Clay Loan or Clay	Area	C	Weighted C
Cultivated						
Flat 0-5% Slopes	0.22	0.35	0.55			0.00
Rolling 5 -10% Slopes	0.3	0.45	0.6			0.00
Hilly 10 -30% Slopes	0.4	0.65	0.7			0.00
Pasture						0.00
Flat 0-5% Slopes	0.1	0.28	0.4	1.08	0.25	0.24
Flat 0-5% Slopes	0.1	0.28	0.4			0.00
Rolling 5 -10% Slopes	0.15	0.35	0.45			0.00
Hilly 10 -30% Slopes	0.22	0.4	0.55			0.00
Woodland or Cutover						0.00
Flat 0-5% Slopes	0.08	0.25	0.35			0.00
Rolling 5 -10% Slopes	0.12	0.3	0.42			0.00
Hilly 10 -30% Slopes	0.18	0.35	0.52			0.00
Lakes & Wetlands		0.05				0.00
Impervious Areas		0.95		0.05	0.95	0.04
			Total =	1.13		0.28

Therefore Use Airport Method

AIRPORT METHOD

(to be used if C is less than 0.4) Tc = 3.26 *(1.1-C) * L^0.5 * S^-0.333

C= 0.28

L= 280 m Tc = 62.95 min Tp= 2/3 Tc

S= 0.36 % = 1.05 hrs = 0.70 hrs

El Diff= 1 m (232.7-231.7)

BRANSBY-WILLIAMS FORMULA

(to be used if C is greater than or equal to 0.4) Tc = 0.057* L * Sw^-0.2 * A^-0.1

A= 0 ha

L= 600 m Tc = #DIV/0! min Tp= 2/3 Tc

Sw= 0.13 % = #DIV/0! hrs = #DIV/0! hrs

EL Diff= 0.78 m

UPLANDS METHOD

Where: Travel Time = Length of travel / Slope^0.5 x V(S^0.5)
Time of Concentration (Tc)= sum of travel times for each land use

LAND COVER	V/(S^0.5)	L (m)	S (m/m)	Travel Time (min)
Forest with heavey ground litter, hay meadow	0.6	50	0.0036	23.15
Trash fallow or minimum tillage cultivation	1.5	0.0	0.01	0.00
Short grass pasture	2.3	0	0.01	0.00
Cultivated, straight row	2.7	230	0.0036	23.66
Nearly bare soil, untilled	3	0	0.01	0.00
Grassed Waterway (ditch)	4.6	0.0	0.01	0.00
Paved Areas; small upland gullies	6.1	0	0.01	0.00

Total Tc= 46.81 min

= 0.78 hrs

Tp= 2/3 Tc

= 0.52 hrs

CATCHMENT ID# = 201 Post development - Intarnal Road

AREA = 11325.1 m2 1.13 ha

IMPERVIOUS AREAS

Buildings	Quantity	Area (m2)	Sub-total
Ex Hse	0	320.0	0.0
		Total Buildings (m2)	0.0
Asphalt Areas			
Roadway			3166
driveway aprons	14	33	462.0
		Total Impervious =	3628.0 m2
		% Impervious =	32%

TIME OF CONCENTRATION

Soils - Simcoe County Soils Maps indicate the soils at the site to be Wyevale - Gravelly Sandy loam.

WEIGHTED (average) RATIONAL "C"

Land Use	Runoff Coefficient C			Area (m2)	C used	Weighted C
	Min	Max				
Buildings - Roof Tops	0.7	0.95		0.0	0.9	0.00
Aspahlt and Concrete	0.8	0.95		3628.0	0.9	0.29
Grass Ditch - slope 0 to 2%						
Sandy Soil	0.05	0.10		7697.1	0.1	0.07
Clayey Soil	0.13	0.17				
			Total	11325.1	Weighted C =	0.36

Therefore Use Airport Method

AIRPORT METHOD

(to be used if C is less than 0.4) $Tc = 3.26 *(1.1-C) * L^{0.5} * S^{-0.333}$

C=	0.36				
L=	280	m	Tc =	51.10	min
S=	0.50	%	=	0.85	hrs

Tp= 2/3 Tc

= 0.57 hrs

BRANSBY-WILLIAMS FORMULA

(to be used if C is greater than or equal to 0.4) $Tc = 0.057 * L * Sw^{-0.2} * A^{-0.1}$

A=	1.13	ha			
L=	0	m	Tc =	0.00	min
Sw=	0.50	%	=	0.00	hrs
Elev Diff=	1.5	m			

Tp= 2/3 Tc

= 0.00 hrs

UPLANDS METHOD

Where: Travel Time = Length of travel / Slope^0.5 x V(S^0.5)

Time of Concentration (Tc)= sum of travel times for each land use

LAND COVER	V/(S^0.5)	L (m)	S (m/m)	Travel Time (min)
Forest with heavey ground litter, hay meadow	0.6	0	0.01	0.00
Trash fallow or minimum tillage cultivation	1.5	0	0.014	0.00
Short grass pasture	2.3	0	0.01	0.00
Cultivated, straight row	2.7	0	0.049	0.00
Nearly bare soil, untilled	3	0	0.01	0.00
Grassed Waterway (ditch)	4.6	280	0.005	14.35
Paved Areas; small upland gullies	6.1	0	0.01	0.00

Total Tc= 14.35 min

= 0.24 hrs

Tp= 2/3 Tc

= 0.16 hrs

CATCHMENT ID# = 102 Pre-development - Individual Lots

AREA = 3000.0 m2 0.30 ha

TIME OF CONCENTRATION

Soils - Simcoe County Soils Maps indicate the soils at the site to be Wyevale - Gravelly Sandy loam.

WEIGHTED RATIONAL "C"

	Soil Texture					
Land Use a& Toposgraphy	Open Sand Loam	Loam or Silt Loam	Clay Loan or Clay	Area	C	Weighted C
Cultivated						
Flat 0-5% Slopes	0.22	0.35	0.55			0.00
Rolling 5 -10% Slopes	0.3	0.45	0.6			0.00
Hilly 10 -30% Slopes	0.4	0.65	0.7			0.00
Pasture						0.00
Flat 0-5% Slopes	0.1	0.28	0.4	0.30	0.25	0.25
Flat 0-5% Slopes	0.1	0.28	0.4			0.00
Rolling 5 -10% Slopes	0.15	0.35	0.45			0.00
Hilly 10 -30% Slopes	0.22	0.4	0.55			0.00
Woodland or Cutover						0.00
Flat 0-5% Slopes	0.08	0.25	0.35			0.00
Rolling 5 -10% Slopes	0.12	0.3	0.42			0.00
Hilly 10 -30% Slopes	0.18	0.35	0.52			0.00
Lakes & Wetlands		0.05				0.00
Impervious Areas		0.95		0		0.00
			Total =	0.30		0.25

Therefore Use Airport Method

AIRPORT METHOD

(to be used if C is less than 0.4) Tc = 3.26 *(1.1-C) * L^0.5 * S^-0.333

C= 0.25

L= 50 m Tc = 27.53 min Tp= 2/3 Tc

S= 0.36 % = 0.46 hrs = 0.31 hrs

BRANSBY-WILLIAMS FORMULA

(to be used if C is greater than or equal to 0.4) Tc = 0.057* L * Sw^-0.2 * A^-0.1

A= 0 ha

L= 600 m Tc = #DIV/0! min Tp= 2/3 Tc

Sw= 0.13 % = #DIV/0! hrs = #DIV/0! hrs

EL Diff= 0.78 m

UPLANDS METHOD

Where: Travel Time = Length of travel / Slope^0.5 x V(S^0.5)
Time of Concentration (Tc)= sum of travel times for each land use

LAND COVER	V/(S^0.5)	L (m)	S (m/m)	Travel Time (min)
Forest with heavey ground litter, hay meadow	0.6	0	0.0036	0.00
Trash fallow or minimum tillage cultivation	1.5	0.0	0.01	0.00
Short grass pasture	2.3	0	0.01	0.00
Cultivated, straight row	2.7	50	0.0036	5.14
Nearly bare soil, untilled	3	0	0.01	0.00
Grassed Waterway (ditch)	4.6	0.0	0.01	0.00
Paved Areas; small upland gullies	6.1	0	0.01	0.00

Total Tc= 5.14 min

= 0.09 hrs

Tp= 2/3 Tc

= 0.06 hrs

CATCHMENT ID# = 202 Post Development - Individual Lots

AREA = 3000.0 m2 0.30 ha

IMPERVIOUS AREAS (estimated)

Buildings	Quantity	Area (m2)	Sub-total
Prop home	1	200.0	200.0
Accessory Structure	1	92.0	92.0
	Total Buildings (m2)		292.0
Asphalt/Conc Areas			
Driveway			50
amenity space			50.0
	Total asph/conc (m2)		100.0
	Total Impervious =		392.0 m2
	% Impervious =		13%

TIME OF CONCENTRATION

Soils - Simcoe County Soils Maps indicate the soils at the site to be Wyevale - Gravelly Sandy loam.

WEIGHTED (average) RATIONAL "C"

Land Use	Runoff Coefficient C			Area (m2)	C used	Weighted C
	Min	Max				
Buildings - Roof Tops	0.7	0.95		292.0	0.95	0.09
Aspahlt and Concrete	0.8	0.95		100.0	0.95	0.03
Lawn - slope 0 to 2%						
Sandy Soil	0.05	0.20		2608.0	0.15	0.13
Clayey Soil	0.18	0.30				
			Total	3000.0	Weighted C =	0.25

Therefore Use Airport Method

AIRPORT METHOD

(to be used if C is less than 0.4) Tc = 3.26 *(1.1-C) * L^0.5 * S^-0.333

C=	0.25						
L=	50	m	Tc =	24.55	min	Tp=	2/3 Tc
S=	0.50	%	=	0.41	hrs	=	0.27 hrs

BRANSBY-WILLIAMS FORMULA

(to be used if C is greater than or equal to 0.4) Tc = 0.057* L * Sw^-0.2 * A^-0.1

A=	0.30	ha					
L=	0	m	Tc =	0.00	min	Tp=	2/3 Tc
Sw=	0.50	%	=	0.00	hrs	=	0.00 hrs
El Diff=	1.5	m					

UPLANDS METHOD

Where: Travel Time = Length of travel / Slope^0.5 x V(S^0.5)
Time of Concentration (Tc)= sum of travel times for each land use

LAND COVER	V/(S^0.5)	L (m)	S (m/m)	Travel Time (min)
Forest with heavey ground litter, hay meadow	0.6	0	0.01	0.00
Trash fallow or minimum tillage cultivation	1.5	0	0.014	0.00
Short grass pasture	2.3	0	0.01	0.00
Cultivated, straight row	2.7	0	0.049	0.00
Nearly bare soil, untilled	3	0	0.01	0.00
Grassed Waterway (ditch)	4.6	0	0.005	0.00
Paved Areas; small upland gullies	6.1	50	0.01	1.37

Total Tc= 1.37 min
= 0.02 hrs

Tp= 2/3 Tc
= 0.02 hrs

Appendix “C”

Hydrologic Modeling Report

Table of Contents

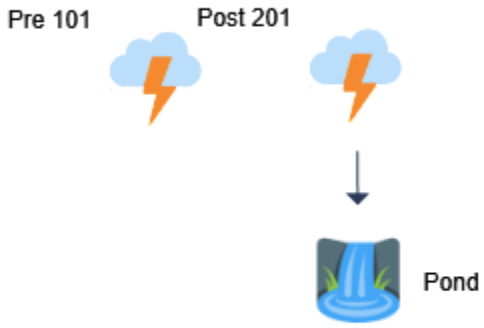
Contents continued...

Basin Model

Hydrology Studio v 3.0.0.27

Project Name: Internal Roads - 900 Cty Rd 6 S

08-29-2023



Hydrograph by Return Period

Project Name: Internal Roads - 900 Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cms)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1	Rational	Pre 101		0.0185		0.0246	0.0287	0.0371	0.0451	0.0517
2	Mod Rational	Post 201		0.0259		0.0344	0.0401	0.0518	0.0630	0.0721
3	Pond Route	Pond		0.0068		0.0071	0.0072	0.0076	0.0079	0.0082

Hydrograph 2-yr Summary

Project Name: Internal Roads - 900 Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 101	0.0185	1.05	93.5	----		
2	Mod Rational	Post 201	0.0259	0.85	87.1	----		
3	Pond Route	Pond	0.0068	1.57	86.9	2	100.131	51.3

Hydrograph Report

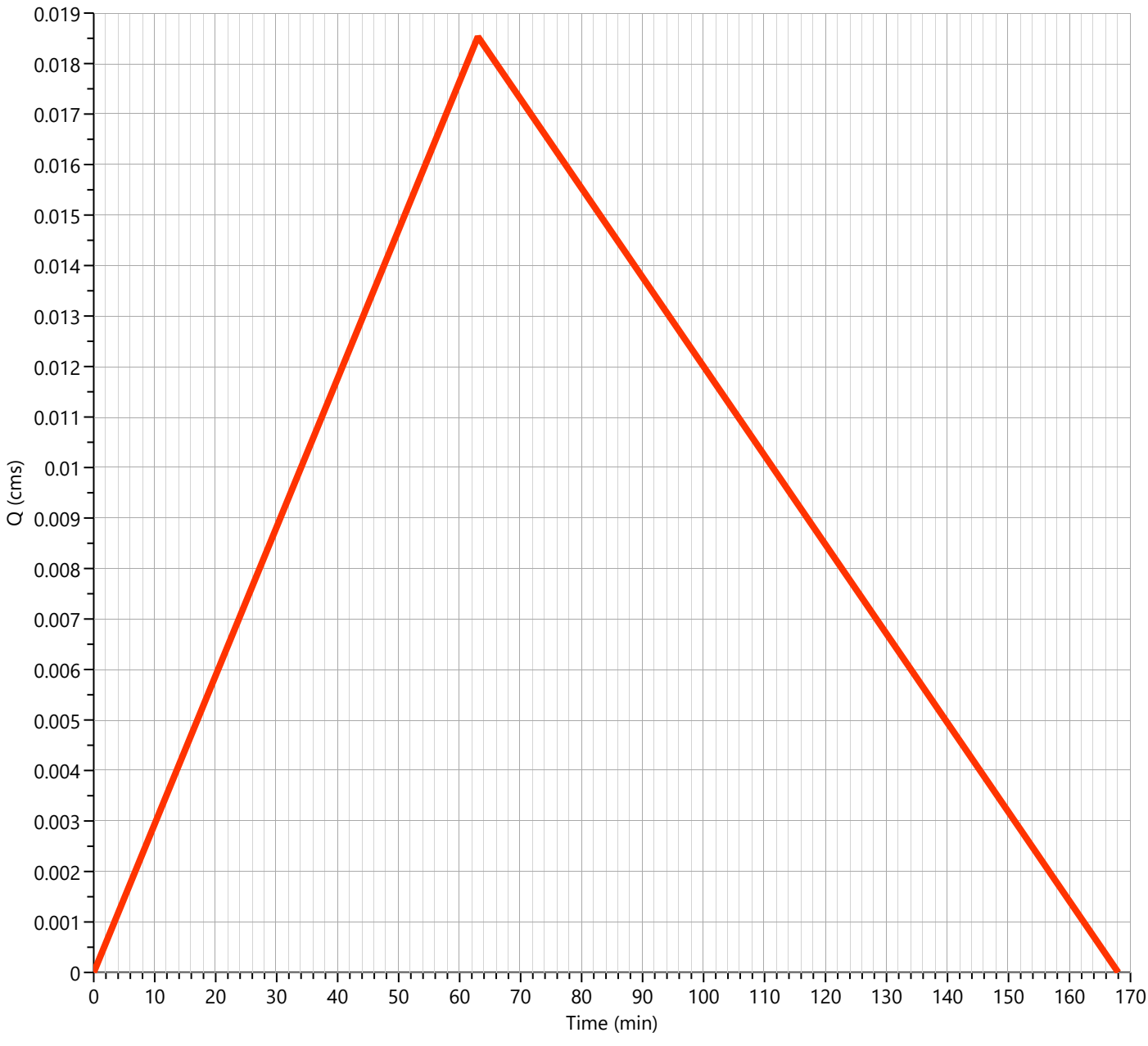
Hydrology Studio v 3.0.0.27

08-29-2023

Pre 101

Hyd. No. 1

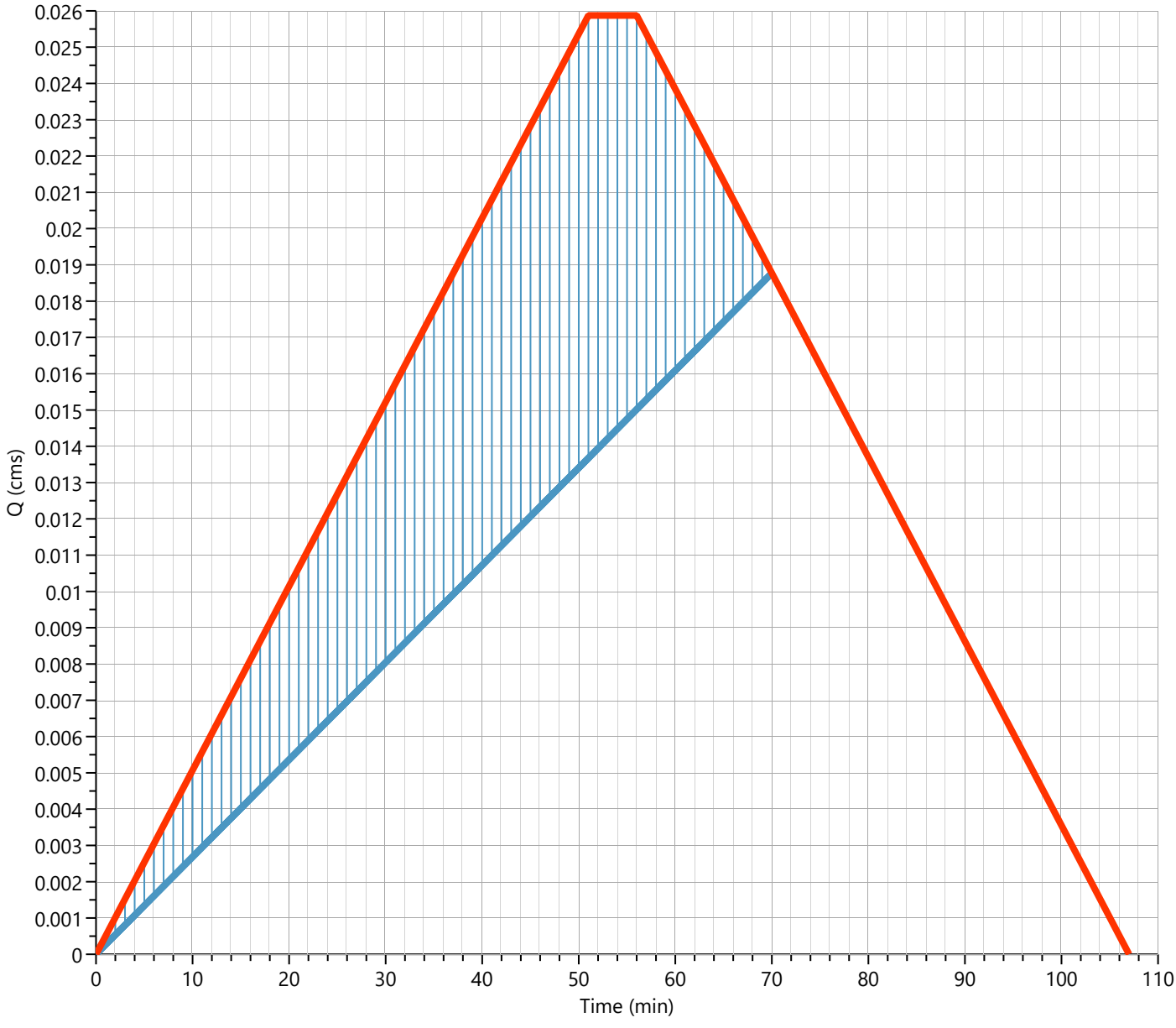
Hydrograph Type	= Rational	Peak Flow	= 0.0185 cms
Storm Frequency	= 2-yr	Time to Peak	= 1.05 hrs
Time Interval	= 1 min	Runoff Volume	= 93.5 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.28
Tc Method	= User	Time of Conc. (Tc)	= 63.0 min
IDF Curve	= Wyevale.idf	Intensity	= 21 mm/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post 201

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0259 cms
Storm Frequency	= 2-yr	Time to Peak	= 0.85 hrs
Time Interval	= 1 min	Runoff Volume	= 87.1 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.36
Tc Method	= User	Time of Conc. (Tc)	= 51.0 min
IDF Curve	= Wyevale.idf	Intensity	= 23 mm/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 1.1 x Tc
Target Q	= 0.0190 cms	Required Storage	= 26.1 cum



Hydrograph Report

Hydrology Studio v 3.0.0.27

08-29-2023

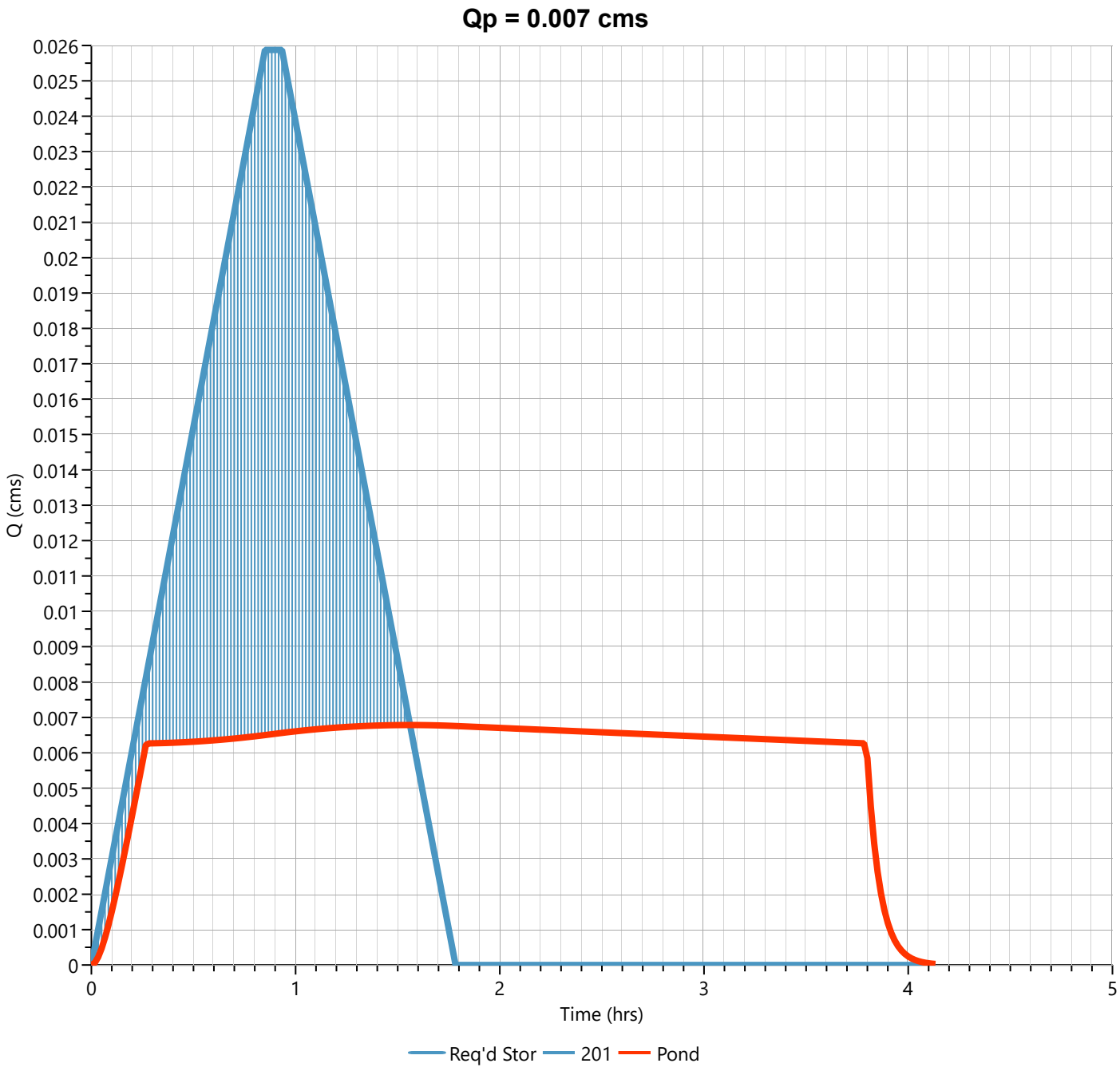
Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.0068 cms
Storm Frequency	= 2-yr	Time to Peak	= 1.57 hrs
Time Interval	= 1 min	Hydrograph Volume	= 86.9 cum
Inflow Hydrograph	= 2 - 201	Max. Elevation	= 100.131 m
Pond Name	= Exfil Pnd	Max. Storage	= 51.3 cum

Pond Routing by Storage Indication Method

Center of mass detention time = 1.11 hrs



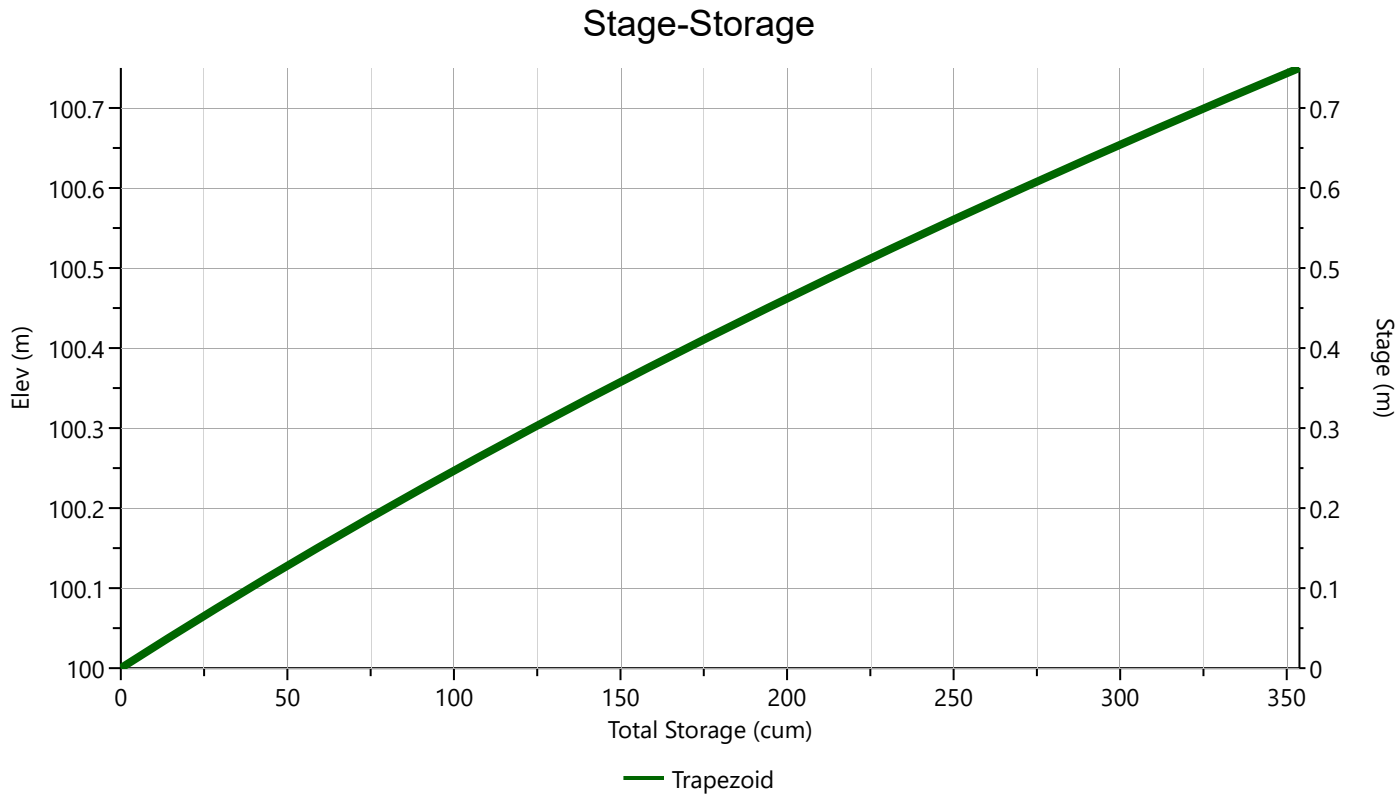
Exfil Pnd

Stage-Storage

Trapezoid	
Description	**Input**
Bottom Elevation, m	100.000
Bottom Length, m	25.000
Bottom Width, m	15.000
Side Slope, H:1	3.000
Total Depth, m	0.750
Voids (%)	100.000

Stage / Storage Table

Stage (m)	Elevation (m)	Contour Area (sqm)	Incr. Storage (cum)	Total Storage (cum)
0.000	100.000	375	0.0000	0.0000
0.038	100.038	384	14.2	14.2
0.075	100.075	393	14.6	28.8
0.113	100.113	402	14.9	43.7
0.150	100.150	412	15.3	59.0
0.188	100.188	421	15.6	74.6
0.225	100.225	431	16.0	90.6
0.263	100.263	440	16.3	107
0.300	100.300	450	16.7	124
0.338	100.338	460	17.1	141
0.375	100.375	470	17.4	158
0.413	100.413	480	17.8	176
0.450	100.450	490	18.2	194
0.488	100.488	501	18.6	213
0.525	100.525	511	19.0	232
0.563	100.563	521	19.4	251
0.600	100.600	532	19.8	271
0.638	100.638	543	20.1	291
0.675	100.675	553	20.6	311
0.713	100.713	564	21.0	332
0.750	100.750	575	21.4	354

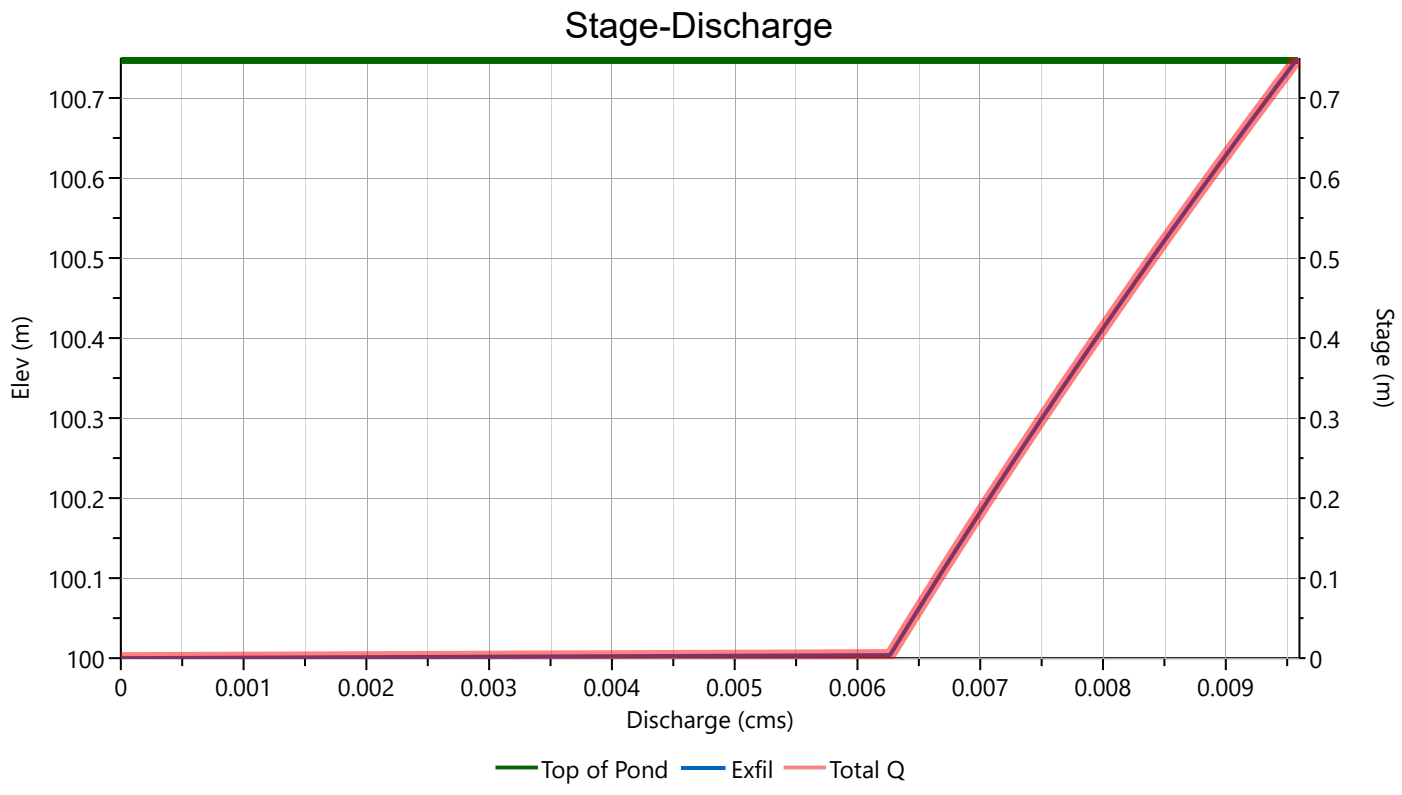


Exfil Pnd

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Perforated Riser	
		1	2	3		
Rise, mm					Hole Diameter, mm	
Span, mm					No. holes	
No. Barrels					Invert Elevation, m	
Invert Elevation, m					Height, m	
Orifice Coefficient, Co					Orifice Coefficient, Co	
Length, m						
Barrel Slope, %						
N-Value, n	0.000					
Weirs	**Riser***	**Weirs**			**Ancillary**	
		1	2	3		
Shape / Type					Exfiltration, mm/hr	60.000**
Crest Elevation, m						
Crest Length, m						
Angle, deg						
Weir Coefficient, Cw						

**Routes through Culvert. **Rate applied to contours.*



Exfil Pnd

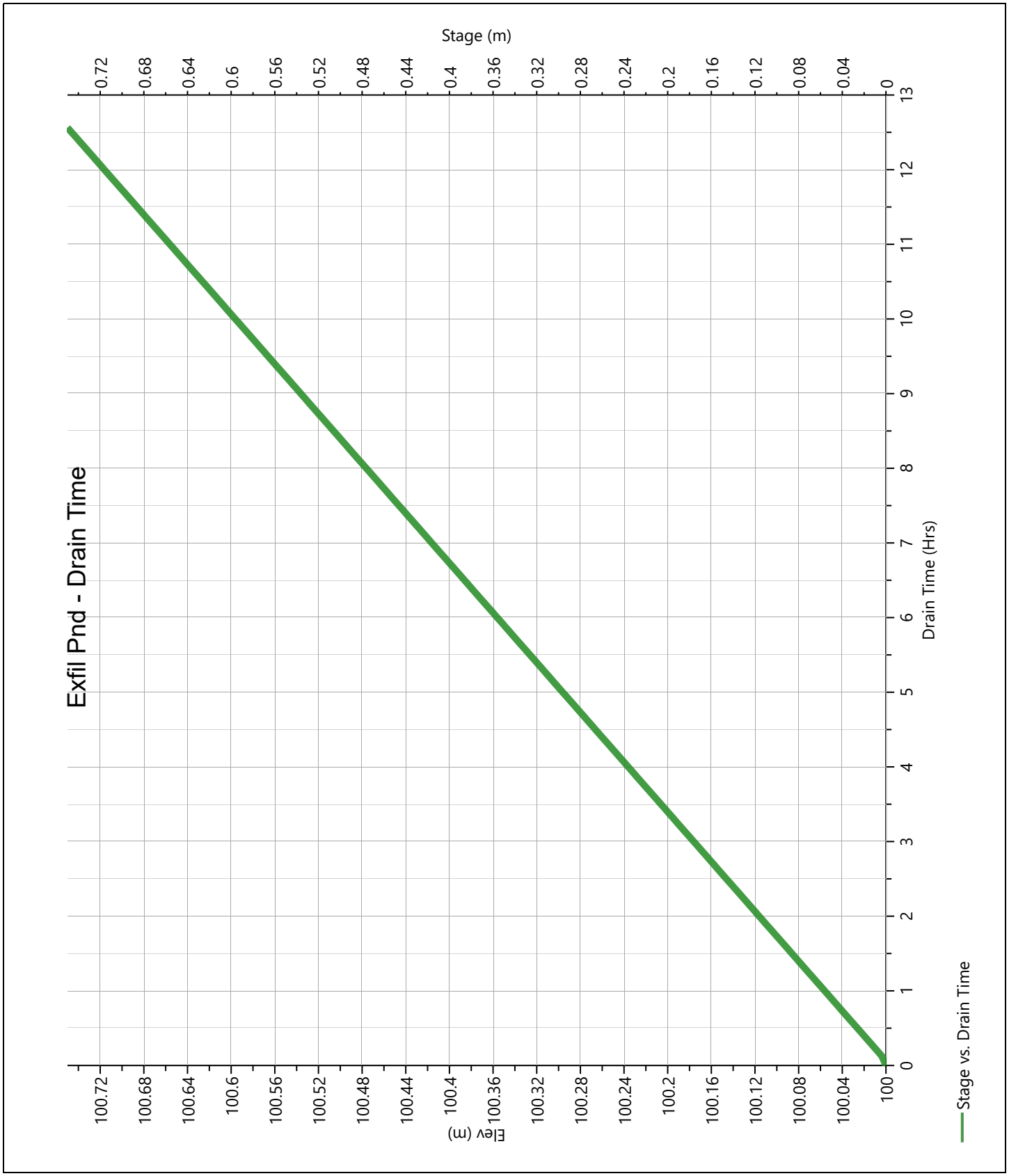
Stage-Storage-Discharge Summary

Stage (m)	Elev. (m)	Storage (cum)	Culvert (cms)	Orifices, cms			Riser (cms)	Weirs, cms			Pf Riser (cms)	Exfil (cms)	User (cms)	Total (cms)
				1	2	3		1	2	3				
0.000	100.000	0.0000										0.000		0.000
0.038	100.038	14.2										0.0064		0.0064
0.075	100.075	28.8										0.0066		0.0066
0.113	100.113	43.7										0.0067		0.0067
0.150	100.150	59.0										0.0069		0.0069
0.188	100.188	74.6										0.0070		0.0070
0.225	100.225	90.6										0.0072		0.0072
0.263	100.263	107										0.0073		0.0073
0.300	100.300	124										0.0075		0.0075
0.338	100.338	141										0.0077		0.0077
0.375	100.375	158										0.0078		0.0078
0.413	100.413	176										0.0080		0.0080
0.450	100.450	194										0.0082		0.0082
0.488	100.488	213										0.0083		0.0083
0.525	100.525	232										0.0085		0.0085
0.563	100.563	251										0.0087		0.0087
0.600	100.600	271										0.0089		0.0089
0.638	100.638	291										0.0090		0.0090
0.675	100.675	311										0.0092		0.0092
0.713	100.713	332										0.0094		0.0094
0.750	100.750	354										0.0096		0.0096

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Exfil Pnd

Pond Drawdown



Hydrograph 5-yr Summary

Project Name: Internal Roads - 900 Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

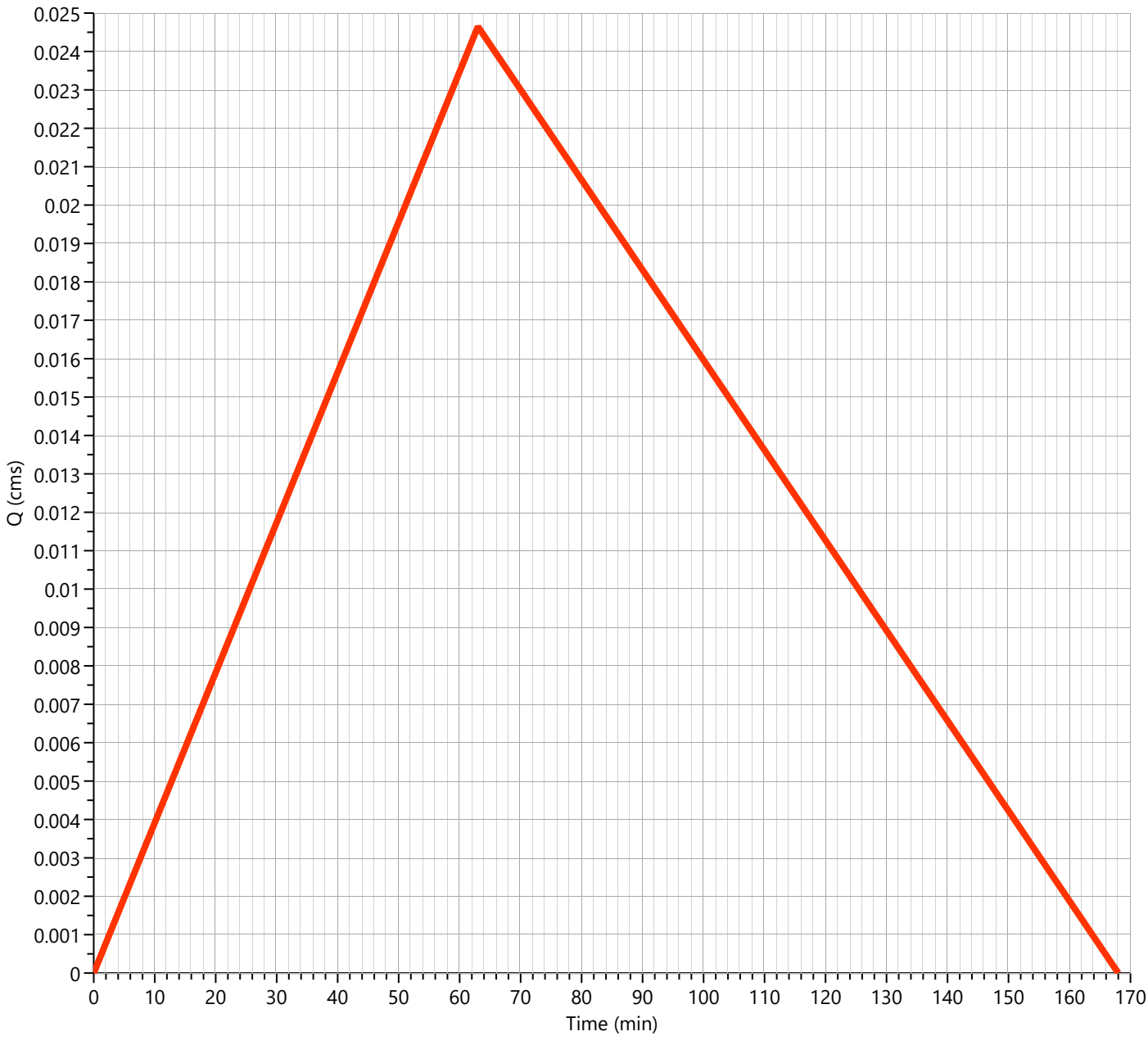
Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 101	0.0246	1.05	124	----		
2	Mod Rational	Post 201	0.0344	0.85	116	----		
3	Pond Route	Pond	0.0071	1.62	116	2	100.195	77.9

Hydrograph Report

Pre 101

Hyd. No. 1

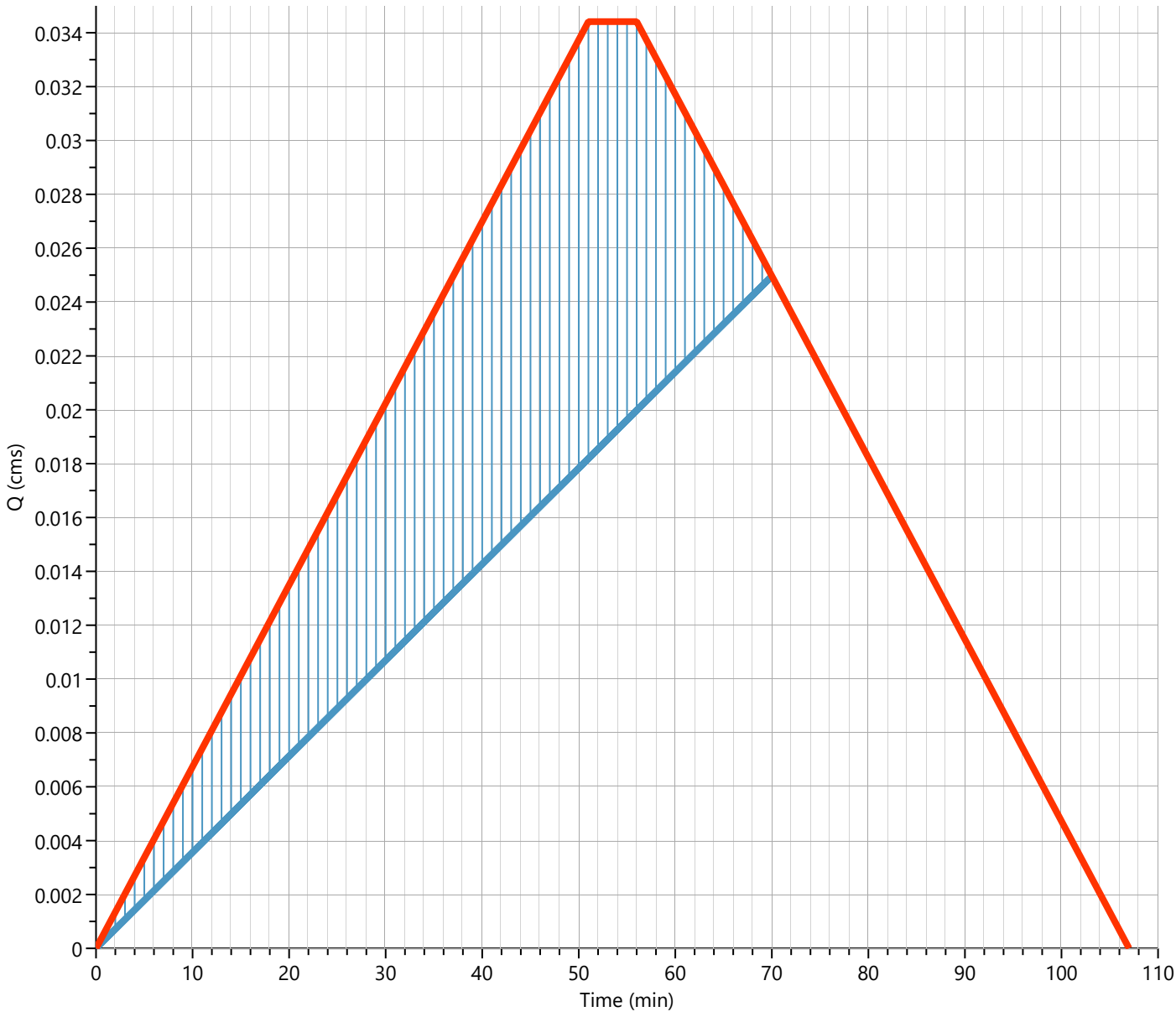
Hydrograph Type	= Rational	Peak Flow	= 0.0246 cms
Storm Frequency	= 5-yr	Time to Peak	= 1.05 hrs
Time Interval	= 1 min	Runoff Volume	= 124 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.28
Tc Method	= User	Time of Conc. (Tc)	= 63.0 min
IDF Curve	= Wyevale.idf	Intensity	= 28 mm/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post 201

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0344 cms
Storm Frequency	= 5-yr	Time to Peak	= 0.85 hrs
Time Interval	= 1 min	Runoff Volume	= 116 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.36
Tc Method	= User	Time of Conc. (Tc)	= 51.0 min
IDF Curve	= Wyevale.idf	Intensity	= 30 mm/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 1.1 x Tc
Target Q	= 0.0250 cms	Required Storage	= 35.6 cum



Hydrograph Report

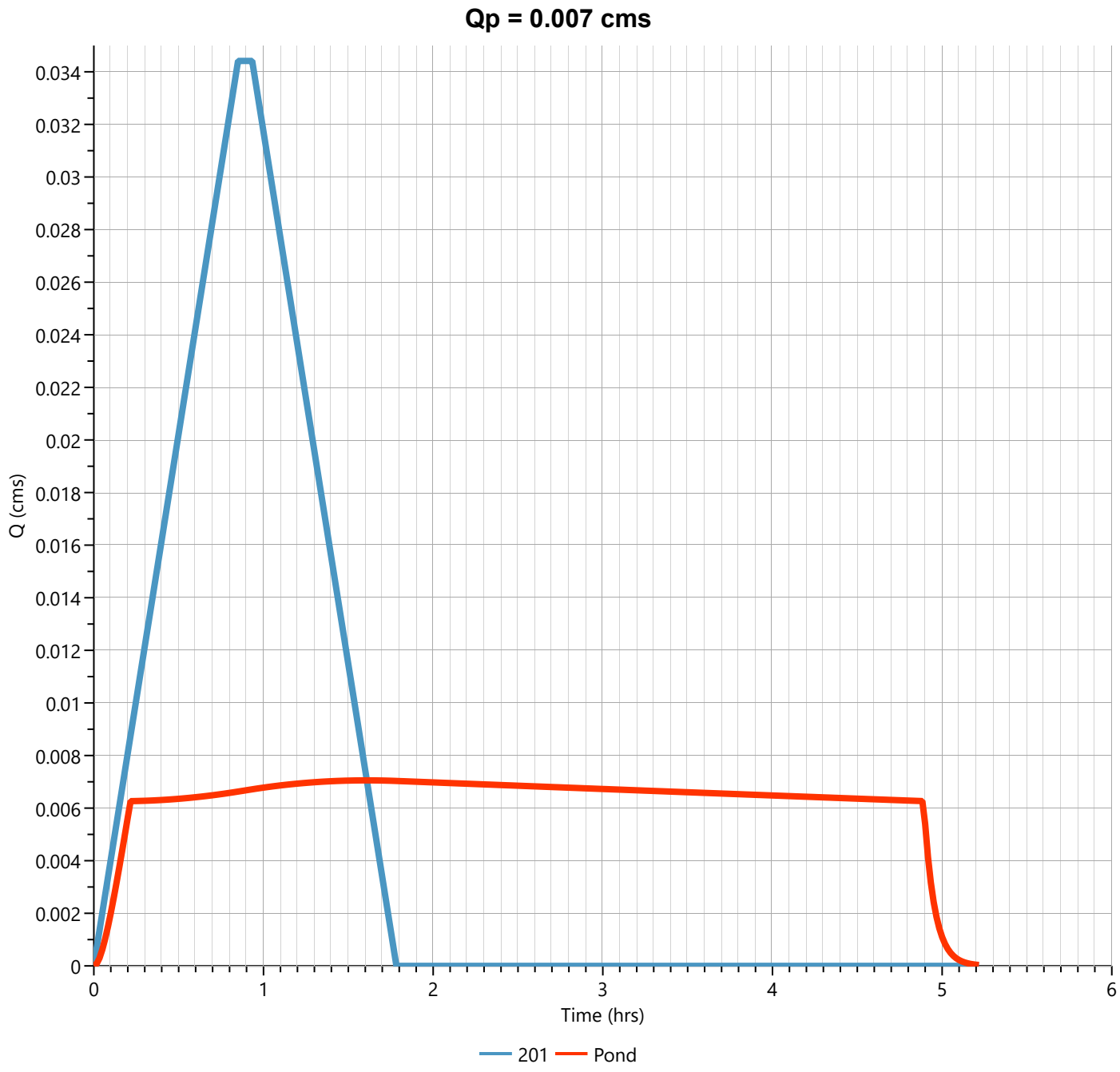
Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.0071 cms
Storm Frequency	= 5-yr	Time to Peak	= 1.62 hrs
Time Interval	= 1 min	Hydrograph Volume	= 116 cum
Inflow Hydrograph	= 2 - 201	Max. Elevation	= 100.195 m
Pond Name	= Exfil Pnd	Max. Storage	= 77.9 cum

Pond Routing by Storage Indication Method

Center of mass detention time = 1.63 hrs



Hydrograph 10-yr Summary

Project Name: Internal Roads - 900 Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

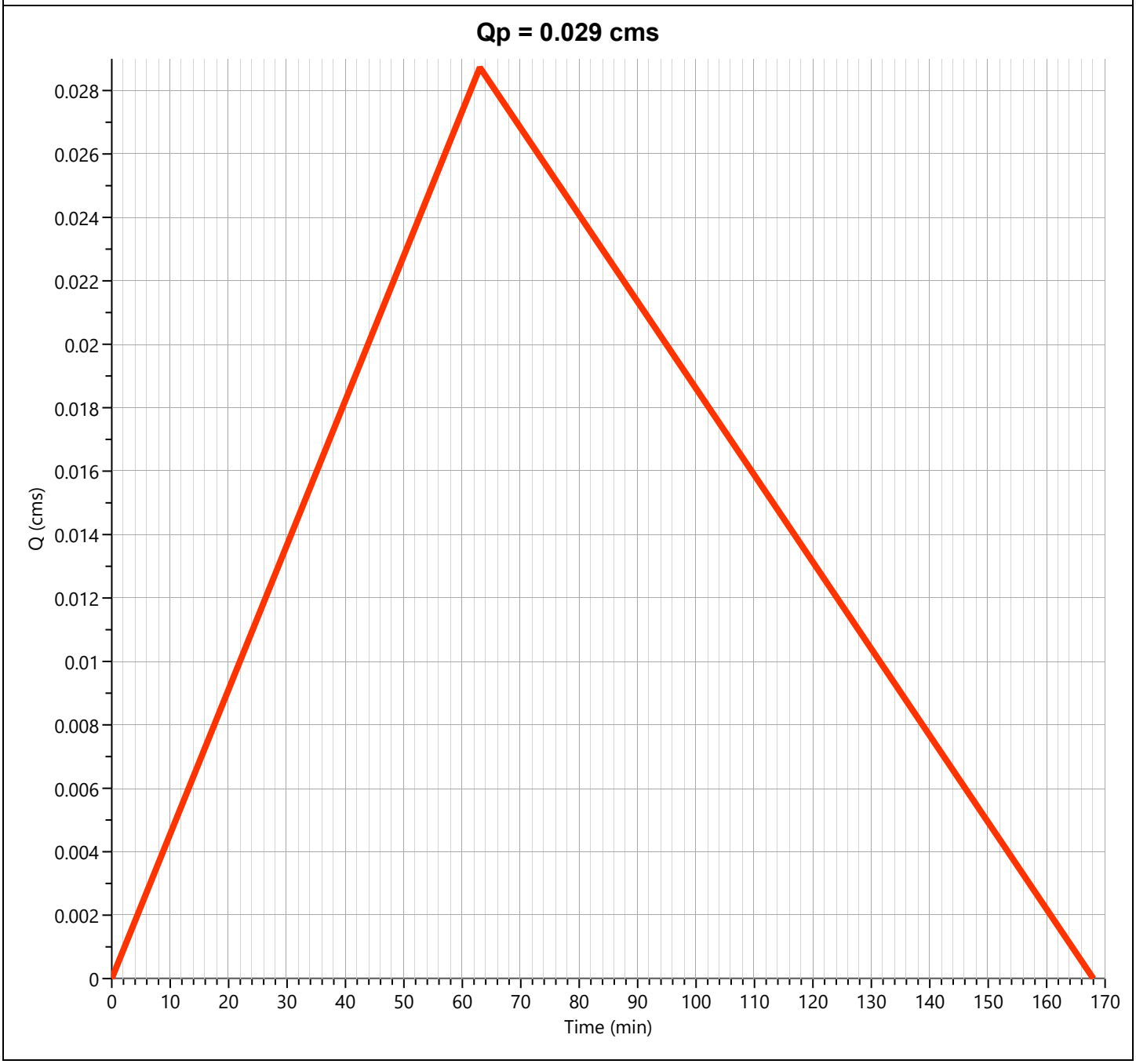
Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 101	0.0287	1.05	145	----		
2	Mod Rational	Post 201	0.0401	0.85	135	----		
3	Pond Route	Pond	0.0072	1.63	135	2	100.238	96.0

Hydrograph Report

Pre 101

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 0.0287 cms
Storm Frequency	= 10-yr	Time to Peak	= 1.05 hrs
Time Interval	= 1 min	Runoff Volume	= 145 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.28
Tc Method	= User	Time of Conc. (Tc)	= 63.0 min
IDF Curve	= Wyevale.idf	Intensity	= 33 mm/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

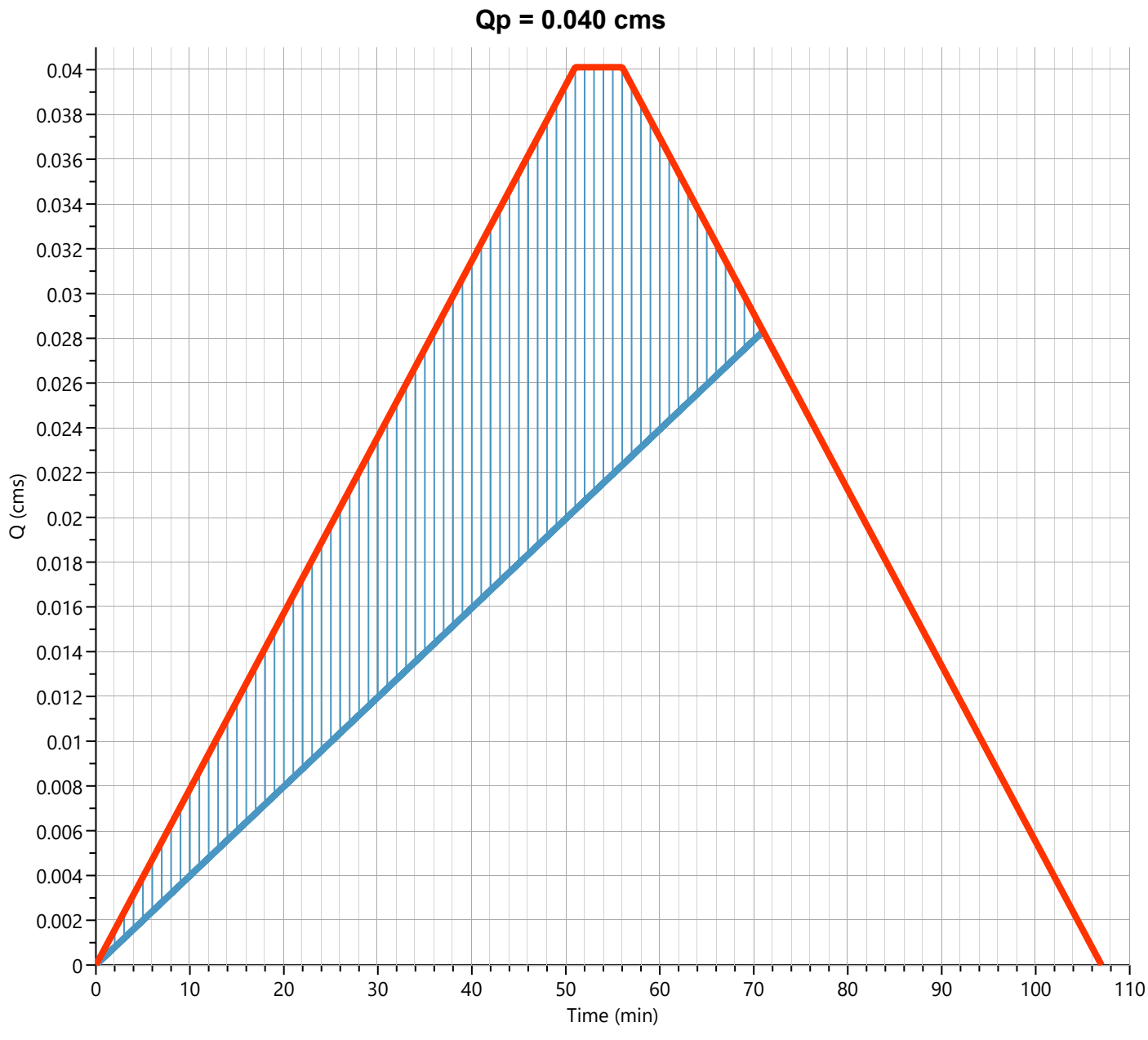
Hydrology Studio v 3.0.0.27

08-29-2023

Post 201

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0401 cms
Storm Frequency	= 10-yr	Time to Peak	= 0.85 hrs
Time Interval	= 1 min	Runoff Volume	= 135 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.36
Tc Method	= User	Time of Conc. (Tc)	= 51.0 min
IDF Curve	= Wyevale.idf	Intensity	= 35 mm/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 1.1 x Tc
Target Q	= 0.0287 cms	Required Storage	= 42.9 cum



Hydrograph Report

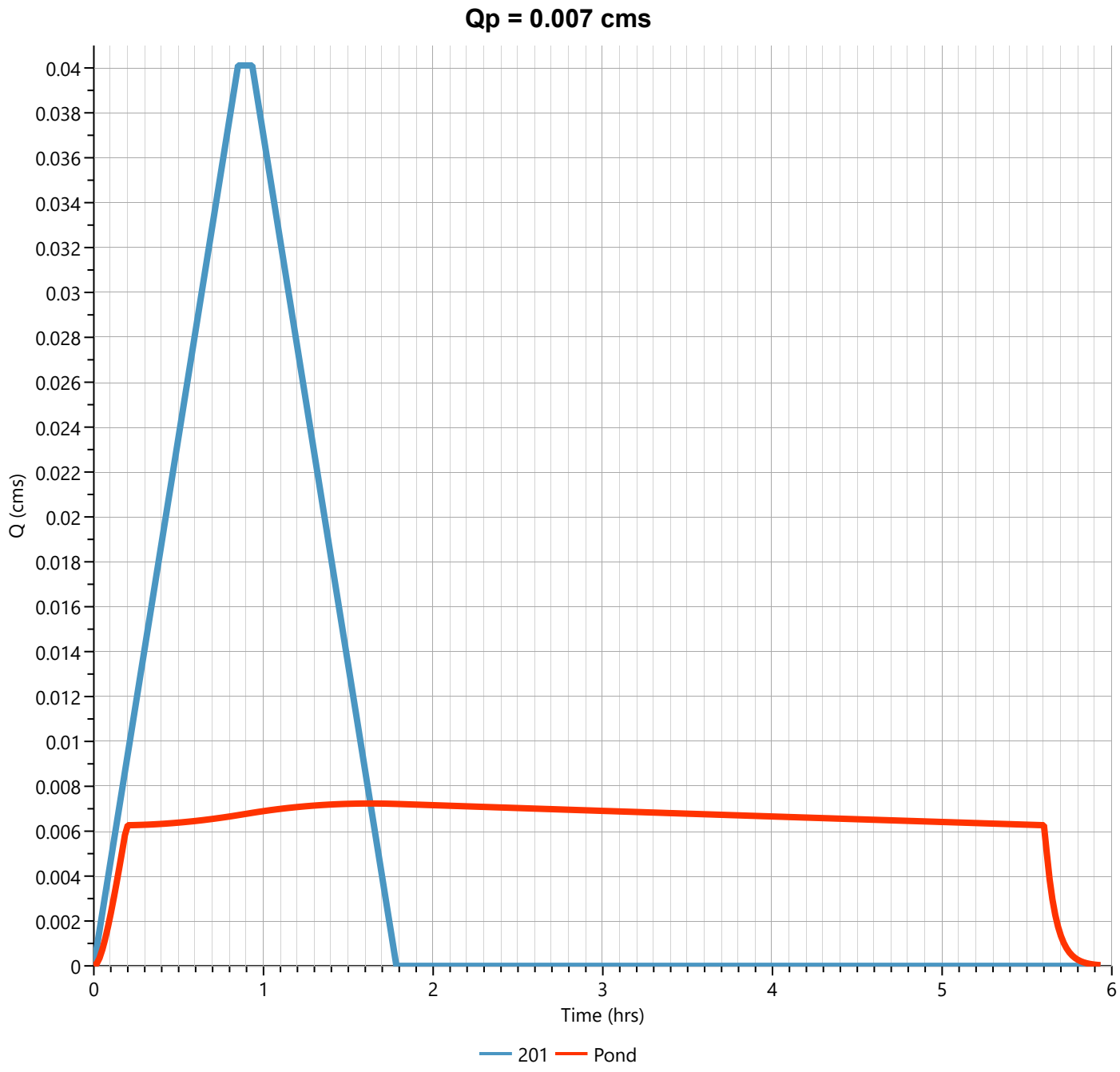
Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.0072 cms
Storm Frequency	= 10-yr	Time to Peak	= 1.63 hrs
Time Interval	= 1 min	Hydrograph Volume	= 135 cum
Inflow Hydrograph	= 2 - 201	Max. Elevation	= 100.238 m
Pond Name	= Exfil Pnd	Max. Storage	= 96.0 cum

Pond Routing by Storage Indication Method

Center of mass detention time = 1.97 hrs



Hydrograph 25-yr Summary

Project Name: Internal Roads - 900 Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 101	0.0371	1.05	187	----		
2	Mod Rational	Post 201	0.0518	0.85	174	----		
3	Pond Route	Pond	0.0076	1.67	174	2	100.322	133

Hydrograph Report

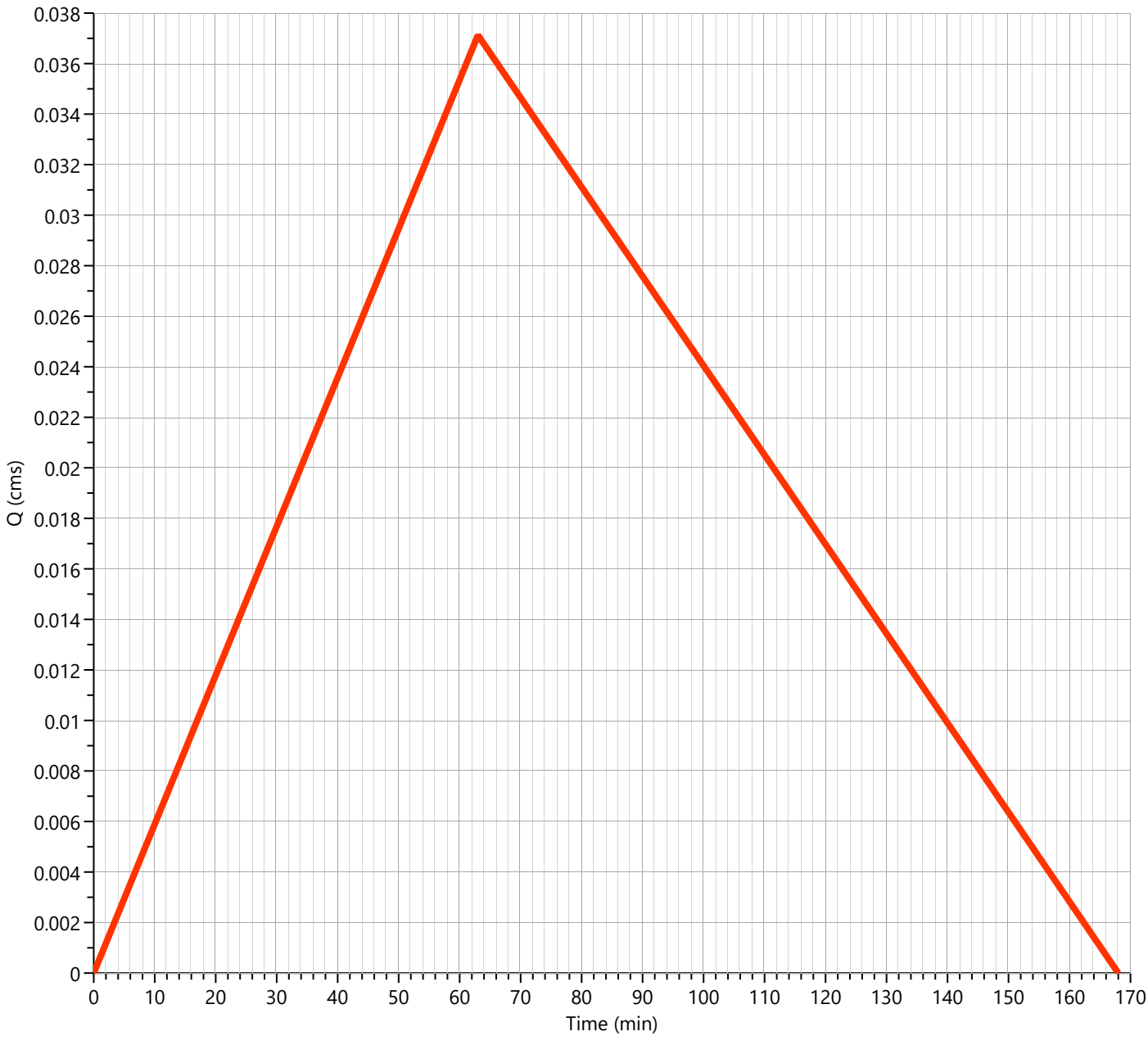
Hydrology Studio v 3.0.0.27

08-29-2023

Pre 101

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 0.0371 cms
Storm Frequency	= 25-yr	Time to Peak	= 1.05 hrs
Time Interval	= 1 min	Runoff Volume	= 187 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.28
Tc Method	= User	Time of Conc. (Tc)	= 63.0 min
IDF Curve	= Wyevale.idf	Intensity	= 38 mm/hr
Freq. Corr. Factor	= 1.10	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

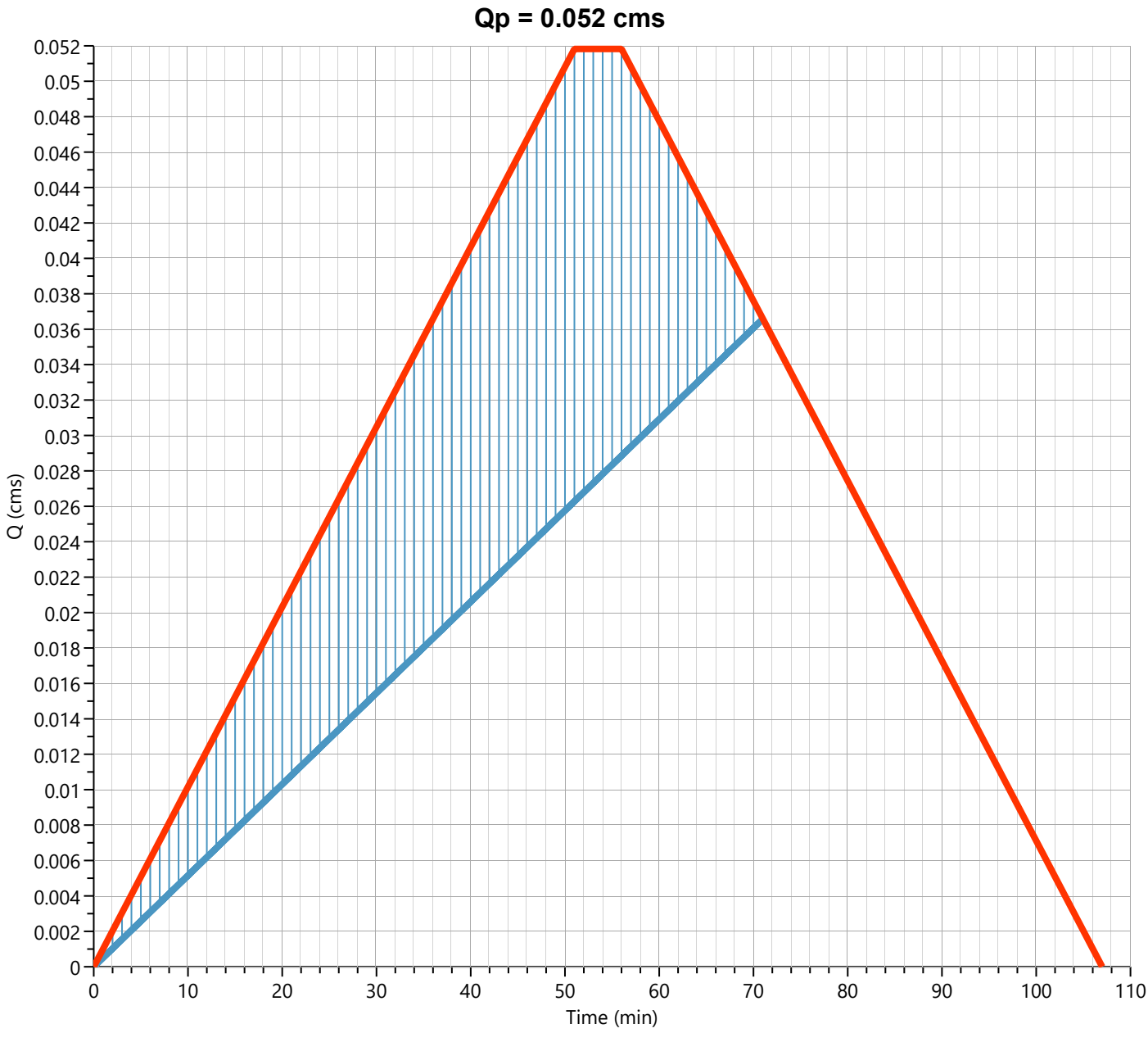
Hydrology Studio v 3.0.0.27

08-29-2023

Post 201

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0518 cms
Storm Frequency	= 25-yr	Time to Peak	= 0.85 hrs
Time Interval	= 1 min	Runoff Volume	= 174 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.36
Tc Method	= User	Time of Conc. (Tc)	= 51.0 min
IDF Curve	= Wyevale.idf	Intensity	= 42 mm/hr
Freq. Corr. Factor	= 1.10	Storm Duration	= 1.1 x Tc
Target Q	= 0.0370 cms	Required Storage	= 55.7 cum



Hydrograph Report

Hydrology Studio v 3.0.0.27

08-29-2023

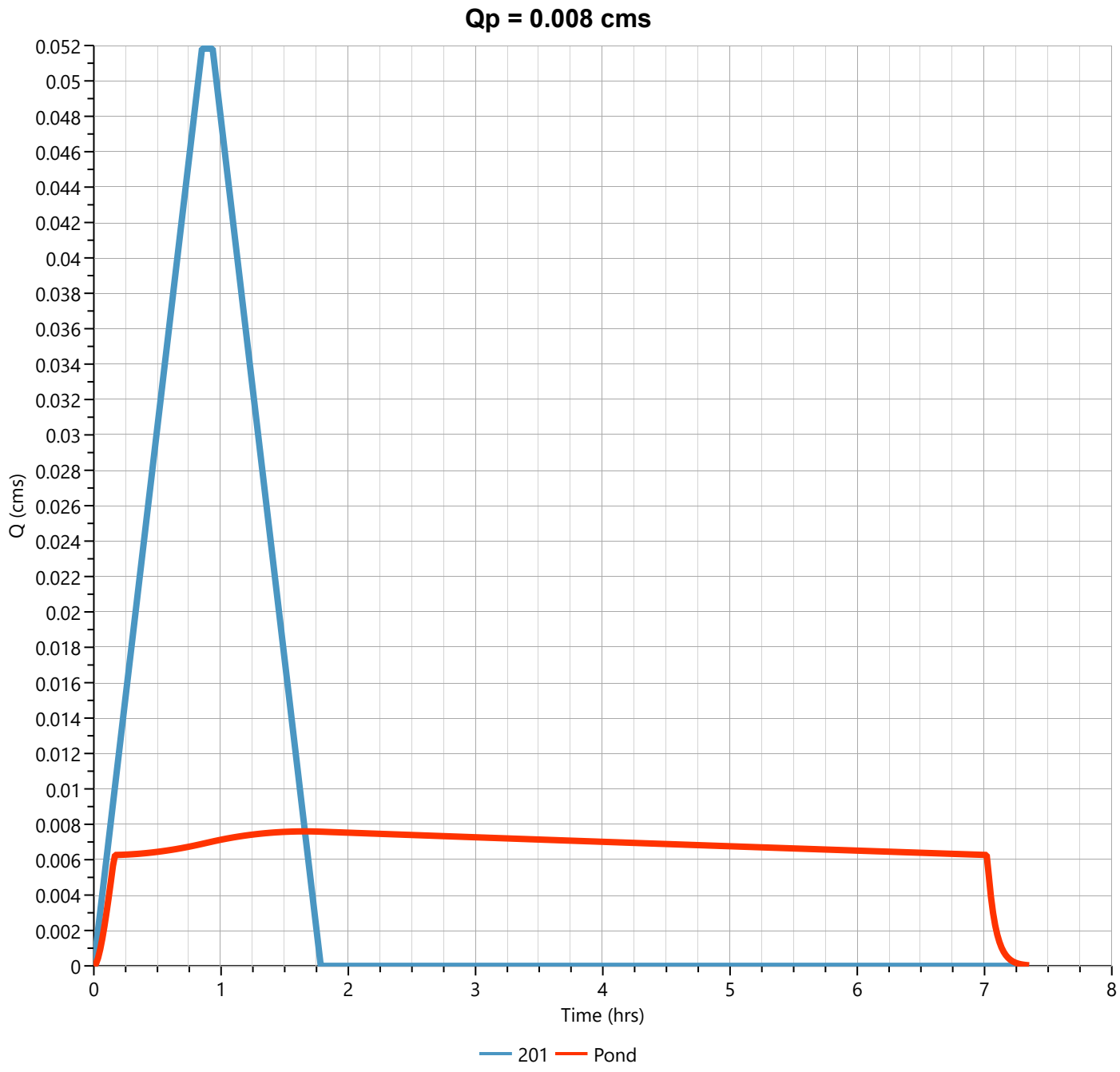
Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.0076 cms
Storm Frequency	= 25-yr	Time to Peak	= 1.67 hrs
Time Interval	= 1 min	Hydrograph Volume	= 174 cum
Inflow Hydrograph	= 2 - 201	Max. Elevation	= 100.322 m
Pond Name	= Exfil Pnd	Max. Storage	= 133 cum

Pond Routing by Storage Indication Method

Center of mass detention time = 2.64 hrs



Hydrograph 50-yr Summary

Project Name: Internal Roads - 900 Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 101	0.0451	1.05	228	----		
2	Mod Rational	Post 201	0.0630	0.85	212	----		
3	Pond Route	Pond	0.0079	1.68	212	2	100.399	169

Hydrograph Report

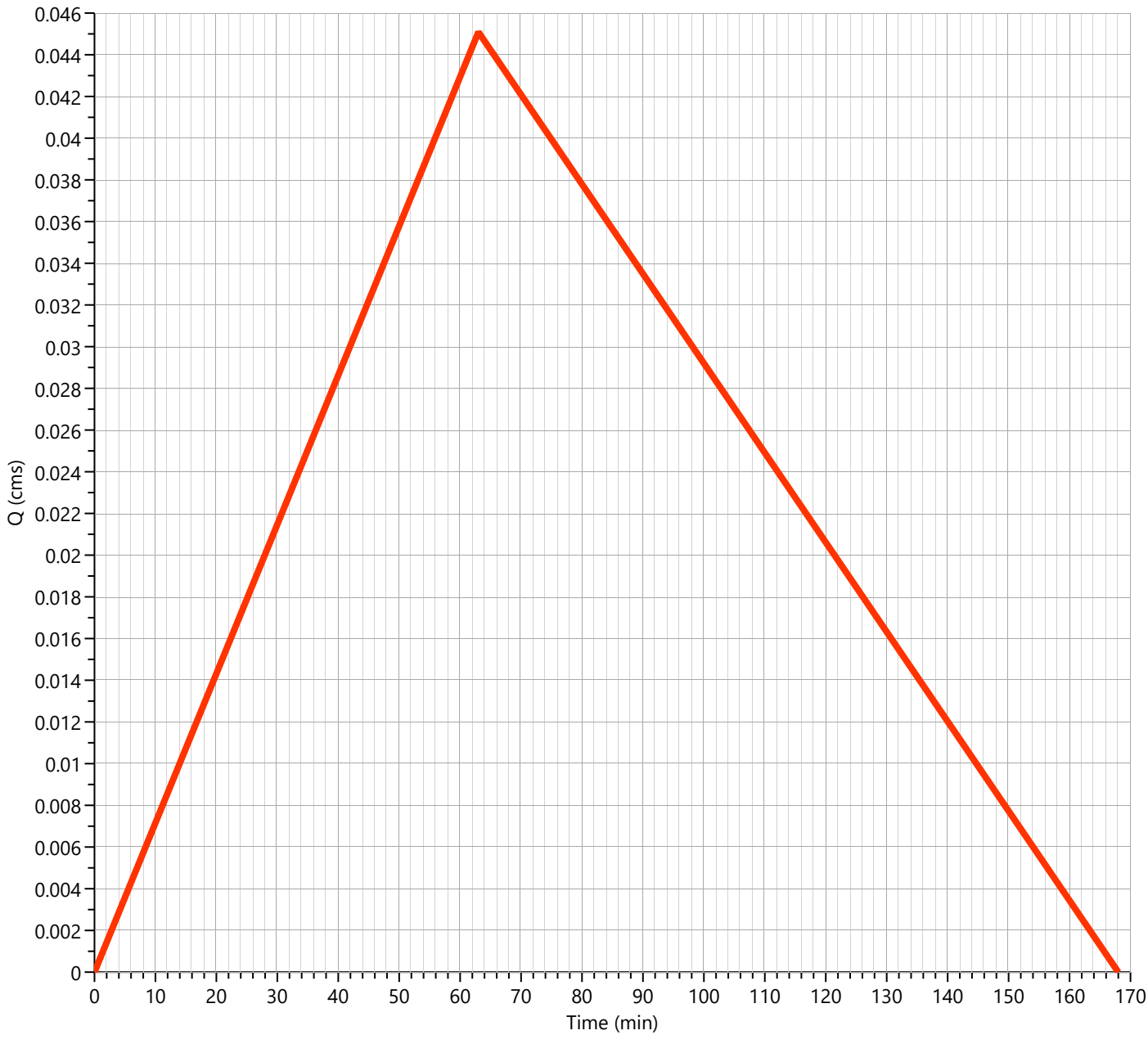
Hydrology Studio v 3.0.0.27

08-29-2023

Pre 101

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 0.0451 cms
Storm Frequency	= 50-yr	Time to Peak	= 1.05 hrs
Time Interval	= 1 min	Runoff Volume	= 228 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.28
Tc Method	= User	Time of Conc. (Tc)	= 63.0 min
IDF Curve	= Wyevale.idf	Intensity	= 43 mm/hr
Freq. Corr. Factor	= 1.20	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

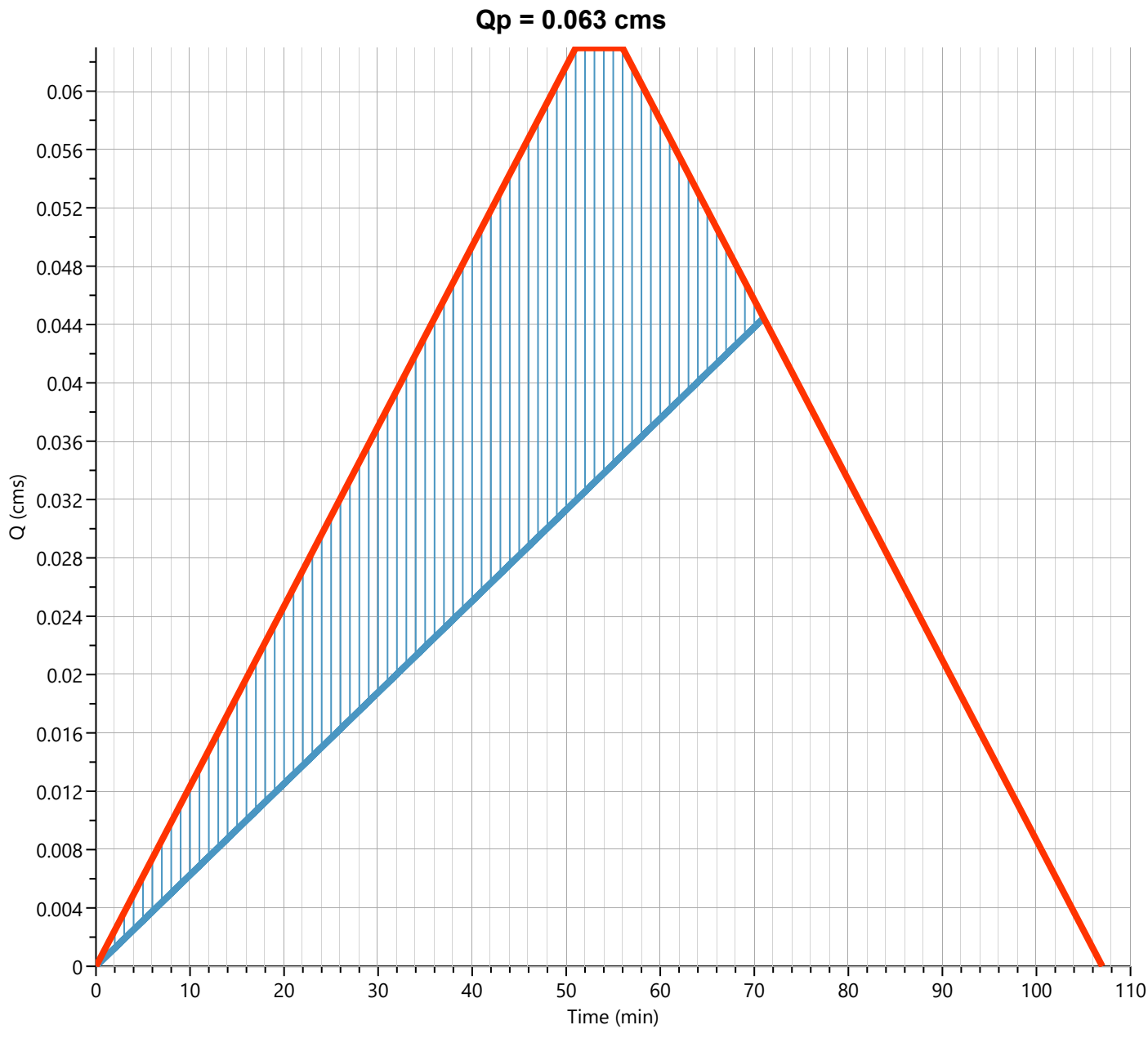
Hydrology Studio v 3.0.0.27

08-29-2023

Post 201

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0630 cms
Storm Frequency	= 50-yr	Time to Peak	= 0.85 hrs
Time Interval	= 1 min	Runoff Volume	= 212 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.36
Tc Method	= User	Time of Conc. (Tc)	= 51.0 min
IDF Curve	= Wyevale.idf	Intensity	= 46 mm/hr
Freq. Corr. Factor	= 1.20	Storm Duration	= 1.1 x Tc
Target Q	= 0.0450 cms	Required Storage	= 67.5 cum



Hydrograph Report

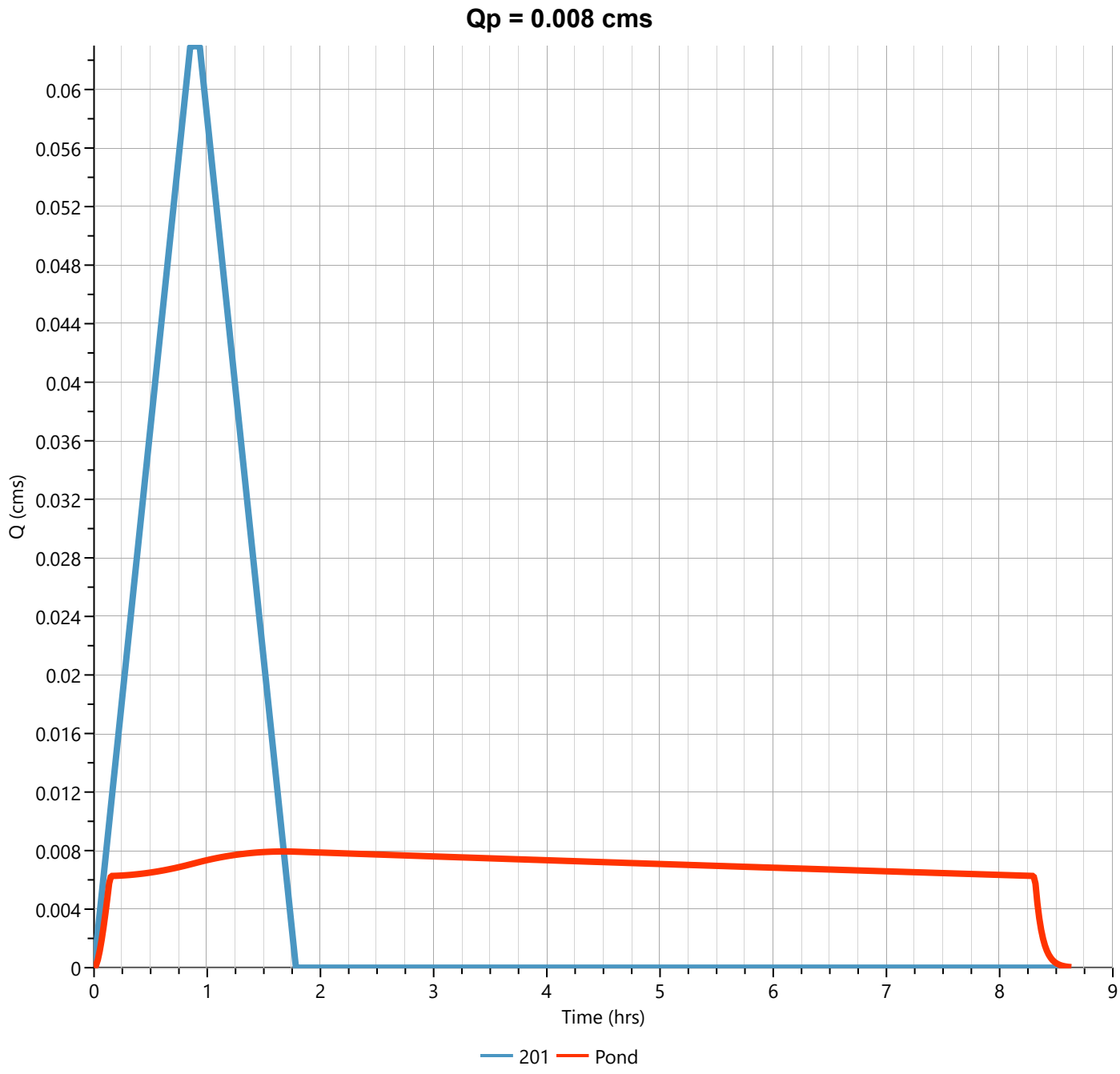
Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.0079 cms
Storm Frequency	= 50-yr	Time to Peak	= 1.68 hrs
Time Interval	= 1 min	Hydrograph Volume	= 212 cum
Inflow Hydrograph	= 2 - 201	Max. Elevation	= 100.399 m
Pond Name	= Exfil Pnd	Max. Storage	= 169 cum

Pond Routing by Storage Indication Method

Center of mass detention time = 3.24 hrs



Hydrograph 100-yr Summary

Project Name: Internal Roads - 900 Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 101	0.0517	1.05	261	----		
2	Mod Rational	Post 201	0.0721	0.85	243	----		
3	Pond Route	Pond	0.0082	1.68	242	2	100.460	199

Hydrograph Report

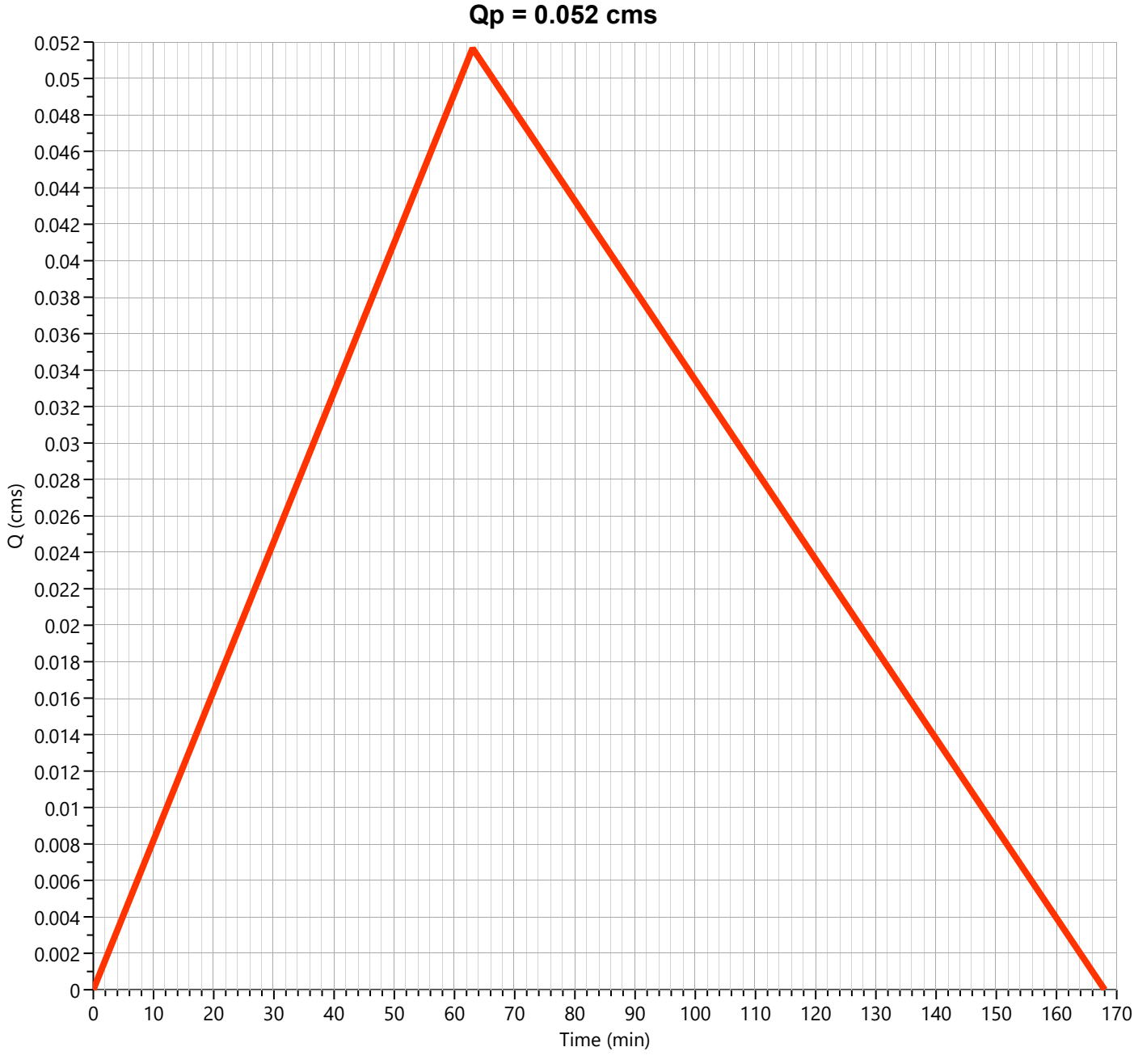
Hydrology Studio v 3.0.0.27

08-29-2023

Pre 101

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 0.0517 cms
Storm Frequency	= 100-yr	Time to Peak	= 1.05 hrs
Time Interval	= 1 min	Runoff Volume	= 261 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.28
Tc Method	= User	Time of Conc. (Tc)	= 63.0 min
IDF Curve	= Wyevale.idf	Intensity	= 47 mm/hr
Freq. Corr. Factor	= 1.25	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

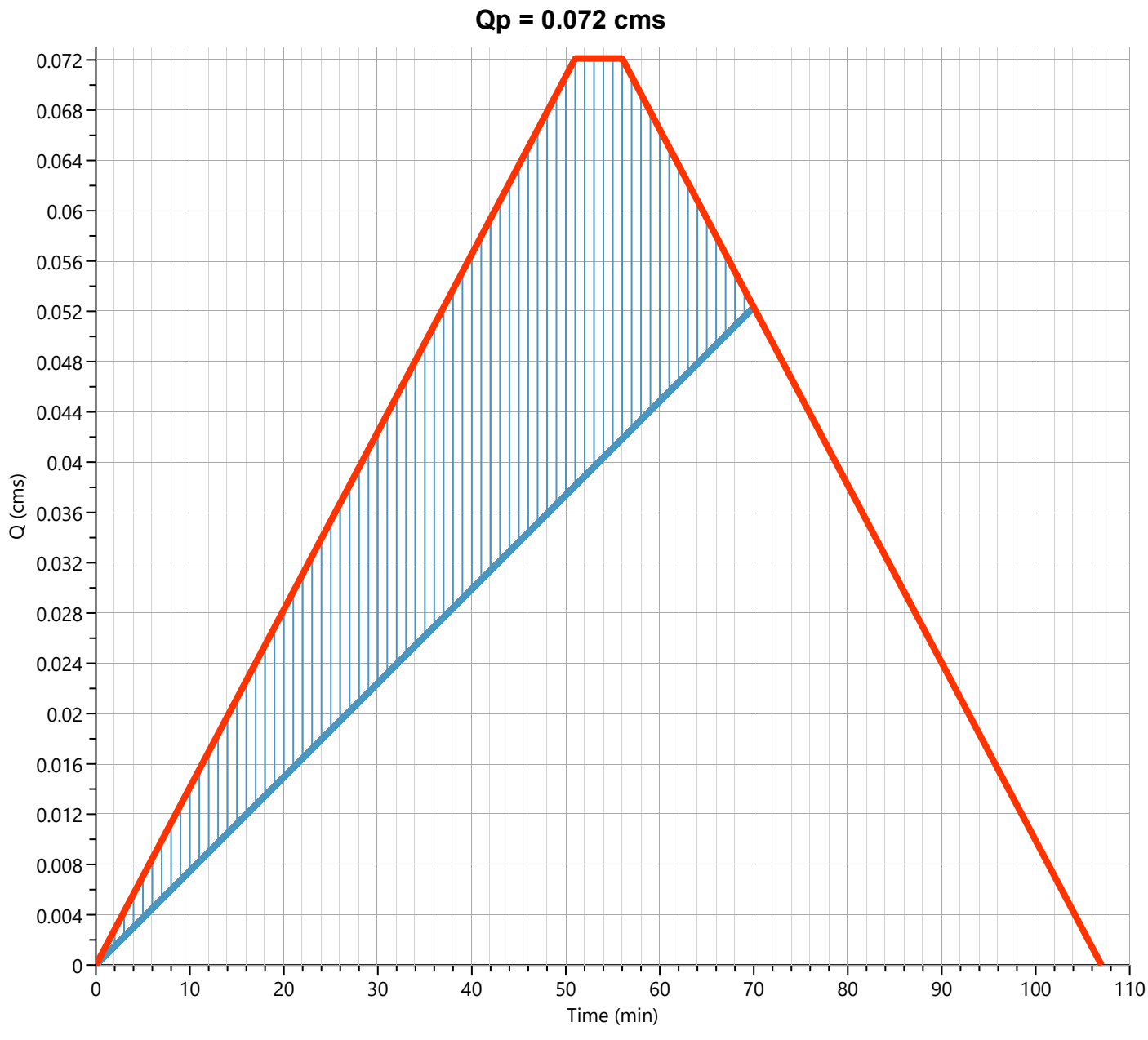
Hydrology Studio v 3.0.0.27

08-29-2023

Post 201

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0721 cms
Storm Frequency	= 100-yr	Time to Peak	= 0.85 hrs
Time Interval	= 1 min	Runoff Volume	= 243 cum
Drainage Area	= 1.13 ha	Runoff Coeff.	= 0.36
Tc Method	= User	Time of Conc. (Tc)	= 51.0 min
IDF Curve	= Wyevale.idf	Intensity	= 51 mm/hr
Freq. Corr. Factor	= 1.25	Storm Duration	= 1.1 x Tc
Target Q	= 0.0520 cms	Required Storage	= 75.8 cum



Hydrograph Report

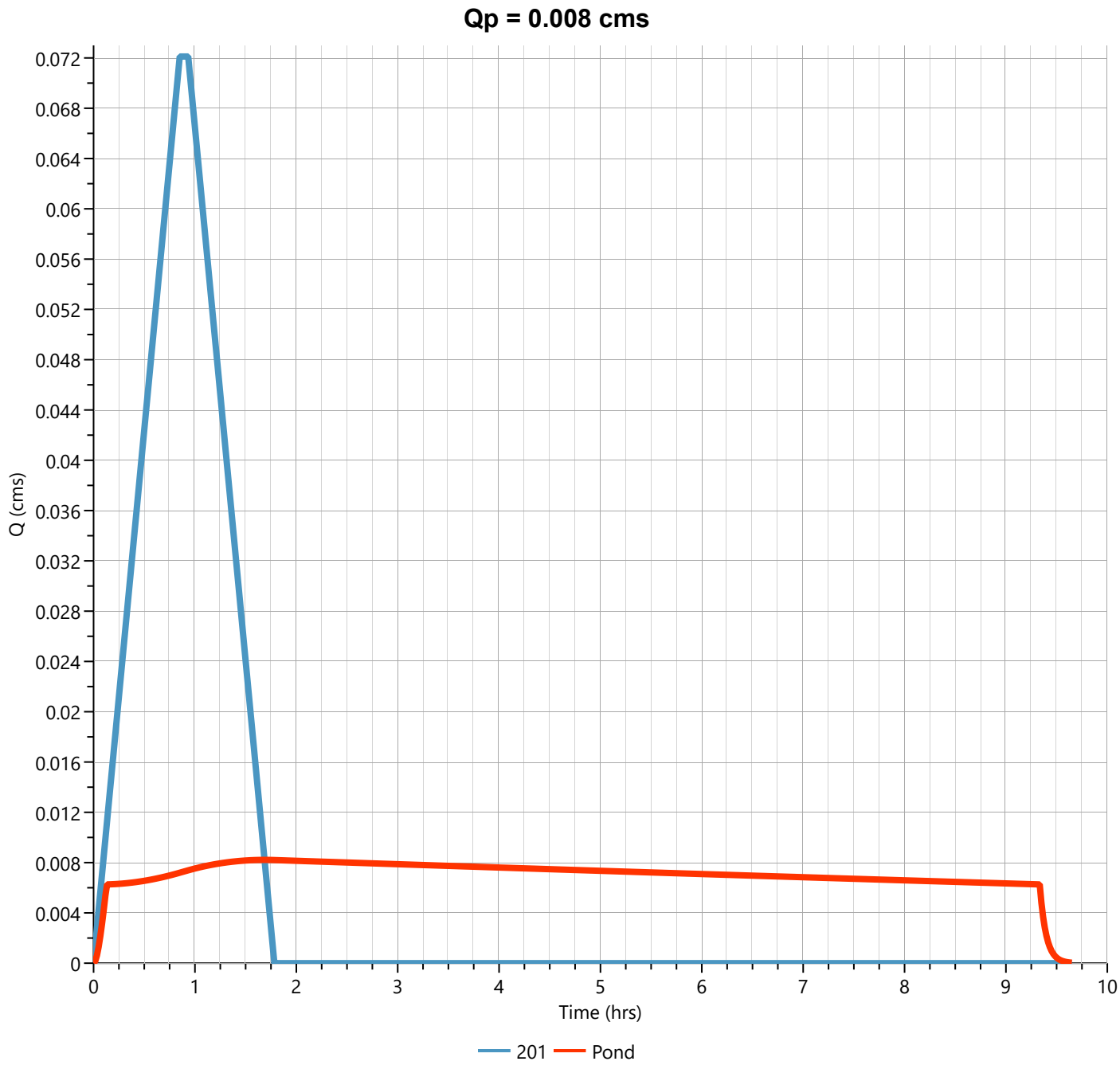
Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.0082 cms
Storm Frequency	= 100-yr	Time to Peak	= 1.68 hrs
Time Interval	= 1 min	Hydrograph Volume	= 242 cum
Inflow Hydrograph	= 2 - 201	Max. Elevation	= 100.460 m
Pond Name	= Exfil Pnd	Max. Storage	= 199 cum

Pond Routing by Storage Indication Method

Center of mass detention time = 3.70 hrs



IDF Report

IDF filename: Wyevale.idf

Hydrology Studio v 3.0.0.27

08-29-2023

Equation Coefficients	Intensity = B / (Tc + D)^E (mm/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
B	0.0000	385.1511	0.0000	512.8892	598.0472	697.0923	782.5577	857.3978	
D	0.0000	0.1000	0.0000	0.1000	0.1000	0.1000	0.1000	0.1000	
E	0.0000	0.7011	0.0000	0.7014	0.7015	0.6996	0.7016	0.7007	

Minimum Tc = 5 minutes

Tc (min)	Intensity Values (mm/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
Cf	1.00	1.00	1.00	1.00	1.00	1.10	1.20	1.25	
5	0	122.901	0	163.581	190.711	222.984	249.508	273.771	
10	0	76.120	0	101.296	118.088	138.251	154.484	169.611	
15	0	57.418	0	76.399	89.060	104.347	116.505	127.960	
20	0	46.985	0	62.512	72.869	85.423	95.322	104.721	
25	0	40.209	0	53.492	62.354	73.127	81.565	89.625	
30	0	35.400	0	47.093	54.894	64.400	71.805	78.913	
35	0	31.785	0	42.281	49.284	57.835	64.466	70.857	
40	0	28.951	0	38.510	44.888	52.690	58.715	64.544	
45	0	26.662	0	35.464	41.336	48.532	54.069	59.443	
50	0	24.767	0	32.943	38.397	45.090	50.224	55.221	
55	0	23.169	0	30.816	35.918	42.187	46.981	51.660	
60	0	21.800	0	28.995	33.795	39.700	44.204	48.610	

Cf = Correction Factor applied to Rational Method runoff coefficient.

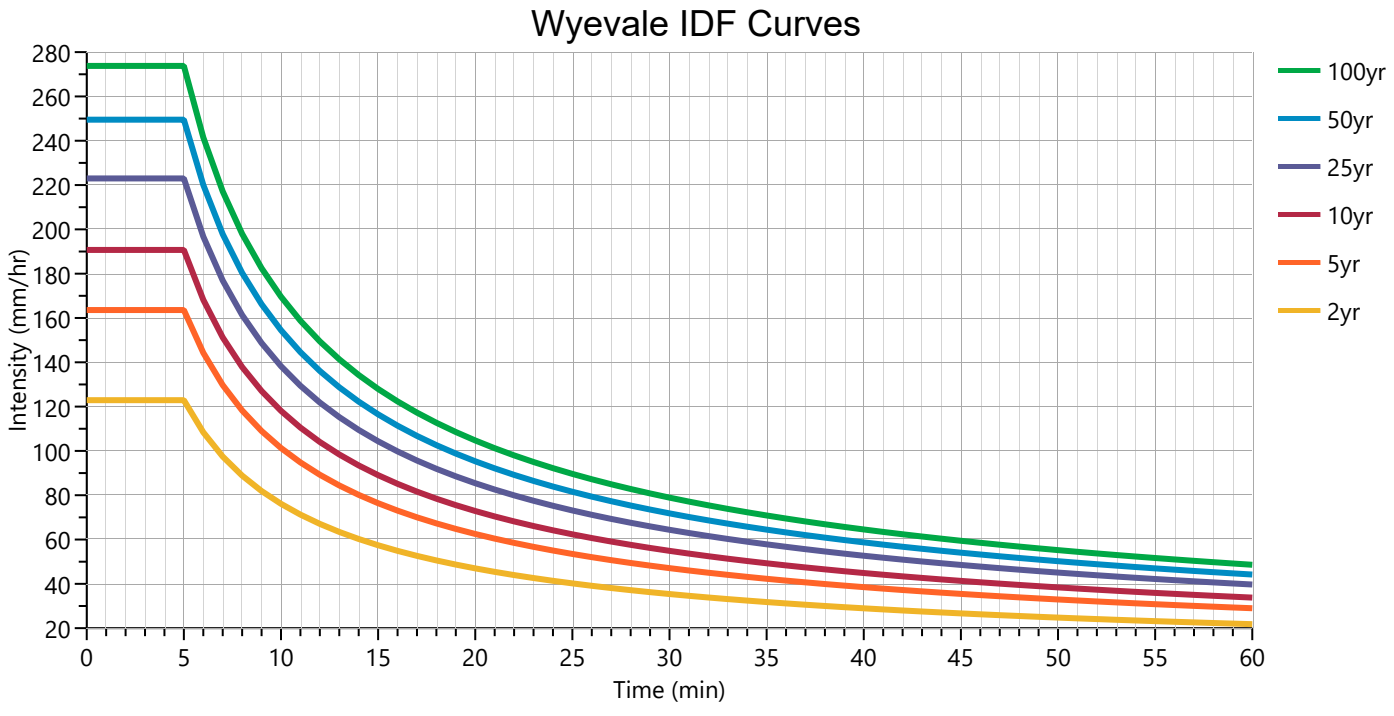


Table of Contents

Project Name: Individual Lots - Cty Rd 6 S

Hydrology Studio v 3.0.0.27 08-29-2023

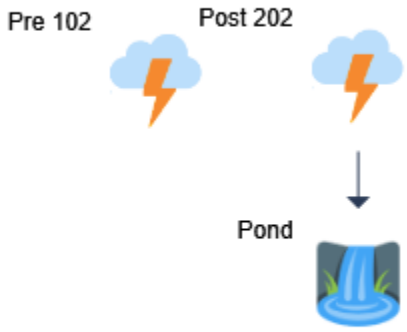
Contents continued...

Basin Model

Hydrology Studio v 3.0.0.27

Project Name: Individual Lots - Cty Rd 6 S

08-29-2023



Hydrograph by Return Period

Project Name: Individual Lots - Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cms)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1	Rational	Pre 102		0.0077		0.0103	0.0120	0.0155	0.0189	0.0216
2	Mod Rational	Post 202		0.0082		0.0109	0.0126	0.0163	0.0199	0.0227
3	Pond Route	Pond		0.000		0.0000	0.000	0.000	0.0000	0.000

Hydrograph 2-yr Summary

Project Name: Individual Lots - Cty Rd 6 S

Hydrology Studio v 3.0.0.27

08-29-2023

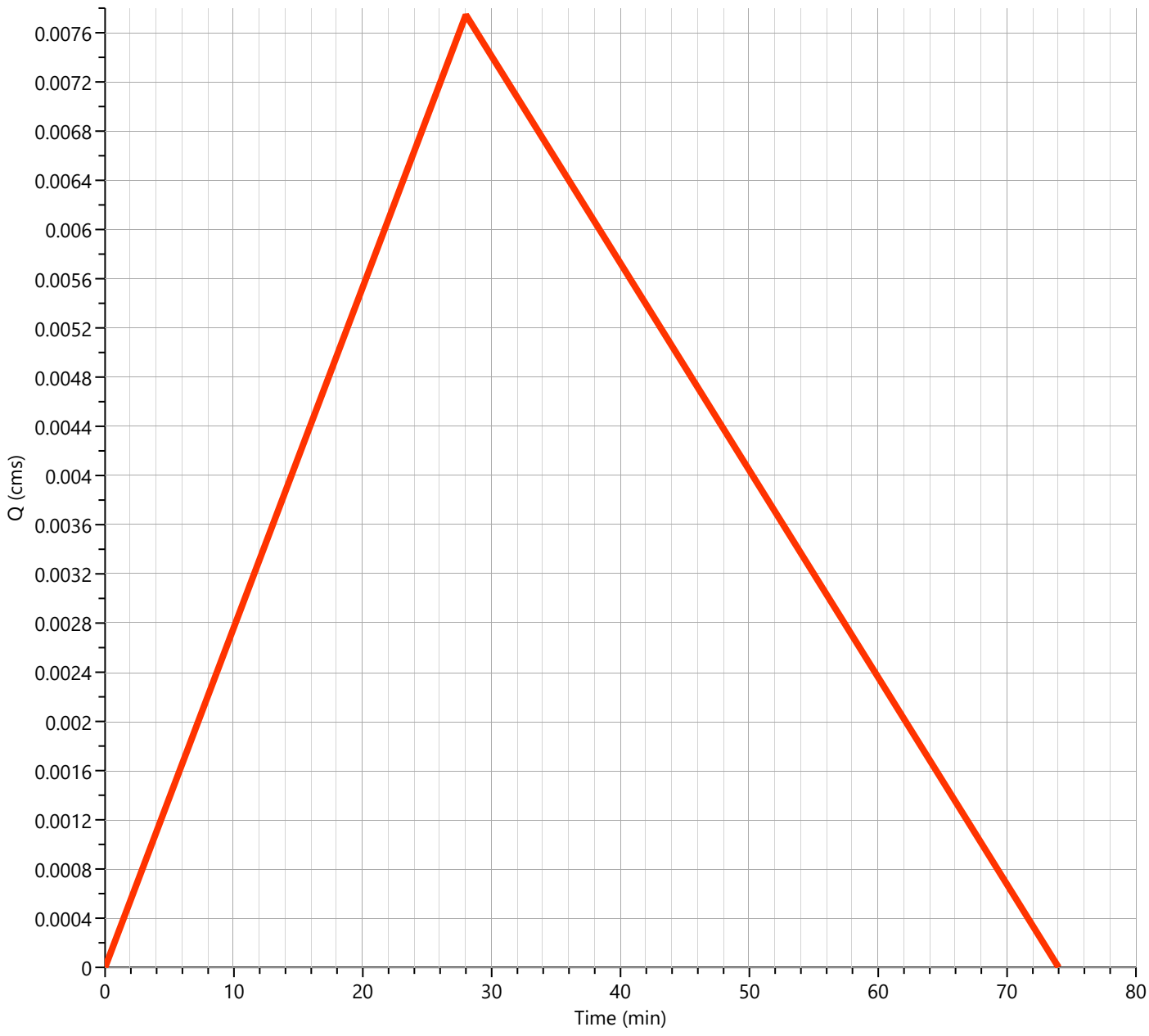
Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 102	0.0077	0.47	17.4	----		
2	Mod Rational	Post 202	0.0082	0.40	12.9	----		
3	Pond Route	Pond	0.000	0.00	0.0000	2	100.307	11.1

Hydrograph Report

Pre 102

Hyd. No. 1

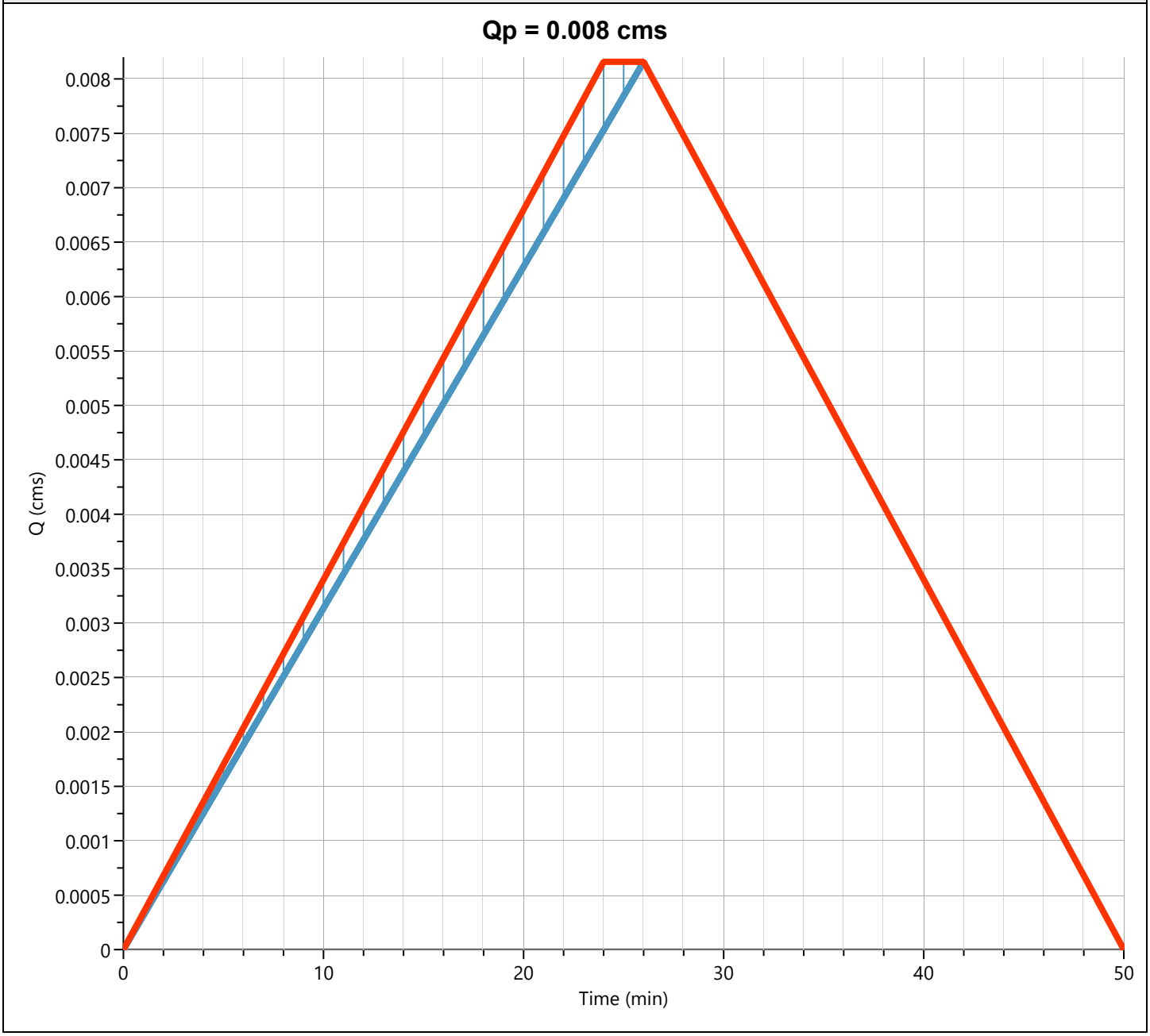
Hydrograph Type	= Rational	Peak Flow	= 0.0077 cms
Storm Frequency	= 2-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Runoff Volume	= 17.4 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 28.0 min
IDF Curve	= Wyevale.idf	Intensity	= 37 mm/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Post 202

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0082 cms
Storm Frequency	= 2-yr	Time to Peak	= 0.40 hrs
Time Interval	= 1 min	Runoff Volume	= 12.9 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 24.0 min
IDF Curve	= Wyevale.idf	Intensity	= 39 mm/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 1.1 x Tc
Target Q	= 0.0080 cms	Required Storage	= 0.9207 cum



Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cms
Storm Frequency	= 2-yr	Time to Peak	= 0.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 0.0000 cum
Inflow Hydrograph	= 2 - 202	Max. Elevation	= 100.307 m
Pond Name	= soakaway	Max. Storage	= 11.1 cum

Pond Routing by Storage Indication Method

Qp = 0.000 cms

Pond Report

Project Name: Individual Lots - Cty Rd 6 S

Hydrology Studio v 3.0.0.27

08-29-2023

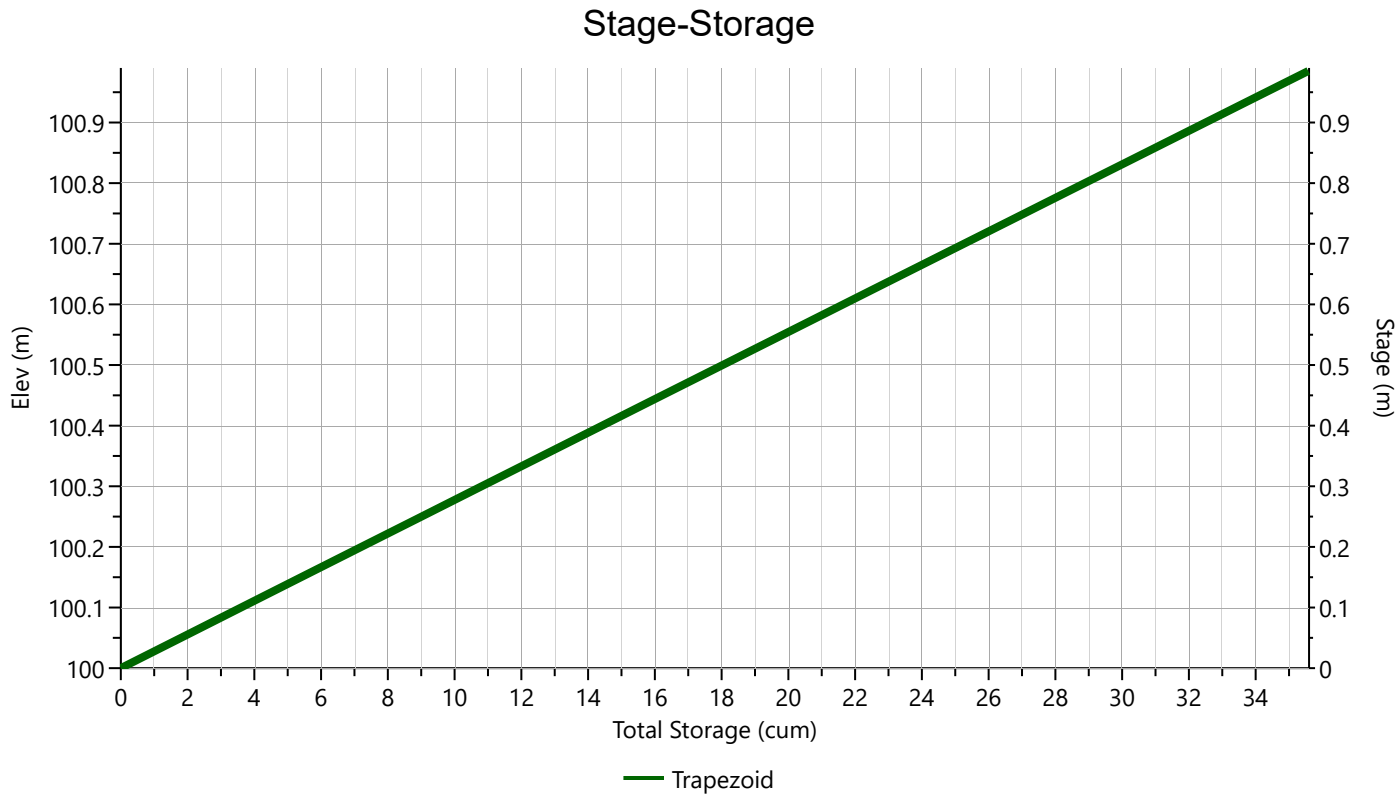
soakaway

Stage-Storage

Trapezoid	
Description	**Input**
Bottom Elevation, m	100.000
Bottom Length, m	6.000
Bottom Width, m	6.000
Side Slope, H:1	0.010
Total Depth, m	0.985
Voids (%)	100.000

Stage / Storage Table

Stage (m)	Elevation (m)	Contour Area (sqm)	Incr. Storage (cum)	Total Storage (cum)
0.000	100.000	36	0.0000	0.0000
0.049	100.049	36	1.773	1.773
0.099	100.099	36	1.774	3.547
0.148	100.148	36	1.774	5.322
0.197	100.197	36	1.775	7.097
0.246	100.246	36	1.776	8.872
0.296	100.296	36	1.776	10.6
0.345	100.345	36	1.777	12.4
0.394	100.394	36	1.777	14.2
0.443	100.443	36	1.778	16.0
0.493	100.493	36	1.779	17.8
0.542	100.542	36	1.779	19.5
0.591	100.591	36	1.780	21.3
0.640	100.640	36	1.780	23.1
0.690	100.690	36	1.781	24.9
0.739	100.739	36	1.781	26.7
0.788	100.788	36	1.782	28.4
0.837	100.837	36	1.783	30.2
0.887	100.887	36	1.783	32.0
0.936	100.936	36	1.784	33.8
0.985	100.985	36	1.784	35.6



soakaway

Stage-Discharge

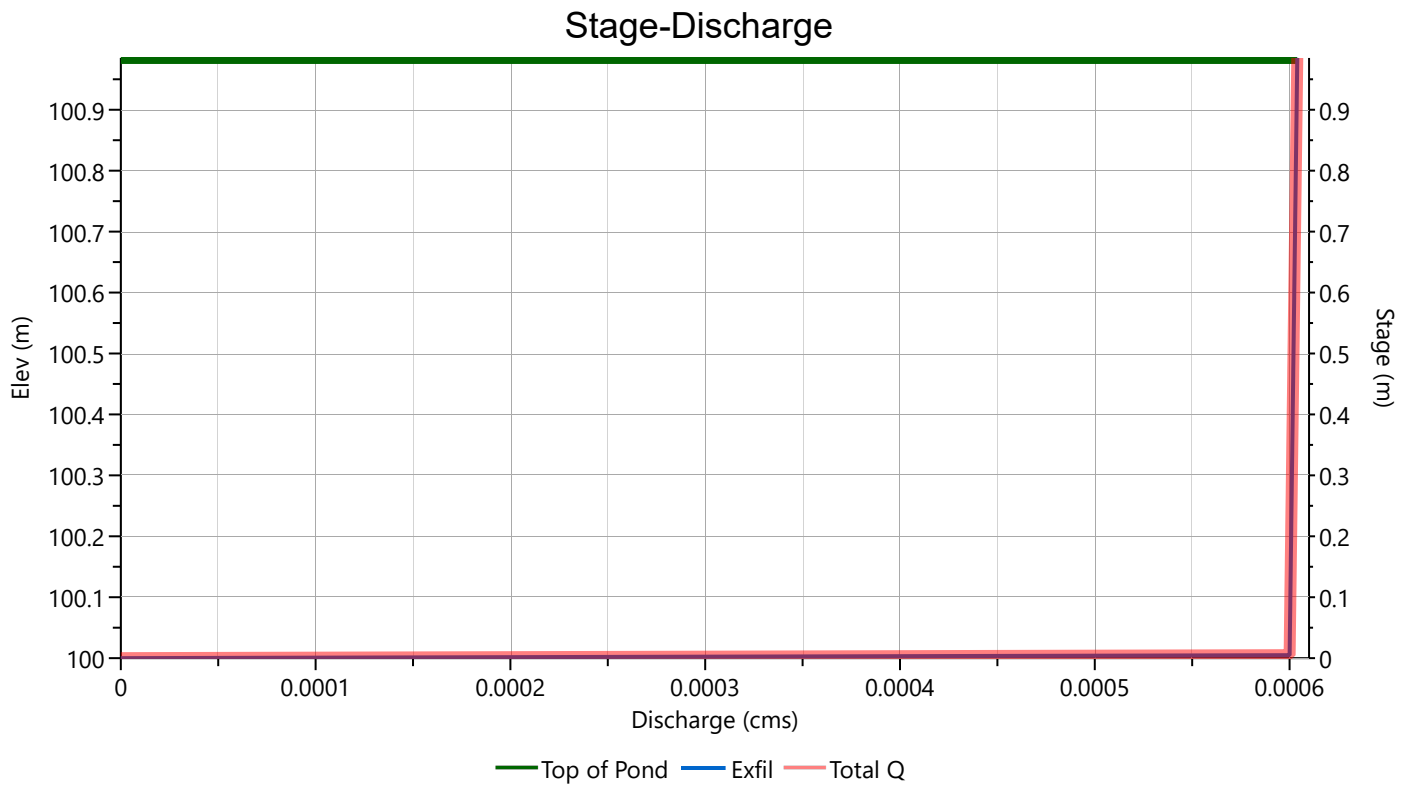
Culvert / Orifices	Culvert	Orifices		
		1	2	3
Rise, mm				
Span, mm				
No. Barrels	1			
Invert Elevation, m	100.000			
Orifice Coefficient, Co	0.600			
Length, m				
Barrel Slope, %				
N-Value, n	0.000			

Perforated Riser	
Hole Diameter, mm	
No. holes	
Invert Elevation, m	
Height, m	
Orifice Coefficient, Co	

Weirs	Riser*	Weirs		
		1	2	3
Shape / Type				
Crest Elevation, m				
Crest Length, m				
Angle, deg				
Weir Coefficient, Cw				

Ancillary	
Exfiltration, mm/hr	60.000**

*Routes through Culvert. **Exfiltration extracted from outflow hydrograph. Rate applied to contours.



soakaway

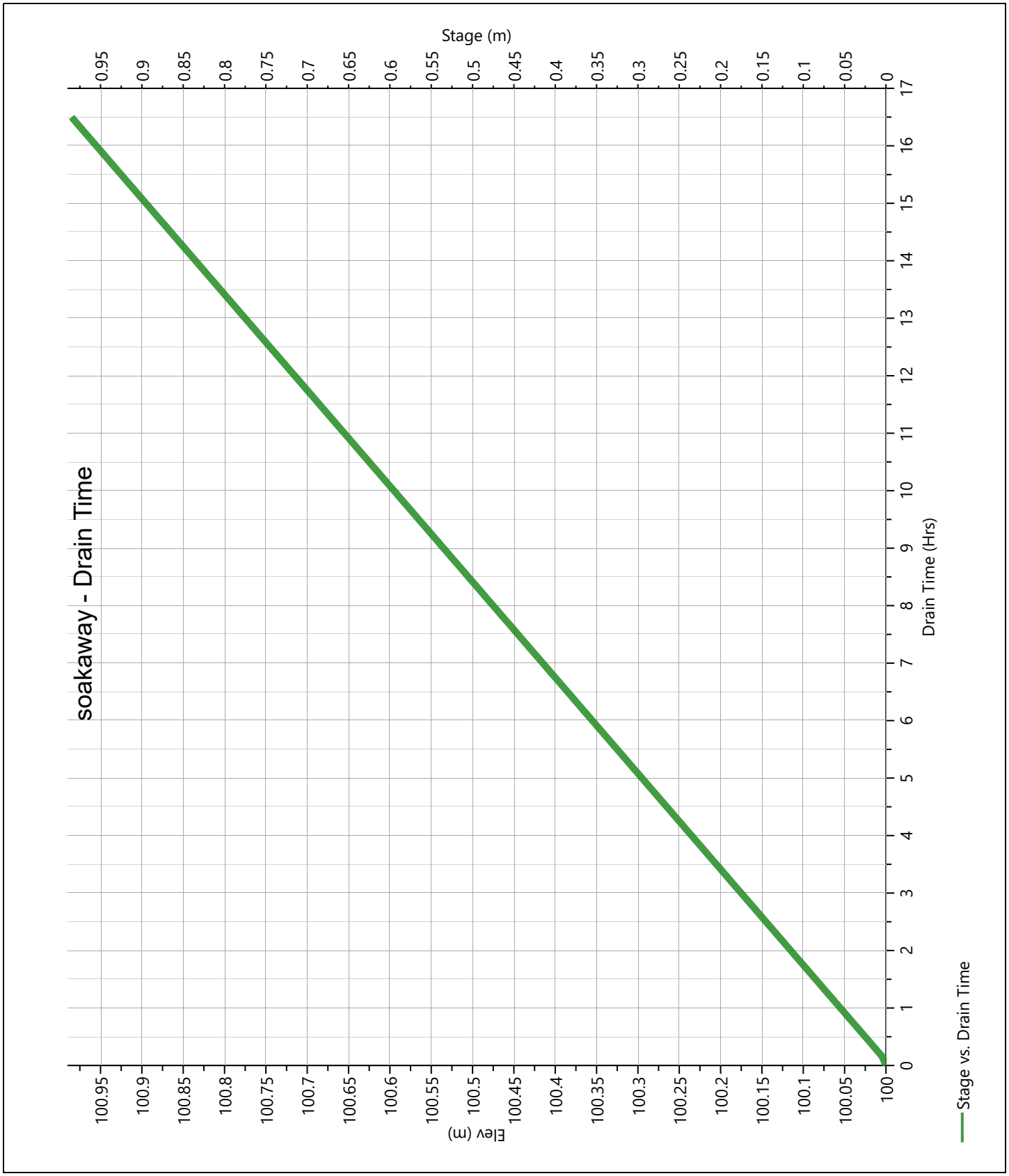
Stage-Storage-Discharge Summary

Stage (m)	Elev. (m)	Storage (cum)	Culvert (cms)	Orifices, cms			Riser (cms)	Weirs, cms			Pf Riser (cms)	Exfil (cms)	User (cms)	Total (cms)
				1	2	3		1	2	3				
0.000	100.000	0.0000										0.000		0.000
0.049	100.049	1.773										0.0006		0.0006
0.099	100.099	3.547										0.0006		0.0006
0.148	100.148	5.322										0.0006		0.0006
0.197	100.197	7.097										0.0006		0.0006
0.246	100.246	8.872										0.0006		0.0006
0.296	100.296	10.6										0.0006		0.0006
0.345	100.345	12.4										0.0006		0.0006
0.394	100.394	14.2										0.0006		0.0006
0.443	100.443	16.0										0.0006		0.0006
0.493	100.493	17.8										0.0006		0.0006
0.542	100.542	19.5										0.0006		0.0006
0.591	100.591	21.3										0.0006		0.0006
0.640	100.640	23.1										0.0006		0.0006
0.690	100.690	24.9										0.0006		0.0006
0.739	100.739	26.7										0.0006		0.0006
0.788	100.788	28.4										0.0006		0.0006
0.837	100.837	30.2										0.0006		0.0006
0.887	100.887	32.0										0.0006		0.0006
0.936	100.936	33.8										0.0006		0.0006
0.985	100.985	35.6										0.0006		0.0006

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

soakaway

Pond Drawdown



Hydrograph 5-yr Summary

Project Name: Individual Lots - Cty Rd 6 S

Hydrology Studio v 3.0.0.27

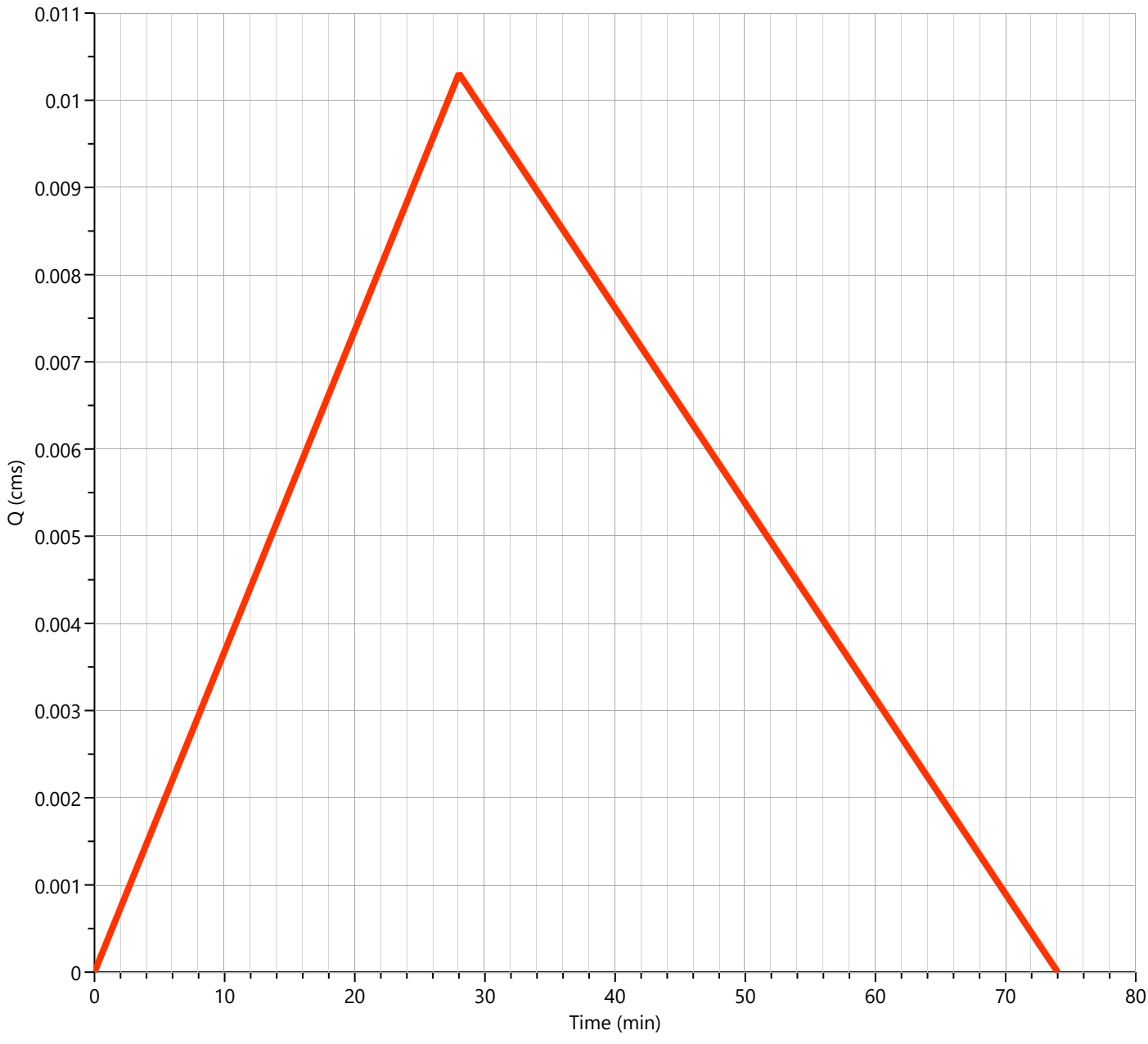
08-29-2023

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 102	0.0103	0.47	23.1	----		
2	Mod Rational	Post 202	0.0109	0.40	17.2	----		
3	Pond Route	Pond	0.0000	8.03	0.0000	2	100.423	15.2

Pre 102

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 0.0103 cms
Storm Frequency	= 5-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Runoff Volume	= 23.1 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 28.0 min
IDF Curve	= Wyevale.idf	Intensity	= 49 mm/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

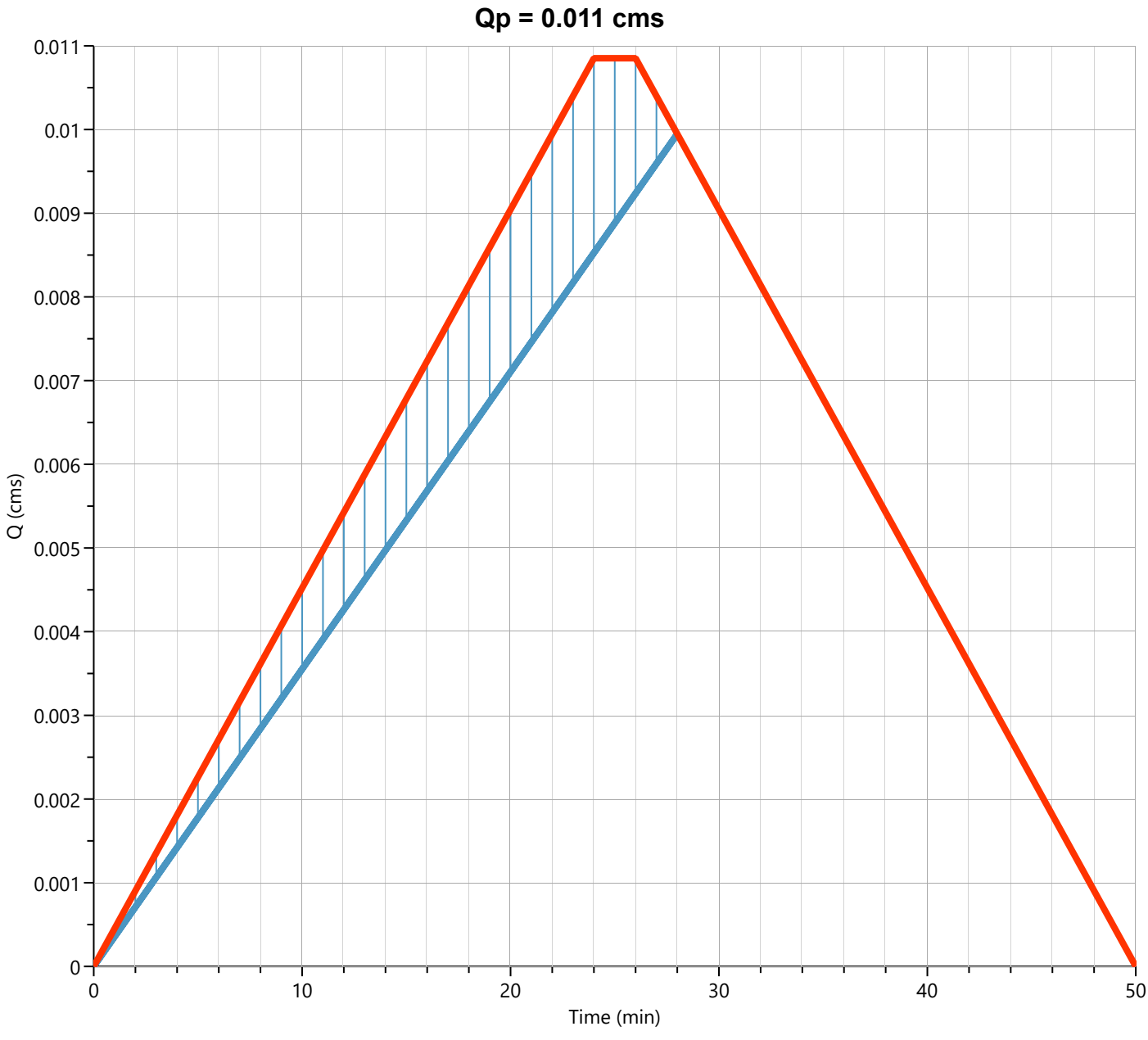
Hydrology Studio v 3.0.0.27

08-29-2023

Post 202

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0109 cms
Storm Frequency	= 5-yr	Time to Peak	= 0.40 hrs
Time Interval	= 1 min	Runoff Volume	= 17.2 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 24.0 min
IDF Curve	= Wyevale.idf	Intensity	= 52 mm/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 1.1 x Tc
Target Q	= 0.0100 cms	Required Storage	= 2.189 cum



Hydrograph Report

Hydrology Studio v 3.0.0.27

08-29-2023

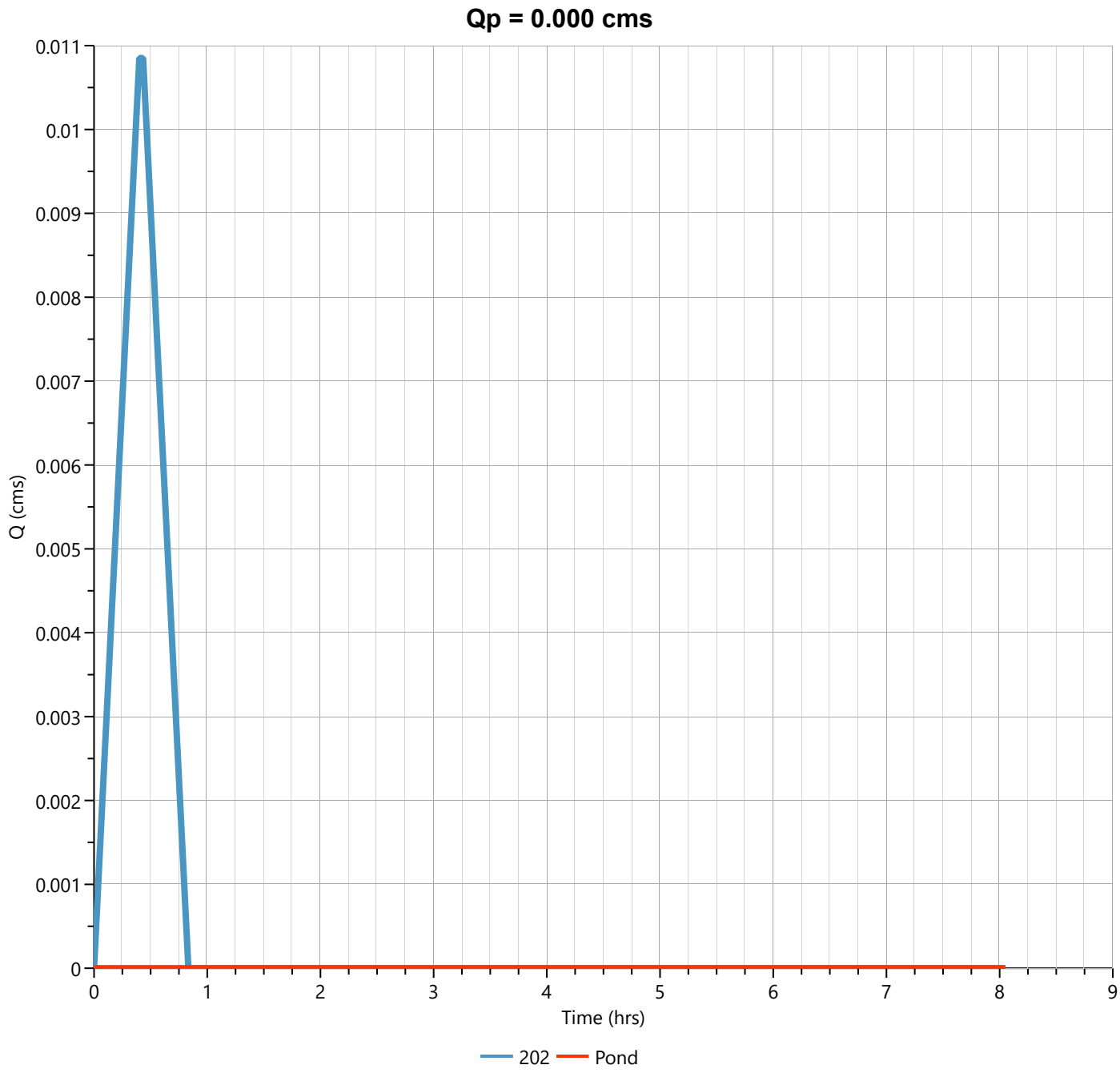
Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.0000 cms
Storm Frequency	= 5-yr	Time to Peak	= 8.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 0.0000 cum
Inflow Hydrograph	= 2 - 202	Max. Elevation	= 100.423 m
Pond Name	= soakaway	Max. Storage	= 15.2 cum

Pond Routing by Storage Indication Method

Center of mass detention time = 7.62 hrs



Hydrograph 10-yr Summary

Project Name: Individual Lots - Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 102	0.0120	0.47	26.9	----		
2	Mod Rational	Post 202	0.0126	0.40	20.0	----		
3	Pond Route	Pond	0.000	0.00	0.0000	2	100.500	18.0

Hydrograph Report

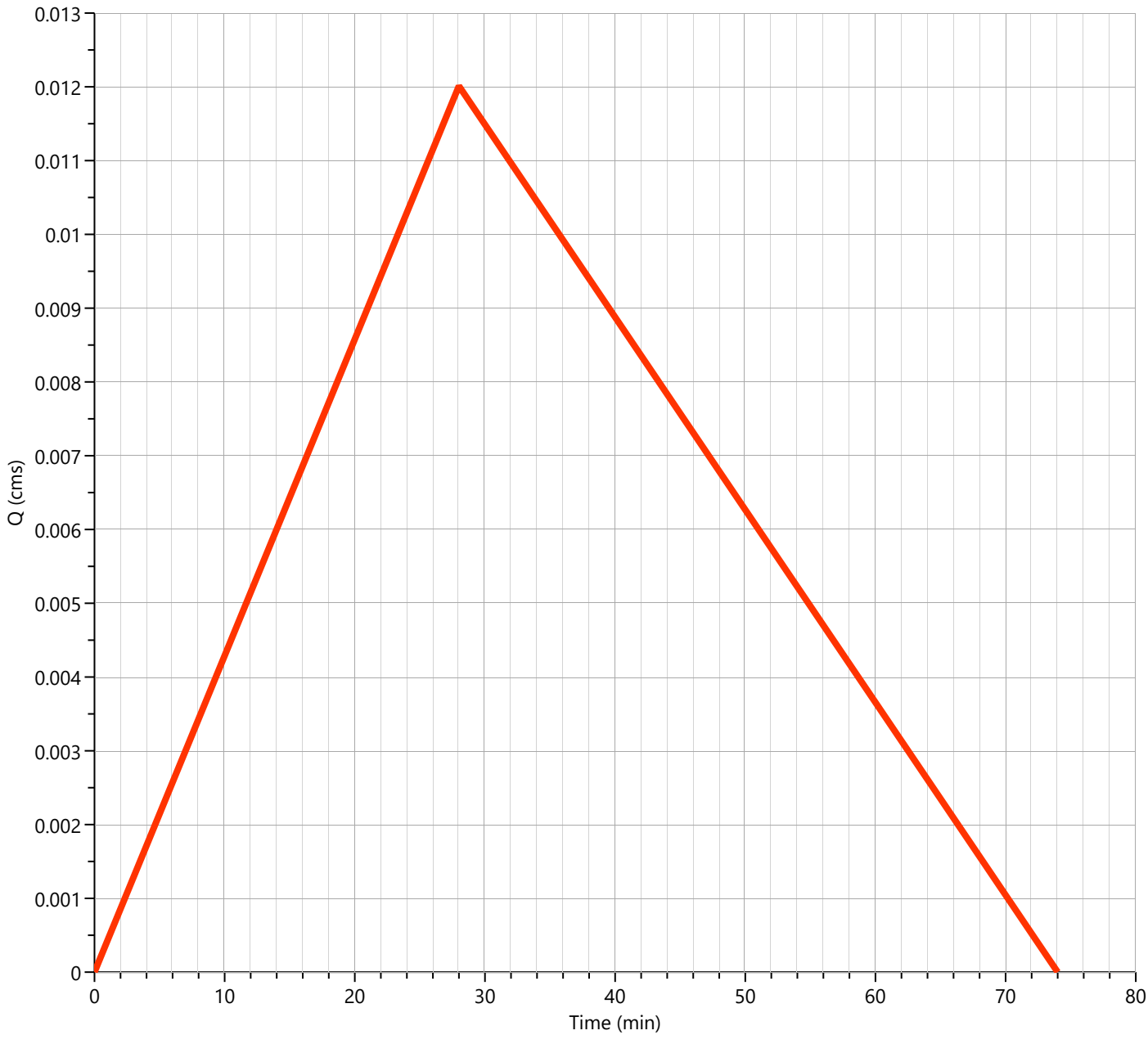
Hydrology Studio v 3.0.0.27

08-29-2023

Pre 102

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 0.0120 cms
Storm Frequency	= 10-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Runoff Volume	= 26.9 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 28.0 min
IDF Curve	= Wyevale.idf	Intensity	= 58 mm/hr
Freq. Corr. Factor	= 1.00	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

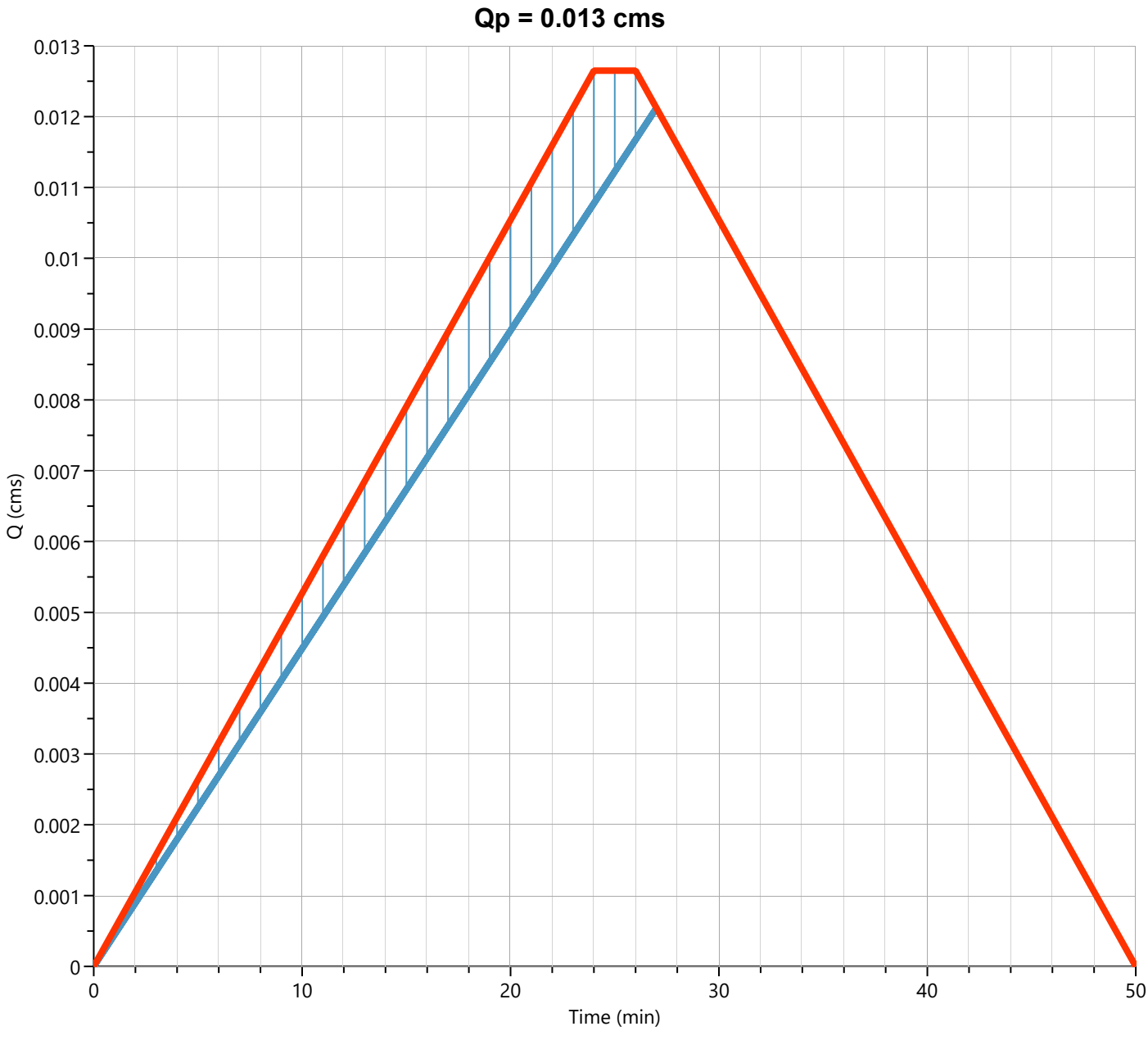
Hydrology Studio v 3.0.0.27

08-29-2023

Post 202

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0126 cms
Storm Frequency	= 10-yr	Time to Peak	= 0.40 hrs
Time Interval	= 1 min	Runoff Volume	= 20.0 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 24.0 min
IDF Curve	= Wyevale.idf	Intensity	= 61 mm/hr
Freq. Corr. Factor	= 1.00	Storm Duration	= 1.1 x Tc
Target Q	= 0.0120 cms	Required Storage	= 2.037 cum



Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cms
Storm Frequency	= 10-yr	Time to Peak	= 0.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 0.0000 cum
Inflow Hydrograph	= 2 - 202	Max. Elevation	= 100.500 m
Pond Name	= soakaway	Max. Storage	= 18.0 cum

Pond Routing by Storage Indication Method

Qp = 0.000 cms

Hydrograph 25-yr Summary

Project Name: Individual Lots - Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

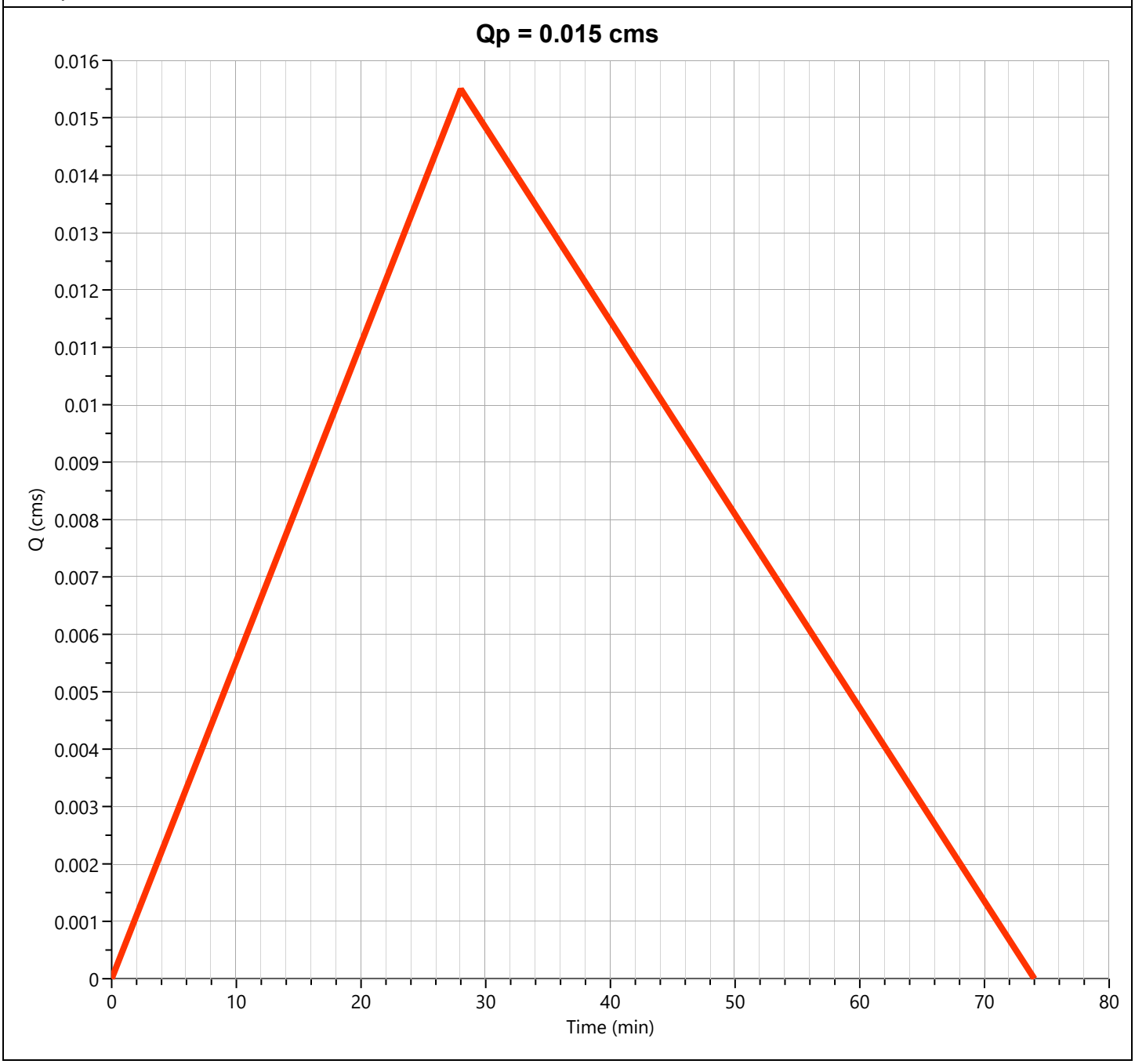
Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 102	0.0155	0.47	34.8	----		
2	Mod Rational	Post 202	0.0163	0.40	25.9	----		
3	Pond Route	Pond	0.000	0.00	0.0000	2	100.658	23.7

Hydrograph Report

Pre 102

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 0.0155 cms
Storm Frequency	= 25-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Runoff Volume	= 34.8 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 28.0 min
IDF Curve	= Wyevale.idf	Intensity	= 68 mm/hr
Freq. Corr. Factor	= 1.10	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

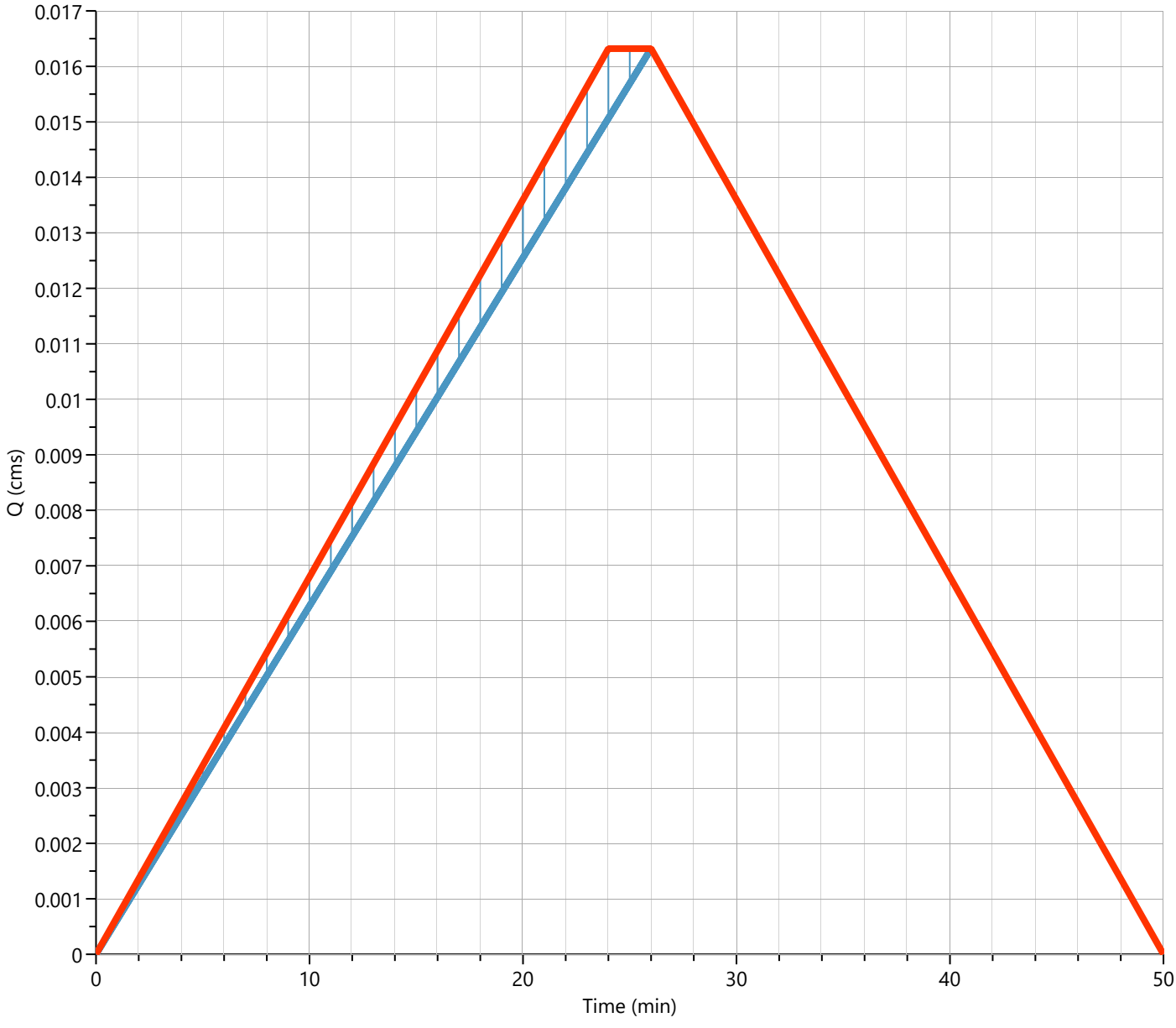
Hydrology Studio v 3.0.0.27

08-29-2023

Post 202

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0163 cms
Storm Frequency	= 25-yr	Time to Peak	= 0.40 hrs
Time Interval	= 1 min	Runoff Volume	= 25.9 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 24.0 min
IDF Curve	= Wyevale.idf	Intensity	= 71 mm/hr
Freq. Corr. Factor	= 1.10	Storm Duration	= 1.1 x Tc
Target Q	= 0.0160 cms	Required Storage	= 1.850 cum



Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cms
Storm Frequency	= 25-yr	Time to Peak	= 0.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 0.0000 cum
Inflow Hydrograph	= 2 - 202	Max. Elevation	= 100.658 m
Pond Name	= soakaway	Max. Storage	= 23.7 cum

Pond Routing by Storage Indication Method

Qp = 0.000 cms

Hydrograph 50-yr Summary

Project Name: Individual Lots - Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 102	0.0189	0.47	42.3	----		
2	Mod Rational	Post 202	0.0199	0.40	31.5	----		
3	Pond Route	Pond	0.0000	14.38	0.0000	2	100.811	29.2

Hydrograph Report

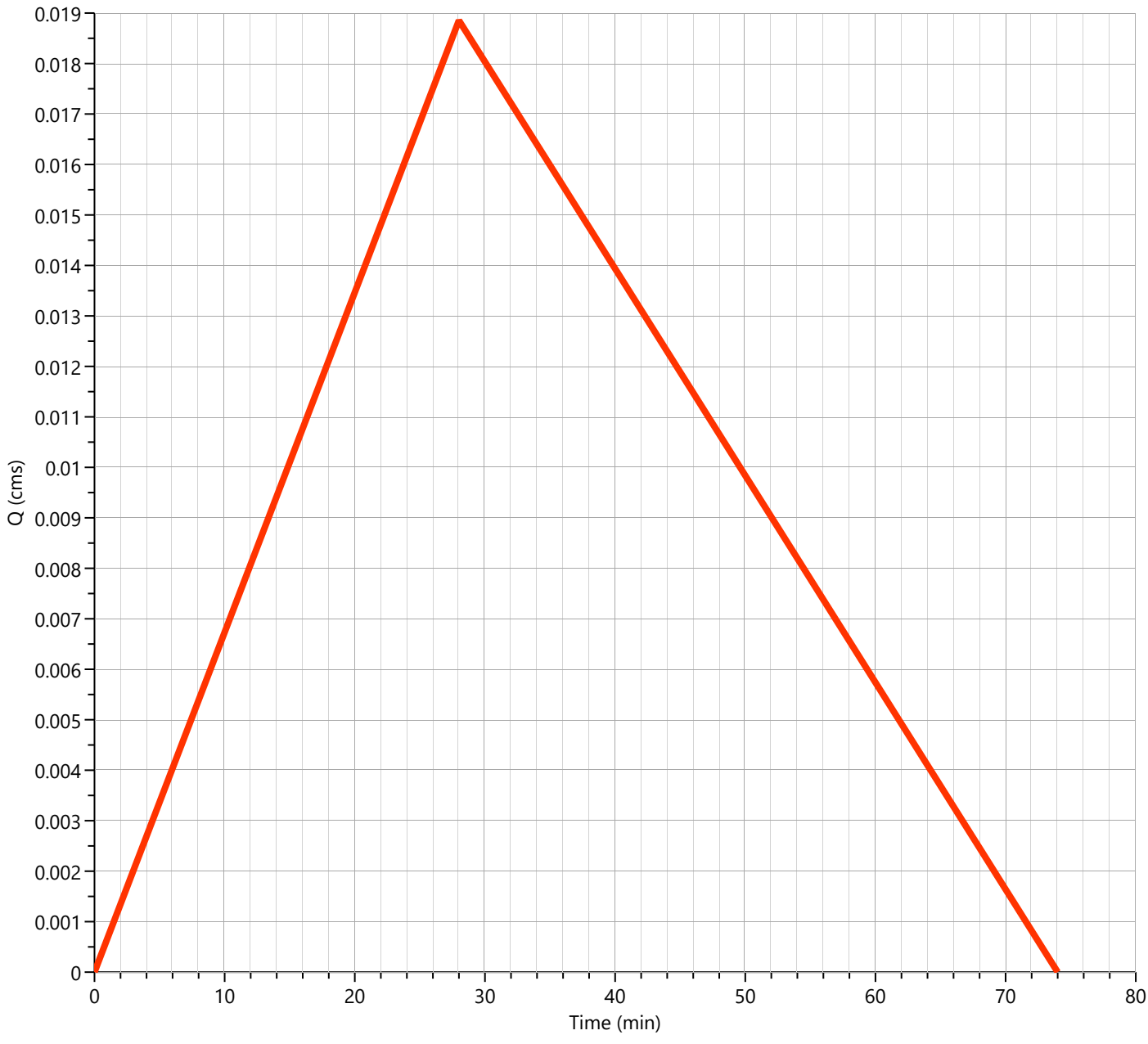
Hydrology Studio v 3.0.0.27

08-29-2023

Pre 102

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 0.0189 cms
Storm Frequency	= 50-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Runoff Volume	= 42.3 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 28.0 min
IDF Curve	= Wyevale.idf	Intensity	= 75 mm/hr
Freq. Corr. Factor	= 1.20	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

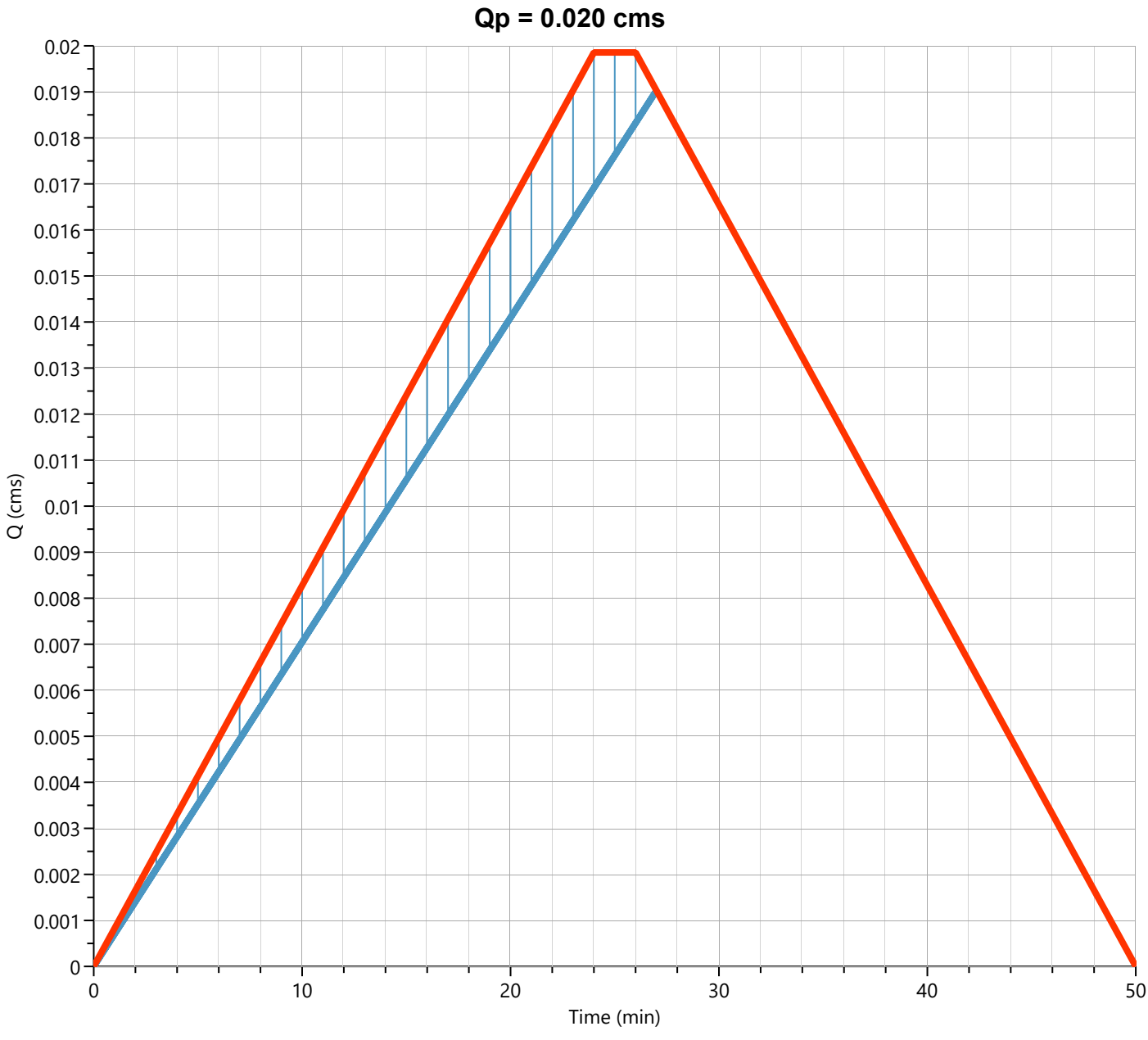
Hydrology Studio v 3.0.0.27

08-29-2023

Post 202

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0199 cms
Storm Frequency	= 50-yr	Time to Peak	= 0.40 hrs
Time Interval	= 1 min	Runoff Volume	= 31.5 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 24.0 min
IDF Curve	= Wyevale.idf	Intensity	= 79 mm/hr
Freq. Corr. Factor	= 1.20	Storm Duration	= 1.1 x Tc
Target Q	= 0.0190 cms	Required Storage	= 2.952 cum



Hydrograph Report

Hydrology Studio v 3.0.0.27

08-29-2023

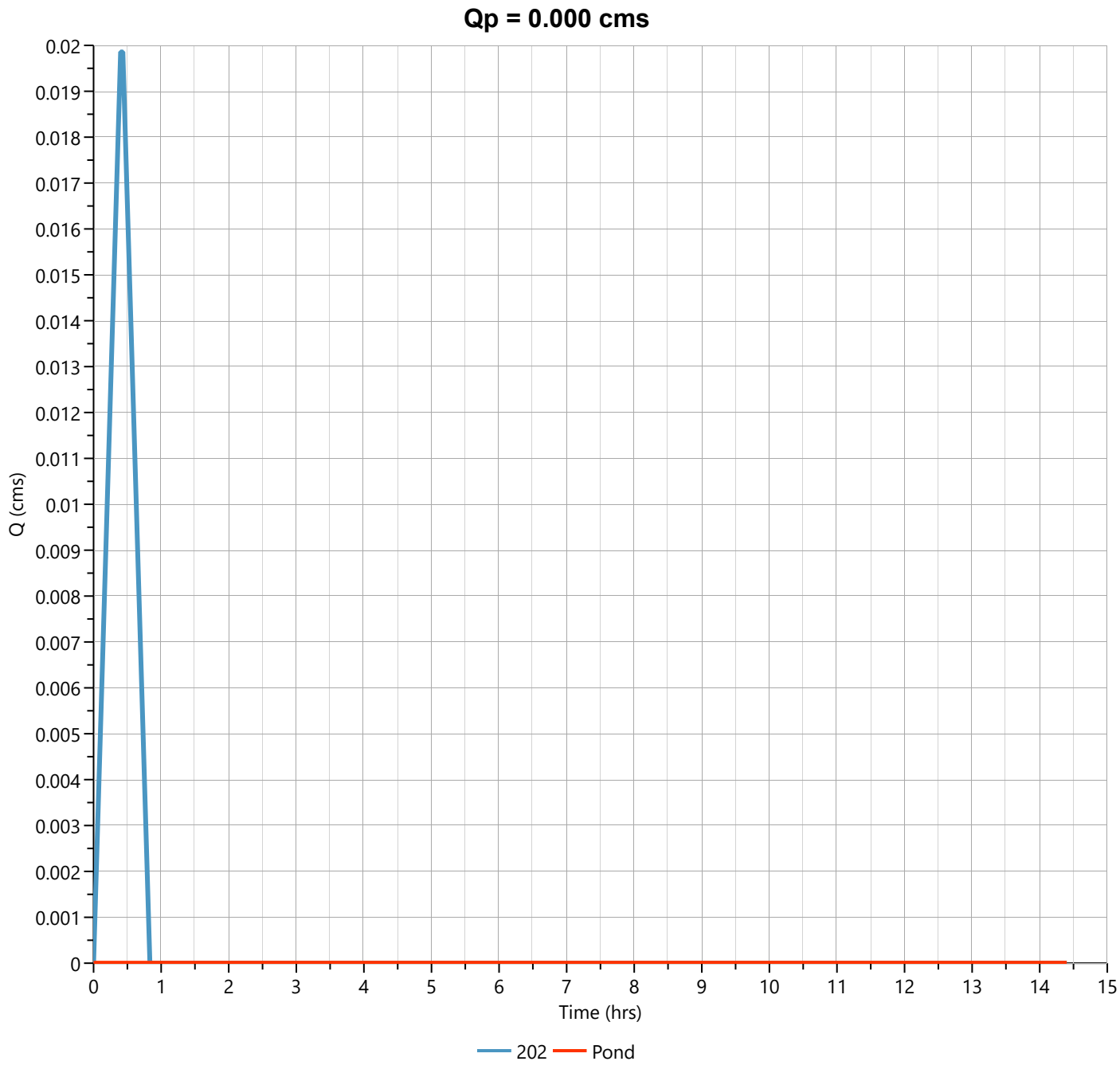
Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.0000 cms
Storm Frequency	= 50-yr	Time to Peak	= 14.38 hrs
Time Interval	= 1 min	Hydrograph Volume	= 0.0000 cum
Inflow Hydrograph	= 2 - 202	Max. Elevation	= 100.811 m
Pond Name	= soakaway	Max. Storage	= 29.2 cum

Pond Routing by Storage Indication Method

Center of mass detention time = 13.97 hrs



Hydrograph 100-yr Summary

Project Name: Individual Lots - Cty Rd 6 S

08-29-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cms)	Time to Peak (hrs)	Hydrograph Volume (cum)	Inflow Hyd(s)	Maximum Elevation (m)	Maximum Storage (cum)
1	Rational	Pre 102	0.0216	0.47	48.4	----		
2	Mod Rational	Post 202	0.0227	0.40	36.0	----		
3	Pond Route	Pond	0.000	0.00	0.0000	2	100.934	33.7

Hydrograph Report

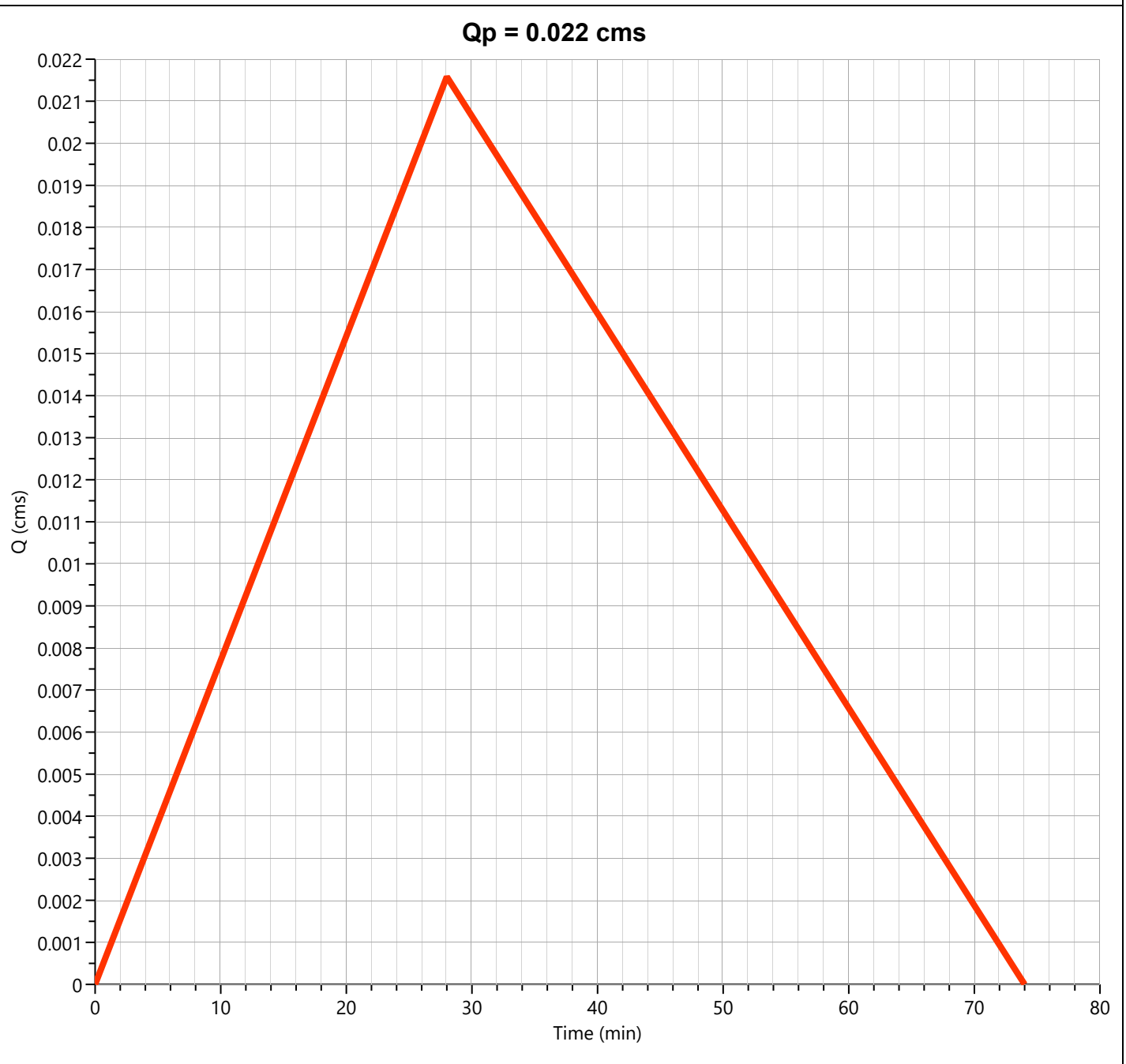
Hydrology Studio v 3.0.0.27

08-29-2023

Pre 102

Hyd. No. 1

Hydrograph Type	= Rational	Peak Flow	= 0.0216 cms
Storm Frequency	= 100-yr	Time to Peak	= 0.47 hrs
Time Interval	= 1 min	Runoff Volume	= 48.4 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 28.0 min
IDF Curve	= Wyevale.idf	Intensity	= 83 mm/hr
Freq. Corr. Factor	= 1.25	Asc/Rec Limb Factors	= 1/1.67



Hydrograph Report

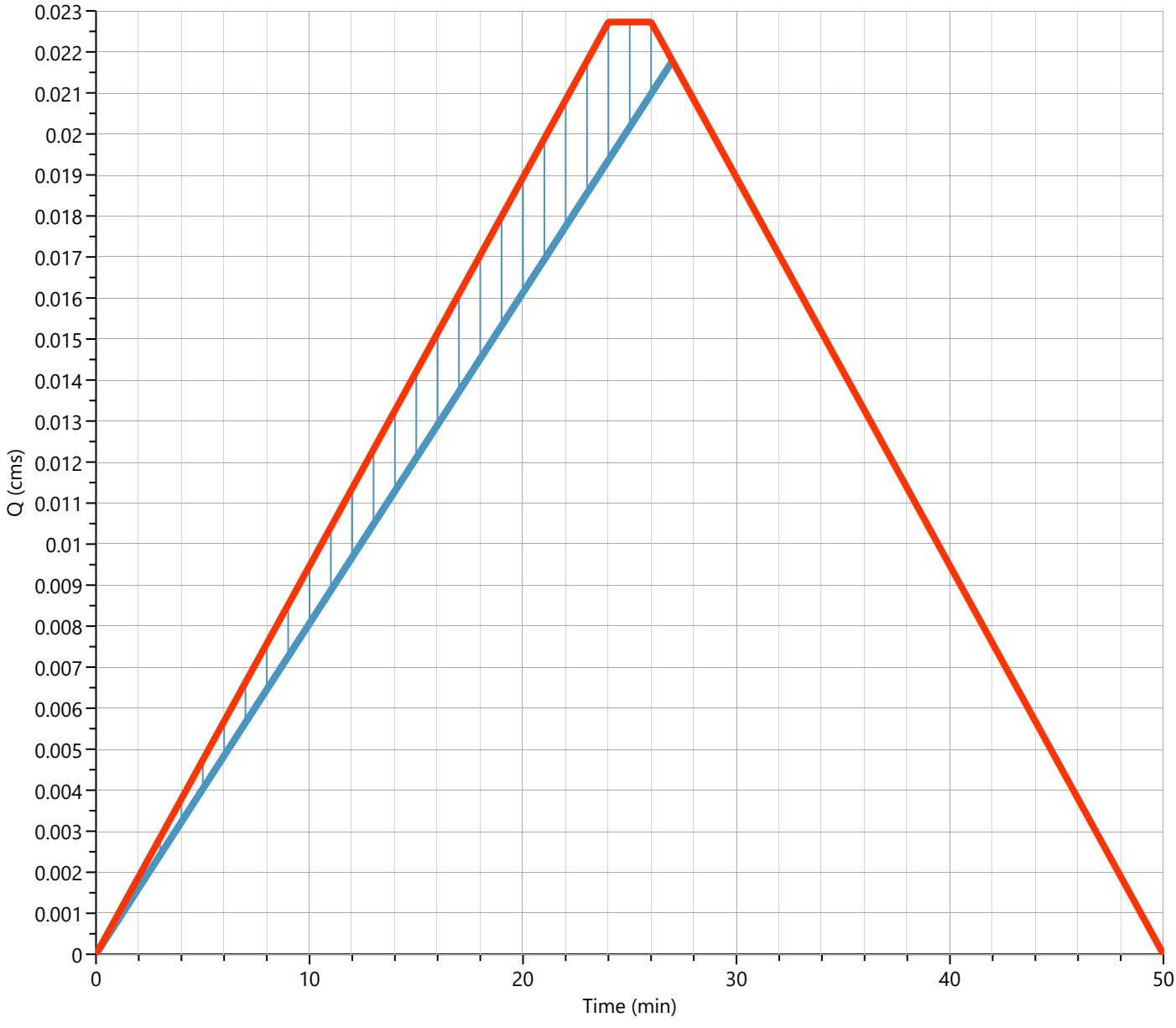
Hydrology Studio v 3.0.0.27

08-29-2023

Post 202

Hyd. No. 2

Hydrograph Type	= Mod Rational	Peak Flow	= 0.0227 cms
Storm Frequency	= 100-yr	Time to Peak	= 0.40 hrs
Time Interval	= 1 min	Runoff Volume	= 36.0 cum
Drainage Area	= 0.3 ha	Runoff Coeff.	= 0.25
Tc Method	= User	Time of Conc. (Tc)	= 24.0 min
IDF Curve	= Wyevale.idf	Intensity	= 87 mm/hr
Freq. Corr. Factor	= 1.25	Storm Duration	= 1.1 x Tc
Target Q	= 0.0220 cms	Required Storage	= 3.001 cum



Pond

Hyd. No. 3

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cms
Storm Frequency	= 100-yr	Time to Peak	= 0.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 0.0000 cum
Inflow Hydrograph	= 2 - 202	Max. Elevation	= 100.934 m
Pond Name	= soakaway	Max. Storage	= 33.7 cum

Pond Routing by Storage Indication Method

Qp = 0.000 cms

IDF Report

IDF filename: Wyevale.idf

Hydrology Studio v 3.0.0.27

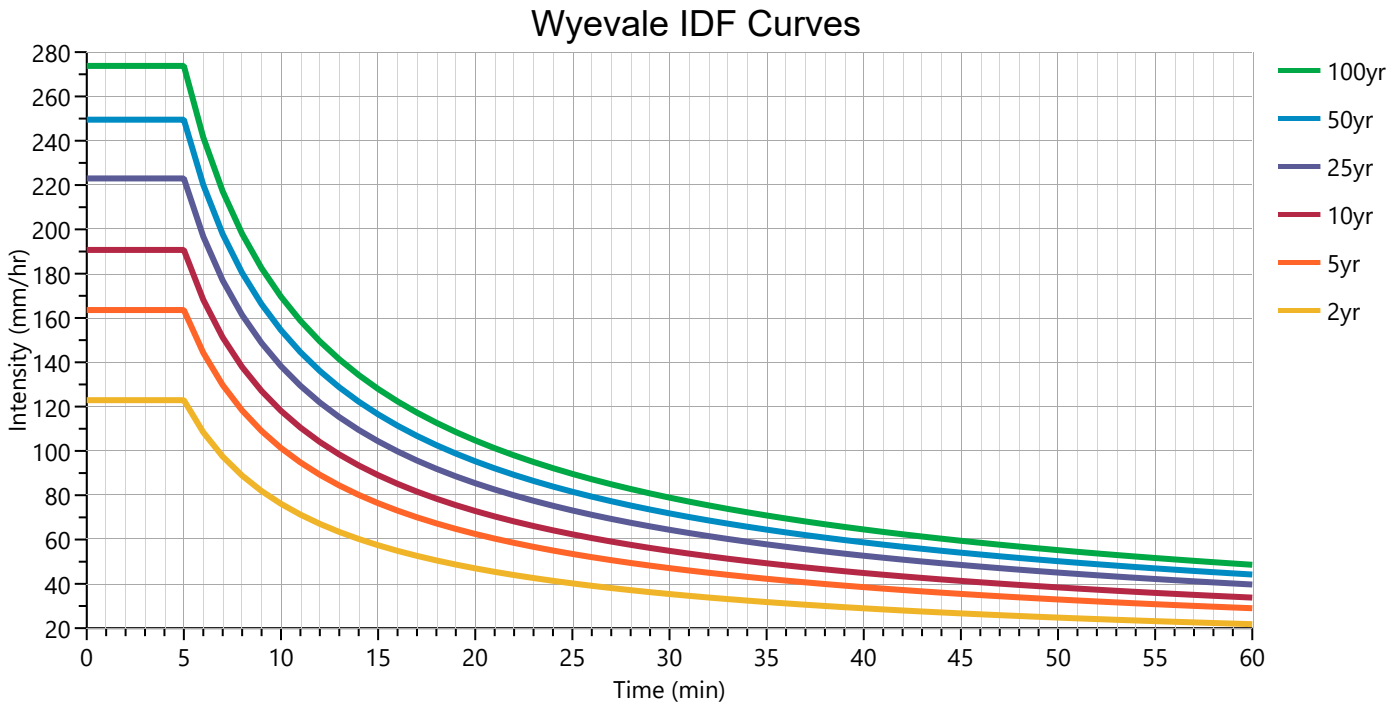
08-29-2023

Equation Coefficients	Intensity = B / (Tc + D)^E (mm/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
B	0.0000	385.1511	0.0000	512.8892	598.0472	697.0923	782.5577	857.3978	
D	0.0000	0.1000	0.0000	0.1000	0.1000	0.1000	0.1000	0.1000	
E	0.0000	0.7011	0.0000	0.7014	0.7015	0.6996	0.7016	0.7007	

Minimum Tc = 5 minutes

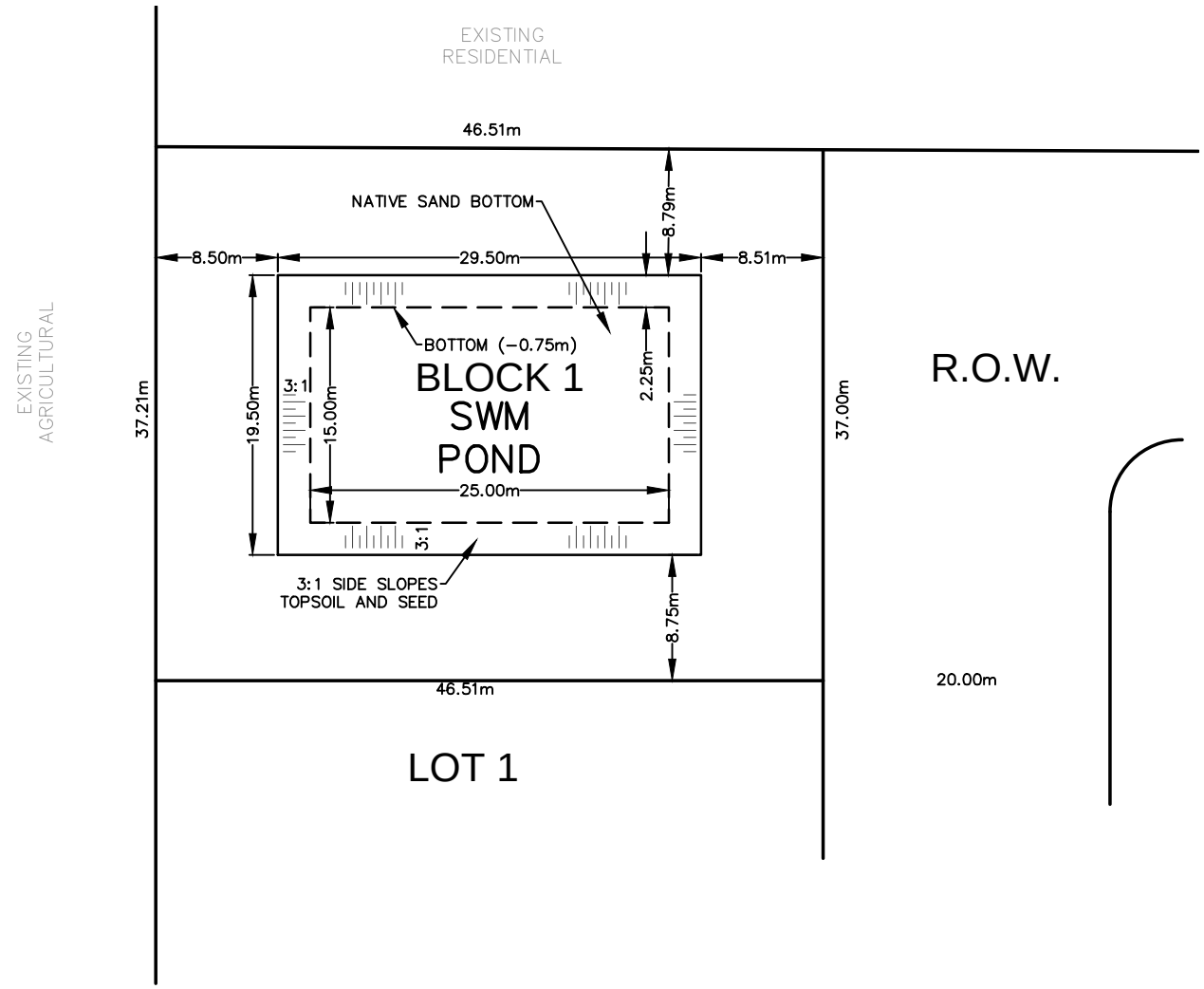
Tc (min)	Intensity Values (mm/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
Cf	1.00	1.00	1.00	1.00	1.00	1.10	1.20	1.25	
5	0	122.901	0	163.581	190.711	222.984	249.508	273.771	
10	0	76.120	0	101.296	118.088	138.251	154.484	169.611	
15	0	57.418	0	76.399	89.060	104.347	116.505	127.960	
20	0	46.985	0	62.512	72.869	85.423	95.322	104.721	
25	0	40.209	0	53.492	62.354	73.127	81.565	89.625	
30	0	35.400	0	47.093	54.894	64.400	71.805	78.913	
35	0	31.785	0	42.281	49.284	57.835	64.466	70.857	
40	0	28.951	0	38.510	44.888	52.690	58.715	64.544	
45	0	26.662	0	35.464	41.336	48.532	54.069	59.443	
50	0	24.767	0	32.943	38.397	45.090	50.224	55.221	
55	0	23.169	0	30.816	35.918	42.187	46.981	51.660	
60	0	21.800	0	28.995	33.795	39.700	44.204	48.610	

Cf = Correction Factor applied to Rational Method runoff coefficient.



Appendix “D”

SWM Controls



STORM RETURN FREQUENCY	VOLUME REQ'D (cu.m.)	WATER DEPTH (m)	DRAWDOWN TIME (hrs)
2YR STM	51.3	0.130	2.25
5YR STM	77.9	0.196	3.32
10YR STM	96.0	0.238	4.01
25YR STM	133.0	0.320	5.40
50YR STM	169.0	0.398	6.69
100YR STM	199.0	0.460	7.75
TOTAL VOLUME	354.0	0.75	

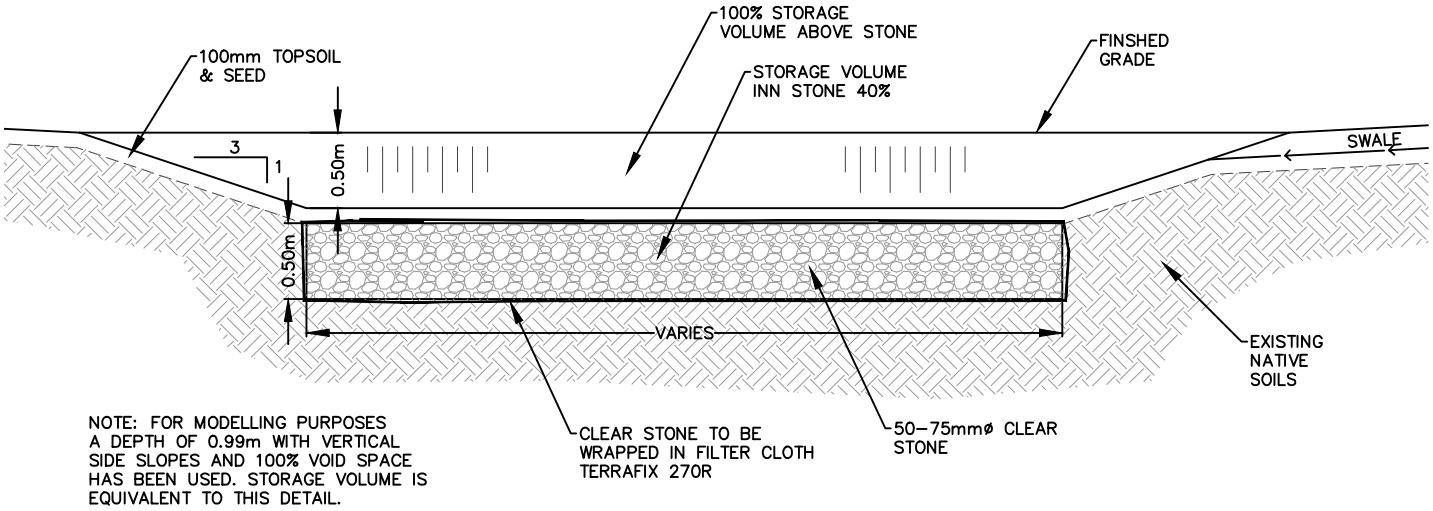
ConSALtech
Engineering Solutions

1249 Marshall Road, Tiny, Ontario, L0K 2E1
Tel: 705-722-1878

PROPOSED STORMWATER
RETENTION/INFILTRATION POND

Scale 1:500

Figure No. 3



NOTE: FOR MODELLING PURPOSES A DEPTH OF 0.99m WITH VERTICAL SIDE SLOPES AND 100% VOID SPACE HAS BEEN USED. STORAGE VOLUME IS EQUIVALENT TO THIS DETAIL.

ConSALtech
Engineering Solutions

1249 Marshall Road, Tiny, Ontario, L0K 2E1
Tel: 705-722-1878

PROPOSED INDIVIDUAL LOT SOAKAWAY PIT GENERAL DETAIL

Scale NTS	Figure No. 4