

STORMWATER NARRATIVE

FOR

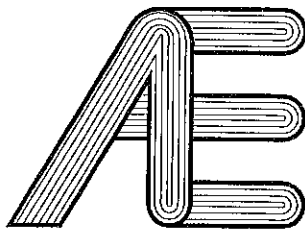
VATRA AUTO SERVICES, LLC.

Lot 78, Block 168.02

North Brunswick, NJ

Middlesex County, New Jersey

BY



**AMERTECH
ENGINEERING, INC.**

ENGINEERS, SURVEYORS AND PLANNERS

757 RIDGEWOOD AVENUE, NORTH BRUNSWICK, N.J. 08802
(732)828-3635 * (732)249-2215 * FAX (732)249-0859
E-MAIL: main@amertechengineering.com

May 4, 2022

PROJECT NO. 21-009



SHARIF H. ALY, P.E., PP, CME
NJ Professional Engineer Lic. No. 34669

FOR THE FIRM

PROJECT LOCATION AND SITE DESCRIPTION:

The existing mechanic repair shop site consists of approximately 1.01± acres located north side of Ridgewood Avenue in North Brunswick, Middlesex County, New Jersey. Property is also known as lot 78, in block 168.02, as per tax map sheet #46 in the North Brunswick.

The property is currently developed with an existing one-story mechanic repair shop that is approximately 4,267 SF and the site contains driveways with broken pavement and gravel.

The applicant is proposing to connect a 5,240 SF building addition to the existing building as shown on the site plan. The use for this addition is for autobody repair mechanic shop/storage. Parking for the proposed site plan is provided on site as required by the township ordinance.

DRAINAGE ANALYSIS:

The purpose of this narrative report is to show compliance with the new March 2, 2021 NJDEP stormwater regulations, as well as to show compliance with the new March 2021 standards for Borough of Mount Arlington as follows. Exhibits and Appendices to support our analysis are provided at the end of this report.

- **Stormwater Quality Standards**

The new March 2021 stormwater regulations for Water Quality will apply to projects that create more than 1/4 acre of regulated motor vehicle surface. The existing parking areas are being reconfigured to accommodate parking for the apartment buildings, and includes overlay and repaving to adjust existing pavement to proposed grades. Overall, the total amount of motor vehicle surface after the reconfiguration will be reduced by 7,099sf and therefore the project does not need to comply with the NJDEP March 2 regulations or new Borough ordinance because it does not create more than 1/4 acre of motor vehicle surface.

- **Groundwater Recharge Standards**

The new March 2021 stormwater regulations for Groundwater Recharge and new Borough ordinance require recharge analysis if the proposed development exceeds the amount of existing impervious coverage. The proposed redevelopment of the site has a net decrease of 10,586 square feet of impervious coverage and therefore does not need to comply with the new regulations for recharge.

- **Stormwater Runoff Quantity Standards**

The new March 2021 stormwater regulations for control of Water Quantity requires that major projects demonstrate through analysis that post-construction runoff hydrographs for the 2, 10 and 100-year storm events do not exceed the pre-construction runoff hydrographs for the same storm events. The proposed redevelopment of the property improves the existing condition by removing 142 square feet of impervious coverage. Runoff hydrographs have been created for both the existing and proposed conditions of the site for 2, 10, and 100-year storms and are provided in the Appendix. The hydrographs demonstrate that post-development hydrographs do not exceed the pre-developed condition and therefore comply with the new stormwater regulations.

PRE-DEVELOPMENT CONDITION:

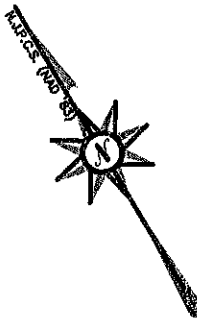
Presently, based off the sites existing conditions/topography, the site drains via sheet flow towards the rear of the site.

LOT 72

151.83'

S 67°36'38" E

20' WIDE SCREEN PLANTING STRIP (FILED MAP 'B')



LOT 76

**BLOCK 168.02
LOT 78**

AREA=47,884 SQ.FT.± (1.099 Ac.±)

DRAINAGE AREA= 1.01± AC.

LOT 79

N 31°18'12" E

307.47'

331.00'

S 31°18'12" W

LOT 77

EX. 1 STY. BRICK/MASONRY BUILDING
(MECHANIC REPAIR SHOP/OFFICE)
(777 RIDGEWOOD AVENUE)
FF=121.20

#757
EX. 2 STY. BUILDING

BEGINNING POINT

(1,103.03 To Newton St.)

N 58°41'43" W

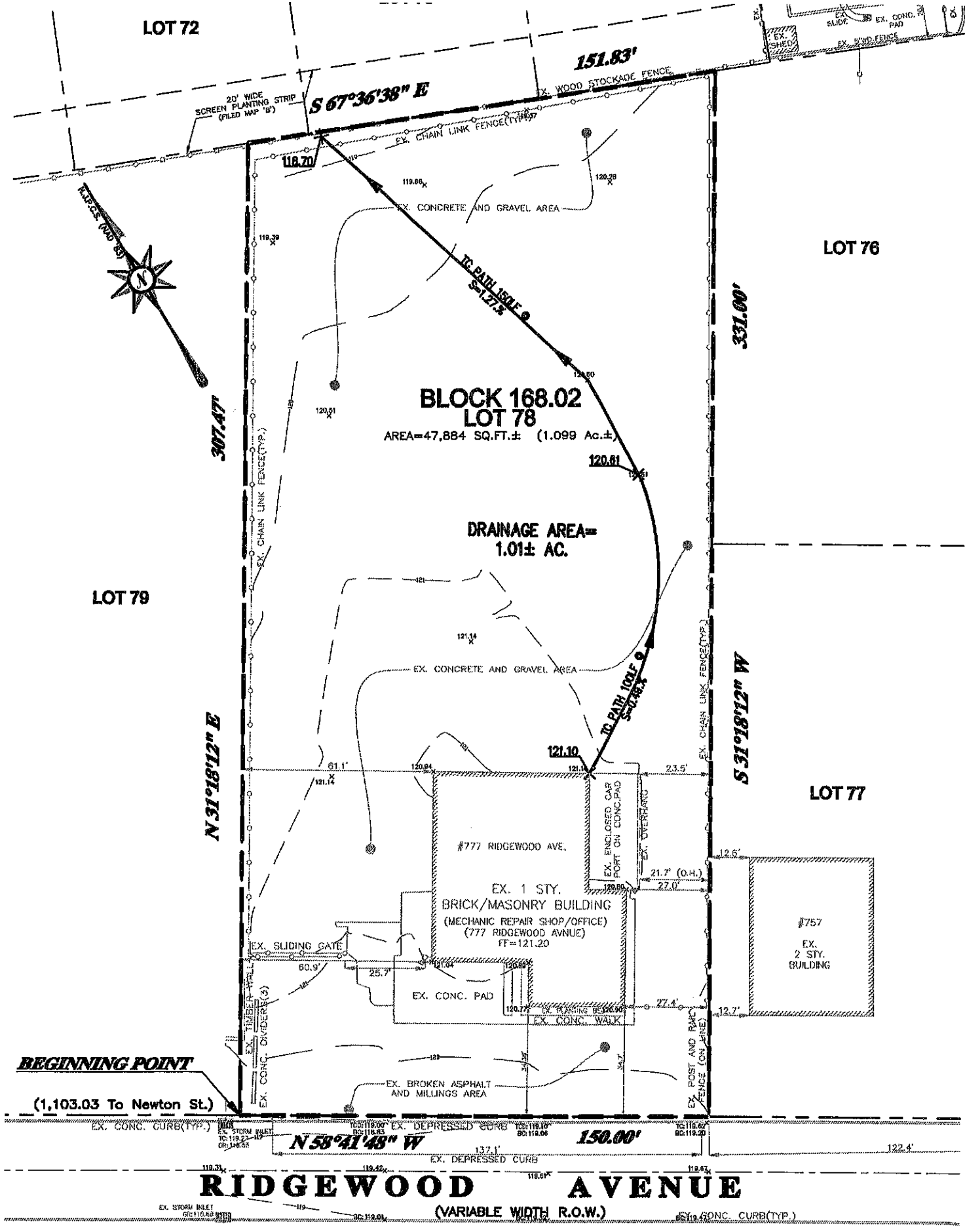
150.00'

RIDGEWOOD AVENUE

(VARIABLE WIDTH R.O.W.)

EX. STORM INLET
12'x18'x24"
OR 18'x24"

EX. CONC. CURB (TYP.)



**PRE-DEVELOPMENT
DRAINAGE AREA**

Pre-Area=Drainage area in acres = ±1.01 Acres (NktB "HSG C", Nixon Variant-Urban Land)

Land use/Cover:

Broken Pavement/Pavement/Concrete= ±1.01 Acres (NktB "HSG C", C=0.99)

Time of Concentration "Tc"= 3 minutes

The rational method shall be utilized to calculate the site peak runoff. The following table summarizes the Pre-Development Site Peak Runoff:

**TABLE-1
PRE-DEVELOPMENT SITE PEAK RUNOFF AREA**

Storm Frequency	Site Peak Runoff "CFS"
2	6.30
10	7.88
100	10.60

POST-DEVELOPMENT CONDITION:

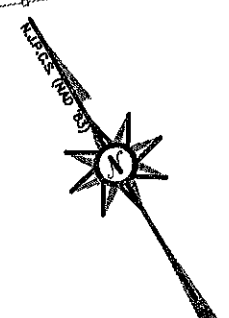
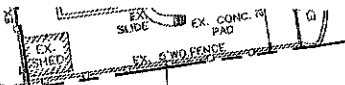
The sites proposed conditions drains via sheet flow towards the rear yard of the site. The sites impervious coverage was reduced from the existing conditions due to the removal and top soil planting. The existing conditions impervious coverage was 47,884 SF, the proposed impervious coverage is now 37,298 SF. Approximately 11,000 SF of grass area is proposed for the site plan.

LOT 72

151.83'

S 67°36'38" E

20' WIDE SCREEN PLANTING STRIP (FILED MAP '9')



LOT 76

DRAINAGE AREA= 1.01± AC.
BLOCK 168.02
LOT 78
AREA=47,884 SQ.FT.± (1.099 Ac.±)

331.00'

REMOVE EX. GRAVEL & REPLACE W/ TOPSOIL & SEED TO ESTABLISH GRASS CORNER

REMOVE EX. GRAVEL & REPLACE W/ TOPSOIL & SEED TO ESTABLISH GRASS CORNER

LOT 79

N 31°18'12" E

PROPOSED 1 STORY EQUIPMENT STORAGE ADDITION (5,240SF±)
FLOOR ELEV.=121.20

EX. CONCRETE AND GRAVEL AREA

S 31°18'12" W

LOT 77

#777 RIDGEWOOD AVE.

EX. 1 STY. BRICK/MASONRY BUILDING (MECHANIC REPAIR SHOP/OFFICE) (777 RIDGEWOOD AVENUE) FF=121.20

#757 EX. 2 STY. BUILDING

SLIDING GATE

EX. CONC. PAD

MAX SLOPE ADA AREA 2X

EX. PLANTING BED

EX. CONC. WALK

IRON ROD FOUND 0.3' W

BEGINNING POINT

(1,103.03 To Newton St.)

EX. CONC. CURB(TYP.)

EX. STORM INLET

N 58°41'48" W

EX. DEPRESSED CURB

150.00'

EX. CONC. CURB(TYP.)

RIDGEWOOD AVENUE

(VARIABLE WIDTH R.O.W.)

EX. STORM INLET

EX. CONC. CURB(TYP.)

**POST-DEVELOPMENT
DRAINAGE AREAS**

Post-Area =Drainage area in acres = ±1.01 Acres (NktB "HSG C", Nixon Variant-Urban Land)

Land use/Cover:

Broken Pavement/Pavement/Concrete= ±0.86 Acres (NktB "HSG C", C=0.99)

Grass= ±0.24 Acres (NktB "HSG C", C=0.51)

Ccomp= 0.89

Time of Concentration "Tc"= 3 minutes

The rational method shall be utilized to calculate the site peak runoff. The following table summarizes the Post-development Site Peak runoff.

**TABLE-2
POST-DEVELOPMENT SITE PEAK RUNOFF AREA**

Storm Frequency	SitePeak Runoff "CFS"
2	6.17
10	7.72
100	10.38

A comparison between Pre and Post-development site runoff area are summarized in Table-3:

**TABLE-3
COMPARISON
PRE-DEVELOPMENT AREA VS. POST-DEVELOPMENT SITE PEAK RUNOFF**

Storm Frequency	Pre-Site Peak Runoff "CFS"	Post-Site Peak Runoff "CFS"
2	6.30	6.17
10	7.88	7.72
100	10.60	10.40

CONCLUSION:

From the above calculations we conclude that there is a slight decrease in site run off from Pre-Development conditions to Post-Development conditions. This is due to the decrease in impervious coverage on site. This analysis shows that the proposed site peak runoff complies with the NJDEP BMP manual and the revised stormwater regulations.

Pre-Development
Site Peak Runoff

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve v9.01

Hyd. No. 1

Pre-Drainage Area

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.30	0.00	0.00	
Land slope (%)	= 0.49	0.00	0.00	
Travel Time (min)	= 2.09	+ 0.00	+ 0.00	= 2.09
Shallow Concentrated Flow				
Flow length (ft)	= 150.00	0.00	0.00	
Watercourse slope (%)	= 1.27	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 2.29	0.00	0.00	
Travel Time (min)	= 1.09	+ 0.00	+ 0.00	= 1.09
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				3.00 min

Hydrograph Report

Hydraflow Hydrographs by Intellsolve v9.01

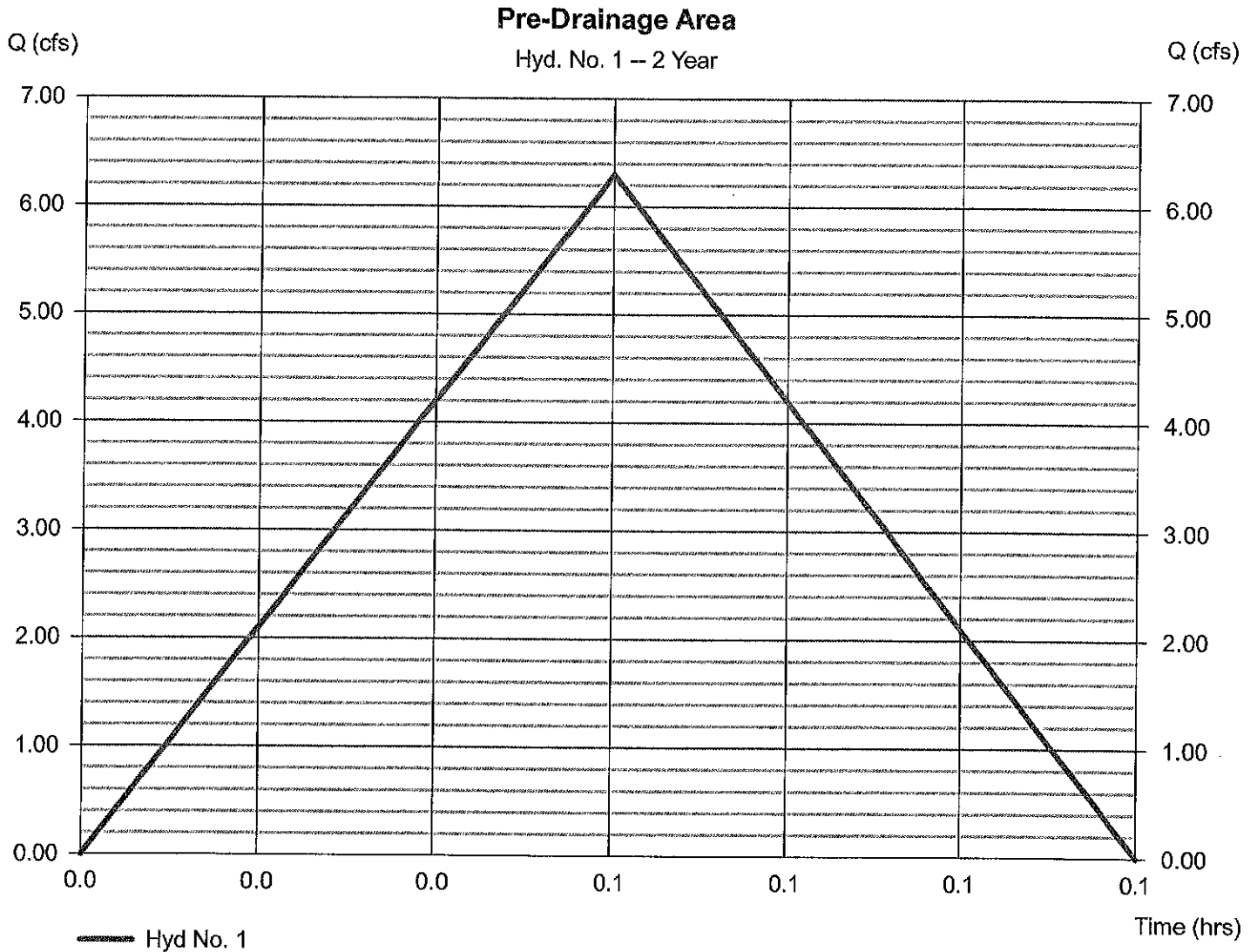
Wednesday, May 4, 2022

Hyd. No. 1

Pre-Drainage Area

Hydrograph type = Rational
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 1.010 ac
Intensity = 6.301 in/hr
IDF Curve = SampleFHA.idf

Peak discharge = 6.300 cfs
Time to peak = 0.05 hrs
Hyd. volume = 1,134 cuft
Runoff coeff. = 0.99
Tc by TR55 = 3.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.01

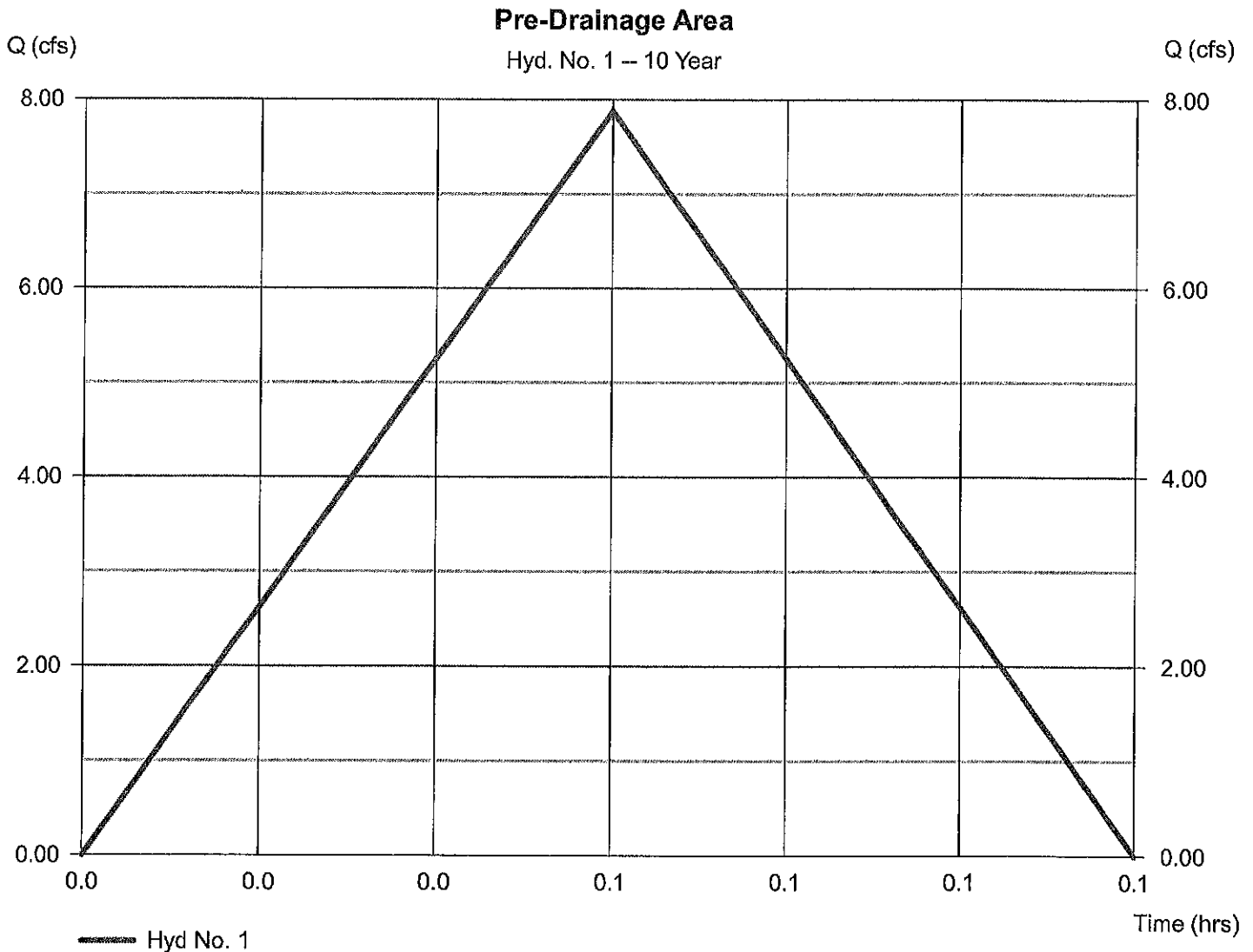
Wednesday, May 4, 2022

Hyd. No. 1

Pre-Drainage Area

Hydrograph type = Rational
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 1.010 ac
Intensity = 7.880 in/hr
IDF Curve = SampleFHA.idf

Peak discharge = 7.879 cfs
Time to peak = 0.05 hrs
Hyd. volume = 1,418 cuft
Runoff coeff. = 0.99
Tc by TR55 = 3.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intellsolve v9.01

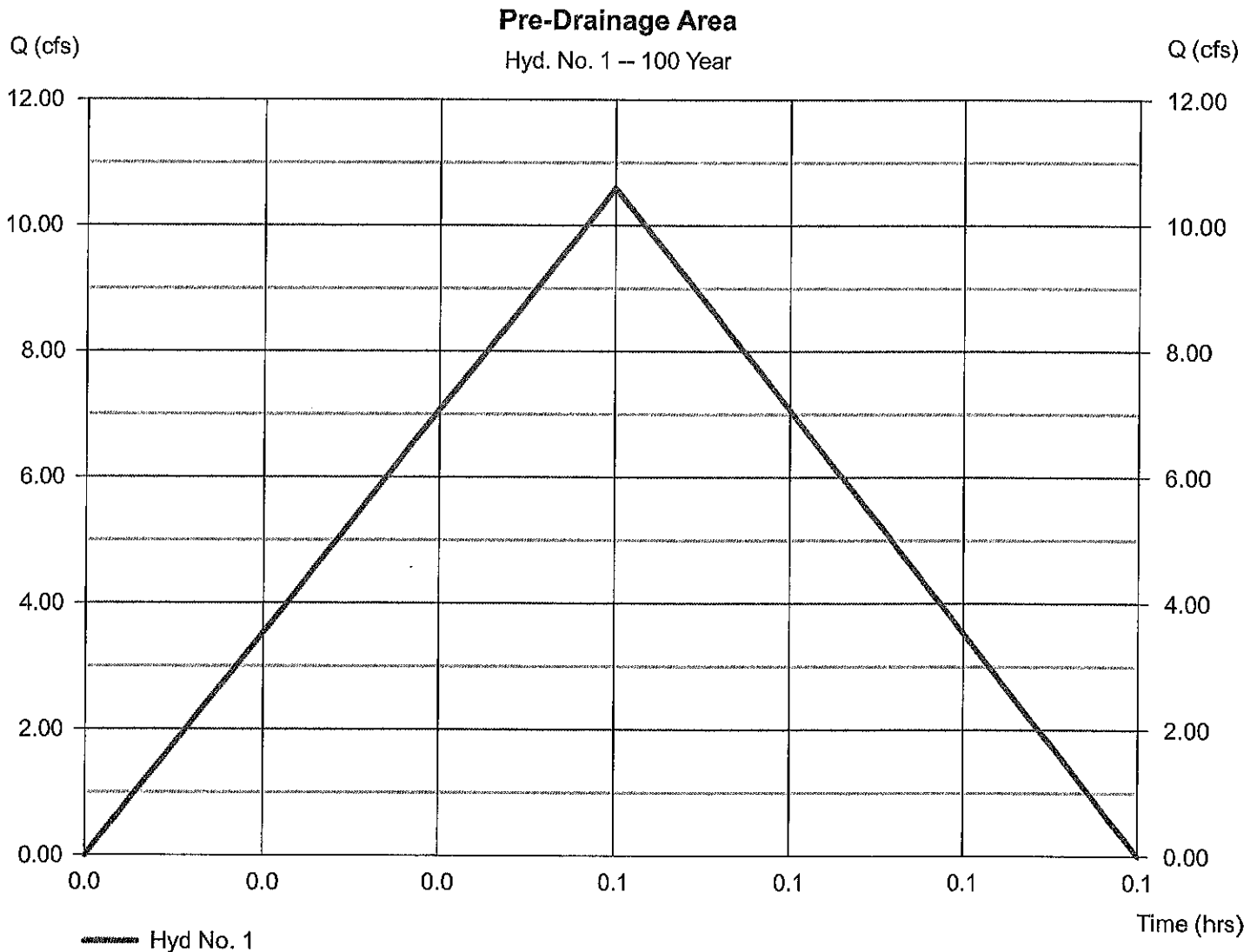
Wednesday, May 4, 2022

Hyd. No. 1

Pre-Drainage Area

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 1.010 ac
Intensity = 10.600 in/hr
IDF Curve = SampleFHA.idf

Peak discharge = 10.60 cfs
Time to peak = 0.05 hrs
Hyd. volume = 1,908 cuft
Runoff coeff. = 0.99
Tc by TR55 = 3.00 min
Asc/Rec limb fact = 1/1



Post-Development
Site Peak Runoff

TR55 Tc Worksheet

Hydraflow Hydrographs by Intellsolve v9.01

Hyd. No. 2

Post-Drainage Area

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.30	0.00	0.00	
Land slope (%)	= 0.90	0.00	0.00	
Travel Time (min)	= 2.27	+ 0.00	+ 0.00	= 2.27
Shallow Concentrated Flow				
Flow length (ft)	= 62.00	0.00	0.00	
Watercourse slope (%)	= 2.42	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.51	0.00	0.00	
Travel Time (min)	= 0.41	+ 0.00	+ 0.00	= 0.41
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				3.00 min

Hydrograph Report

Hydraflow Hydrographs by Intellsolve v9.01

Wednesday, May 4, 2022

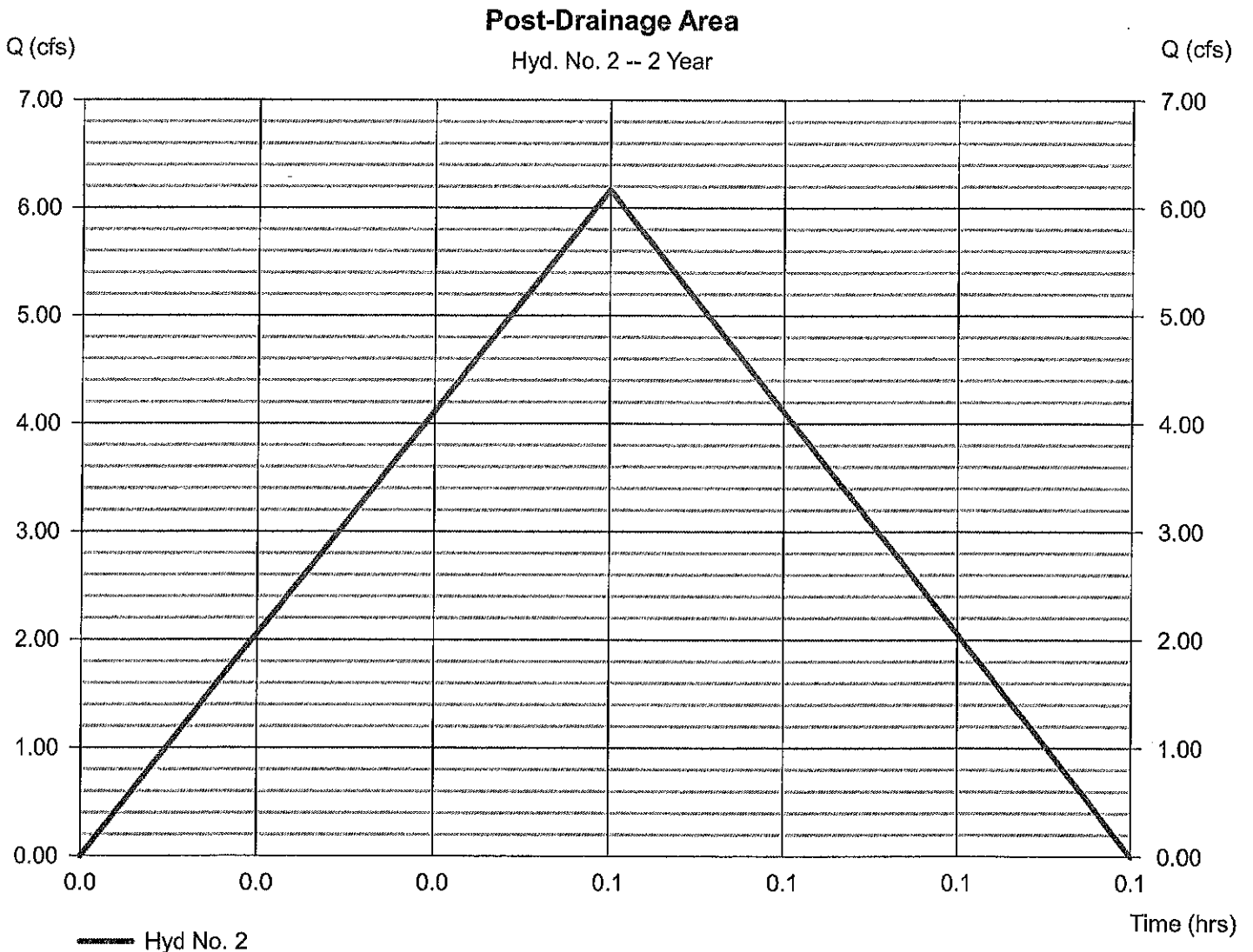
Hyd. No. 2

Post-Drainage Area

Hydrograph type = Rational
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 1.100 ac
 Intensity = 6.301 in/hr
 IDF Curve = SampleFHA.idf

Peak discharge = 6.168 cfs
 Time to peak = 0.05 hrs
 Hyd. volume = 1,110 cuft
 Runoff coeff. = 0.89*
 Tc by TR55 = 3.00 min
 Asc/Rec limb fact = 1/1

* Composite (Area/C) = [(0.860 x 0.99) + (0.240 x 0.51)] / 1.100



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.01

Wednesday, May 4, 2022

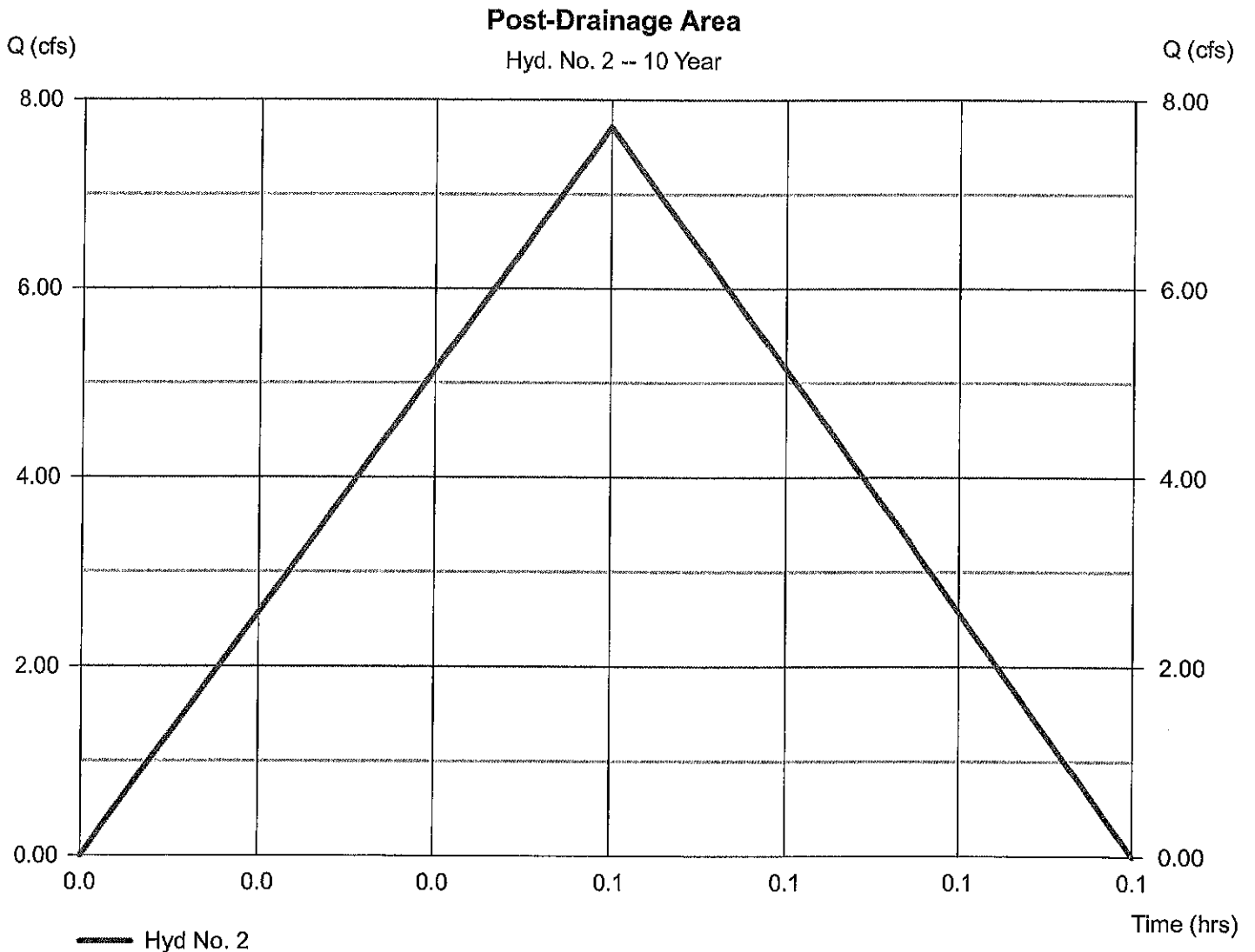
Hyd. No. 2

Post-Drainage Area

Hydrograph type = Rational
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 1.100 ac
 Intensity = 7.880 in/hr
 IDF Curve = SampleFHA.idf

Peak discharge = 7.715 cfs
 Time to peak = 0.05 hrs
 Hyd. volume = 1,389 cuft
 Runoff coeff. = 0.89*
 Tc by TR55 = 3.00 min
 Asc/Rec limb fact = 1/1

* Composite (Area/C) = $[(0.860 \times 0.99) + (0.240 \times 0.51)] / 1.100$



Hydrograph Report

Hyd. No. 2

Post-Drainage Area

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 1.100 ac
Intensity = 10.600 in/hr
IDF Curve = SampleFHA.idf

Peak discharge = 10.38 cfs
Time to peak = 0.05 hrs
Hyd. volume = 1,868 cuft
Runoff coeff. = 0.89*
Tc by TR55 = 3.00 min
Asc/Rec limb fact = 1/1

* Composite (Area/C) = $[(0.860 \times 0.99) + (0.240 \times 0.51)] / 1.100$

