TOWN OF NEEDHAM
MASSACHUSETTS

Room 20, Town Hall
Needham, MA 02492
781-455-7526

APPLICATION FOR APPROVAL OF A DEFINITIVE SUBDIVISION PLAN

PLANNING DEPARTMENT

Date: September 30 2022

The undersigned, on behalf of Brian Connaughton (owner's name or self) of 920 South Street, Needham, MA 02492 (address), owner of land in Needham, the description of said land being submitted herewith, desiring to make a subdivision of said land hereby submits the following required plans and documents:

a) the original tracings and eight full sized copies and six reduced sized copies of each of the following plans –

- i. a key location map
- ii. a lot plan
- iii. a profile plan
- iv. a municipal services and utility plan
- v. a topographic plan
- vi. any detail plans required

Each plan bearing titles, endorsements and imprints required.

b) a filing fee of $500 plus $250 per lot for each lot in the subdivision.

c) a description of the boundaries of the entire area to be subdivided; and

d) ~~a list of names and addresses of all abutters as they appear on the most recent Needham Assessors' records~~

e) Exhibit A - List of Waivers; Exhibit B - Legal Description; and Drainage Calculations
(specify any additional material or information submitted)

and petitions the Planning Board to consider and approve such subdivision plans under the provisions of the Subdivision Control Law (M.G.L. Chapter 41, Sections 81-A through 81-G inclusive, as amended) and in accordance with the Rules and Regulations of the Needham Planning Board and the applicable By-Laws of the Town of Needham.

The undersigned certifies that the applicant(s) is/are the sole owner(s) of the entire land proposed to be subdivided and that the subdivision plans and the description submitted indicate the true boundaries of said land and ~~the correct names of all abutters as shown on the most recent records of the Needham Assessors.~~

(If the applicant is not the owner, written authorization to act as agent must be attached)

Brian Connaughton (owners)

By _____ (agent)
George Giunta, Jr., Esq.

This application is accepted by the Needham Planning Board in accordance with Sections 81-Q and 81-T of the Subdivision Control Law.

Nov. 1 2022 By _____

EXHIBIT A

Definitive Subdivision Application
920 South Street
Needham, MA

LIST OF WAIVERS

The Applicants hereby request the following waivers with respect to the Town of Needham, Subdivision Regulations and Procedural Rules of the Planning Board:

1. Waiver of the requirements of Section 3.2, relative to submission of definitive plans, as follows:

a. A waiver from the requirements of subsection (b) that plans be drawn on blue tracing cloth or mylar, and that the Title Block be located in the lower right-hand corner;

b. A waiver from the requirements of subsection (e) that street line traverse closures be provided.

2. Waiver of the requirements of Section 3.3, relative to street and construction details, as follows:

a. A waiver from the required width of roadway layout at Section 3.3.1 from 50 feet to 20 feet;

b. A waiver from the required pavement width at Section 3.3.1 from twenty-four (24) to eighteen (18) feet;

c. A waiver from the required pavement radius in the turnaround at Section 3.3.5 from sixty (60) feet to fifty (50) feet;

e. A waiver from the curbing requirement at Section 3.3.6 in the in the cul-de-sac;

f. A waiver from the requirement of sidewalks on both sides of the road layout at Section 3.3.16 to no sidewalk

g. A general waiver of construction and such other unspecified waivers as may be necessary for the construction of the way and related improvements as shown on the revised plans submitted herewith.

3. Waiver of any and all other requirements as may be necessary and appropriate for the division / reconfiguration of the subject premises as depicted on the plan.

EXHIBIT B

Definitive Subdivision Application
920 South Street
Needham, MA

Description

That certain parcel of registered land, known and numbered 920 South Street, bounded and described as follows:

Northerly	by South Street on two courses, together measuring 177.66 feet;
Northeasterly	by land now or formerly of Erna Schwartz Place Family Trust, 331.24 feet;
Southeasterly	again by land now or formerly of Erna Schwartz Place Family Trust , 235.92;
Easterly	again by land now or formerly of Erna Schwartz Place Family Trust , 621 feet, more or less;
Southerly	by the Charles River, 264 feet, more or less,
Easterly	by land now or formerly of Mark Lichtenstein, Trustee and land now or formerly of Philip & Karen B. Silviera, on two courses, together measuring 1,092 feet, more or less.

Said parcel is shown as Lot numbered 16 on a plan drawn by Cheney Engineering Co., Inc., Surveyors, dated March 1987, as approved by the Land Court, filed in the Land Court Registration Office as No. 2417R, a copy of a portion of which is filed with the Norfolk County Registry District of the Land Court with Certificate No. 130654 in Book 654.

The above-described land is subject to the sewer easements as set forth in Document Nos. 6159, 8953, 146331 and shown on said plan as Sewer Easement (30.00 Wide).

The above-described land is also subject to Sewer Easement (20.00 Wide) shown on said plan.

Being the same premises conveyed to Brian Connaughton by deed of VNA Care Hospice, Inc., dated April 8, 2022, filed with the Norfolk County Registry District of the Land Court as Document No. 1501178 and noted on Certificate of Title No. 207299, to which deed reference is made for title.

Brain Connaughton
920 South Street
Needham, MA 02492

September 30, 2022

Town of Needham
Planning Board
Needham, Massachusetts 02492

Attn: Lee Newman, Planning Director

Re: Brian Connaughton
Application for Approval of
Definitive Subdivision Plan and Scenic Road Act
920 South Street, Needham, MA

Dear Mrs. Newman,

Please accept this letter as confirmation that I, Brian Connaughton, current owner of the property known and numbered 920 South Street, Needham, MA, have authorized my attorney George Giunta, Jr., Esquire, to make application to the Planning Board for Approval of Definitive Subdivision Plan and Scenic Road Act, and other zoning and planning related relief that may be required or appropriate in connection with the division of the said premises into two lots with a new roadway. In connection therewith, Attorney Giunta is specifically authorized to execute, sign, deliver and receive all necessary documentation related thereto, including, without limitation, Application for Approval of a Definitive Subdivision Plan and Application for Hearing Under the Scenic Road Act.

Sincerely,

Brain Connaughton

TOWN OF NEEDHAM
MASSACHUSETTS

500 Dedham Avenue
Needham, MA 02492
781-455-7550

PLANNING BOARD

APPLICATION FOR PUBLIC HEARING UNDER THE SCENIC ROAD ACT

Name of Applicant: Brian Connaughton

Address of Applicant: 920 South Street, Needham, MA 02492

Location of Property Subject to Scenic Road Act:
Address: 920 South Street, Needham, MA 02492

Assessor's Map and Parcel Number: Map 205, Parcel 20

Description of Proposed Activity Subject to Scenic Roads Act:

Removal and / or alteration of existing stone wall and possible removal of tress and vegetation along southerly side of South Street in connection with construction of proposed new subdivision roadway.

Purpose of Proposed Activity:

Accommodation of proposed new subdivision roadway.

This application shall be accompanied by a filing fee of $250.00 and a deposit in the amount determined by the Planning Board sufficient to cover advertising, notification and other costs for the public hearing.

Applicant Signature: Brian Connaughton
By: George Giunta, Jr., Esq. Date: Sept. 30, 2022

For Planning Department Use:

Application accepted this 1 day of NOV., 2022 as duly submitted under the rules and regulations of the Planning Board, by

Brain Connaughton
920 South Street
Needham, MA 02492

September 30, 2022

Town of Needham
Planning Board
Needham, Massachusetts 02492

Attn: Lee Newman, Planning Director

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Application for Approval of
Definitive Subdivision Plan and Scenic Road Act
920 South Street, Needham, MA

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Sincerely,

Brain Connaughton

GEORGE GIUNTA, JR.
ATTORNEY AT LAW*
281 CHESTNUT STREET
NEEDHAM, MASSACHUSETTS 02492
*Also admitted in Maryland
TELEPHONE (781) 449-4520 FAX (781) 465-6095

September 30, 2022

Lee Newman
Planning Director
Town of Needham
1471 Highland Avenue
Needham, MA 02492

Re: 920 South Street - Definitive Subdivision Application
Brian Connaughton

Dear Lee,

Please be advised that I represent Brian Connaughton relative to his property at 920 South Street, Needham, MA 02492 (the "Premises') and his intent to subdivide same into two buildable lots. In connection therewith, submitted herewith please find the following:

1. Completed Application for Approval of a Definitive Subdivision Plan;

2. Exhibit A – List of Waivers;

3. Exhibit B - Description;

4. Definitive Subdivision Plan, 920 South Street, Needham, Massachusetts, prepared by Verne T. Porter, Jr., PLS, Land Surveyors – Civil Engineers, 354 Elliot Street, Newton, Massachusetts 02464, consisting of 9 sheets as follows: 1. Title Sheet, dated September 9, 2022, 2. Existing Conditions Site Plan, dated September 9, 2022, 3. By-Right Subdivision Plan of Land, dated September 9, 2022, 4. Proposed Lotting Plan of Land, dated September 9, 2022, 5. Proposed Grading Plan, dated September 9, 2022, 6. Proposed Utilities Plan, dated September 9, 2022, 7. Plan, Profile & Detail Sheet, dated September 9, 2022, 8. Detail Sheet, dated September 9, 2022, and 9. Detail Sheet, dated September 9, 2022 (hereinafter, collectively, the "Subdivision Plan");

5. Drainage Summary, Proposed Two-Lot Residential Subdivision, 920 South Street, Needham, Massachusetts, dated September 28, 2022, prepared by Verne T. Porter, Jr., PLS, Land Surveyors – Civil Engineers, 354 Elliot Street, Newton, Massachusetts 02464;

6. Check No. 107 in the amount of $1,000 for the applicable filing fee; and

7. Application for Public Hearing Under the Scenic Road Act.

The Premises is located on the Southerly side of South Street in the Rural Residential Conservation (RRC) Zoning District. It is shown and identified as Parcel 70 on Assessor's Map No. 205 and is currently occupied by a three-story, twenty-two room structure, originally constructed in 1908.[1] While the structure was likely built initially as a single-family residential dwelling, it was used for commercial purposes as the Stanley Tippet Hospice Home from approximately 1993 until recently. In addition, the Premises is also occupied by a small, detached shed, driveways and parking areas.

As shown on the Subdivision Plan, the applicant is proposing to subdivide the Premises into two building lots, as well as a small non-buildable parcel along South Street. Both of the new lots will have frontage on and will be served by and accessed from the proposed new roadway.

As depicted on sheet 3 of the Subdivision Plan, a new roadway can be built with a 60 foot radius circle and 40 foot width road (with sidewalks on both sides).[2] However, whereas the proposed road will only serve two lots, will end in a turn-around, and is located in a scenic area of Town, the Applicant is of the opinion that a full roadway, 24 feet wide, with sidewalks and a full 120 foot diameter circle is not appropriate. Rather, the Applicant feels that something akin to a shared driveway is far more suitable for this location, would better preserve open space and the scenic nature of the area. Therefore, the Applicant is requesting a waiver of construction as well as several other waivers. Given the nature of the development, its location on South Street and past practice of the Board, The Applicant asserts that the requested waivers are appropriate for this development.

Finally, while the proposed new roadway is located in substantially the same place as the existing driveway, removal of a small portion of the existing stone wall and modification thereof is necessary to accommodate the proposed new roadway. Therefore, an Application for Public Hearing Under the Scenic Road Act is submitted herewith, and the Applicant requests that same be acted on simultaneous with his application for Definitive Subdivision Approval.

Kindly schedule this matter for consideration at the next available meeting of the Planning Board. Please also let me know if you require any further information or materials.

As always, your anticipated courtesy and cooperation and appreciated.

Sincerely,

George Giunta, Jr.

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[1] According to Assessor's Department records

[2] This "by-right" condition assumes a single waiver; namely, reduction of roadway width from 50' to 40'. A waiver of roadway width has been granted for nearly all subdivisions approved in the last 50 years. Moreover, the standard width of public ways throughout the Town is 40 feet. Therefore, while a roadway width of 40 feet technically requires a waiver, by virtue of its near universal application, such width has become a de facto standard.

Definitive Subdivision Plan
~920 South Street~
Needham, Massachusetts

FOR REGISTRY USE ONLY

Locus Map
Scale 1"=400'

Sheet Index

1. THIS PLAN WAS MADE FROM AN ACTUAL ON THE GROUND SURVEY BY THIS OFFICE

2. THE SUBJECT PROPERTY IS LOCATED IN THE RURAL RESIDENTIAL ZONE

3. ASSESSORS MAP 205 PARCEL 7

4. UTILITIES SHOWN WHERE COMPILED FROM BEST AVAILABLE INFORMATION AND ACTUAL FIELD LOCATIONS. THEY MAY OR MAY NOT BE COMPLETE OR CORRECT. CONTRACTOR TO FIELD VERIFY ALL LOCATIONS AND DEPTHS PRIOR TO ANY EXCAVATION.

5. THIS PLAN DOES NOT SHOW ANY UNRECORDED OR UNWRITTEN EASEMENTS WHICH MAY EXIST. A REASONABLE AND DILIGENT ATTEMPT HAS BEEN MADE TO OBSERVE ANY APPARENT, VISIBLE USES OF THE LAND: HOWEVER, THIS DOES NOT CONSTITUTE A GUARANTEE THAT NO SUCH EASEMENTS EXIST.

6. WETLANDS DELINEATIONS PERFORMED BY ECOTEC INC.

7. LOCUS IS LOCATED IN THE FOLLOWING FLOOD ZONE PER FEMA FLOOD INSURANCE RATE MAP NUMBER 25021C0038E DATED 7-17-2012

Zone Rural Residence Conservation
43,560s.f. Minimum
150' Lot Frontage
50' Front Setback
25' Side Setback
25' Rear Setback
FAR Not Applicable
Max. Lot Coverage 15%
Max. Stories 2 1/2
Max. Height 35'

Owner/Applicant:
Brian Connaughton
920 South Street
Needham, Ma. 02492
Cert. #207299

DIRECTOR OF PUBLIC WORKS	
DATE APPROVED	
TOWN ENGINEER	
DATE APPROVED	
I, TOWN CLERK OF THE TOWN OF NEEDHAM, HEREBY CERTIFY THAT THE NOTICE OF THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE	
DATE	TOWN CLERK

APPROVAL IN ACCORDANCE WITH SECTION 91-U OF CHAPTER 41 OF THE GENERAL LAWS AS AMENDED
TOWN OF NEEDHAM PLANNING BOARD
BY:
APPROVED:

I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS PLAN IS TRUE AND CORRECT TO THE ACCURACY REQUIRED BY THE SUBDIVISION REGULATIONS AND PROCEDURAL RULES OF THE NEEDHAM PLANNING BOARD.

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS

9-28-22

REVISIONS	
DATE	DESCRIPTION

COMMONWEALTH OF MASSACHUSETTS — VERNE T. PORTER JR. — LAND SURVEYOR — 37261 — REGISTERED — PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS — PAUL J. TYRELL — CIVIL — No. 45910 — REGISTERED — PROFESSIONAL ENGINEER

~Title Sheet~

920 South Street

Needham, Massachusetts

Scale: As Noted — September 9, 2022

VERNE T. PORTER Jr., PLS

Land Surveyors – Civil Engineers

354 Elliot Street Newton, Massachusetts 02464

0 20 40 60 80

Cover Sheet — #22019

Design By:

Checked By:

Drawn By:

Legend

- =Erosion Control
- =Trench Drain
- =Catch Basin
- =Drain ManHole
- =Sewer Manhole
- =Hydrant
- =Gas Gate
- =Water Gate
- GV =Gas Gate
- WV =Water Gate
- =Utility Pole
- =Light Pole
- =Test Pit
- WF-B18 =Wetland Flag
- =Vegetated Wetland
- =Tree To Remain
- =Tree To Be Removed
- R=100.00 =Rim Elevation
- I=90.00 =Invert Elevation
- T.C.=103.00 =Top of Concrete Elevation
- 24x5 =Proposed Spot Elevation
- 62 =Proposed Contour Line
- 64 =Existing Contour Line
- 63x3 =Existing Spot Elevation
- x =Existing Fence
- =Proposed D-Stone
- S85°19'54"E 102.45 =Property Line W/Bearing & Distance

Dig Safe
•Excavators
Before you dig contact the Dig Safe Center. To prevent damage to telephone, gas or electric underground facilities of member utilities, call toll free Massachusetts state law requires notification at least three business days before you start digging opeeations. In an emergency, call immediately.

DIG SAFE

South Street

Overhead Wires

Approx. Location 16" Water Main WF

Approx. Loc. Drain Line

Approx. Location Drain Line

Approx. Loc. Gas Main

S89°40'16"W 134.35'

R=775.84'
L=15.05'

N20°30'00"W
331.24'

R=75.84'
L=75.60'

S76°29'42"W
101.78'

N76°29'42"E
120.00'

R=30.00
L=31.82'

312.00'
S00°33'49"W

201.1'

62.1'

Bituminous Driveway

Existing House #20
T.C.=241.82±

Patio

Shed

Existing 8" PVC Sewer, SMH

Existing 6" PVC Sewer

SMH

SMH

SMH
R=208.62

N28°30'00"E
238.82'

SMH
R=213.11

Tennis Court

Fence

20' Wide Sewer Easement
Sewer Main

100' Buffer Line

50' Buffer Line

25' No Disturbance

E.B.V.W.

Lawn Encroachment

Fence

Pathway

Contour Elevation 205.64

Well

Existing House #31

Approx. Loc. EBVW

WF-A8 WF-A7 WF-A6 WF-A5 WF-A4 WF-A3 WF-A2 WF-A1

25' No Disturbance

50' Buffer Line

100' Buffer Line

WF-B1 WF-B2 WF-B3 WF-B4 WF-B5 WF-B6 WF-B7 WF-B8 WF-B9 WF-B10 WF-B11 WF-B12 WF-B13 WF-B14 WF-B15 WF-B16 WF-B17 WF-B18 WF-B19 WF-B20 WF-B21 WF-B22 WF-B23 WF-B24 WF-B25 WF-B26

TP-U TP-W

N07°00'00"W 630'+/-
621'± To Bank

780'± To Bank
S00°33'49"W 1103'+/-

RA1 RA2 RA3 RA4 RA5 RA6 RA7

200' Outer Riparian Line

100' Inner Riparian Line

Existing 30' Wide MDC Sewer Easement

Approx. Loc. Top Bank

264'±

SMH
R=202.87

Charles River

Marant Drive

914 South Street
n/f
Erna Schwartz Place
Family Trust

#11 Marant Drive
n/f
Silviera, Philip
& Karen B

#31 Marant Drive
n/f
Lichtenstein, Mark Trustee

Lot 16
255,097±s.f.
5.8562±Acres

1. THIS PLAN WAS MADE FROM AN ACTUAL ON THE GROUND SURVEY BY THIS OFFICE

2. THE SUBJECT PROPERTY IS LOCATED IN THE RURAL RESIDENTIAL ZONE

3. ASSESSORS MAP 205 PARCEL 7

4. UTILITIES SHOWN WHERE COMPILED FROM BEST AVAILABLE INFORMATION AND ACTUAL FIELD LOCATIONS. THEY MAY OR MAY NOT BE COMPLETE OR CORRECT. CONTRACTOR TO FIELD VERIFY ALL LOCATIONS AND DEPTHS PRIOR TO ANY EXCAVATION.

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6. WETLANDS DELINEATIONS PERFORMED BY ECOTEC INC.

7. LOCUS IS LOCATED IN THE FOLLOWING FLOOD ZONE PER FEMA FLOOD INSURANCE RATE MAP NUMBER 25021C0038E DATED 7-17-2012

DIRECTOR OF PUBLIC WORKS
DATE APPROVED
TOWN ENGINEER
DATE APPROVED
I, TOWN CLERK OF THE TOWN OF NEEDHAM, HEREBY CERTIFY THAT THE NOTICE OF THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE
DATE TOWN CLERK

APPROVAL IN ACCORDANCE WITH SECTION 91-U OF CHAPTER 41 OF THE GENERAL LAWS AS AMENDED
TOWN OF NEEDHAM PLANNING BOARD
BY:
APPROVED:

I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS PLAN IS TRUE AND CORRECT TO THE ACCURACY REQUIRED BY THE SUBDIVISION REGULATIONS AND PROCEDURAL RULES OF THE NEEDHAM PLANNING BOARD.

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9-29-22

Owner/Applicant:
Brian Connaughton
920 South Street
Needham, Ma. 02492
Cert. #207299

REVISIONS	
DATE	DESCRIPTION

COMMONWEALTH OF MASSACHUSETTS VERNE T. PORTER JR LAND SURVEYOR 37126 REGISTERED PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS PAUL J. TYRELL CIVIL No. 45910 REGISTERED PROFESSIONAL ENGINEER

~Existing Conditions Site Plan~

920 South Street

Needham, Massachusetts

Scale: 1"=40' September 9, 2022

VERNE T. PORTER Jr, PLS

Land Surveyors - Civil Engineers

354 Elliot Street, Newton, Ma. 02464

0 40 80 120 160

Sheet 1 of 8

Project:	22019
Desinged By:	
Drawn By:	
Checked By:	

Dig Safe
Excavators
Before you dig contact the Dig Safe Center. To prevent damage to telephone, gas or electric underground facilities of member utilities, call toll free
Massachusetts state law requires notification at least three business days before you start digging operations. In an emergency, call immediately.

DIG SAFE

South Street

Parcel "A"
473±s.f.
Not a Separate Building Lot

Lot 1
44,625±s.f.
B.F.=

Lot 2
(Upland=150,592±s.f.)
(Wetland=37,088±s.f.)
187,680±s.f.
B.F.=

Proposed 40' Wide Roadway

Proposed 24' Wide Traveled Way
Proposed Granite Curbing
Proposed Granite Sidewalk
Proposed 5' Sidewalk

Tennis Court

Fence

Existing House #31

Contour Elevation 205.64

Marant Drive

Charles River

Approx. Loc. EBVW

25' No Disturbance

50' Buffer Line

100' Buffer Line

25' Setback Line

50' Setback Line

35' Setback Line

20' Wide Sewer Easement

30' Wide Sewer Easement

200' Outer Riparian Line

100' Inner Riparian Line

Zone Rural Residence Conservation
43,560s.f. Minimum
150' Lot Frontage
150' Lot Width
50' Front Setback
25' Side Setback
25' Rear Setback
FAR Not Applicable
Max. Lot Coverage 15%
Max. Stories 2 1/2
Max. Height 35'

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DIRECTOR OF PUBLIC WORKS	
DATE APPROVED	
TOWN ENGINEER	
DATE APPROVED	
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9-28-22

Owner/Applicant:
Brian Connaughton
920 South Street
Needham, Ma. 02492
Cert. #207299

REVISIONS	
DATE	DESCRIPTION

COMMONWEALTH OF MASSACHUSETTS — VERNE T. PORTER JR. — LAND SURVEYOR — 37788 — REGISTERED PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS — PAOLI TYRELL CIVIL — NO. 45810 — REGISTERED PROFESSIONAL ENGINEER

~By Right Subdivision Plan of Land~

920 South Street

Needham, Massachusetts

Scale: 1"=40' September 9, 2022

VERNE T. PORTER Jr, PLS

Land Surveyors - Civil Engineers

354 Elliot Street, Newton, Ma. 02464

0 40 80 120 160

Sheet 2 of 8

Project:	22019
Desinged By:	
Drawn By:	
Checked By:	

For Registry Use Only

South Street

Parcel "A"
517±s.f.
Not A Separate
Building Lot

Lot 1
43,617±s.f.
B.F.=19.08

Lot 2
(Upland=157,803±s.f.
Wetland=37,089±s.f.)
194,892±s.f.
4.4741 Acres
B.F.=9.08

Approx. Loc. EBVW
WF-A8 WF-A7 WF-A6 WF-A5 WF-A4 WF-A3 WF-A2 WF-A1

25' No Disturbance
50' Buffer Line
100' Buffer Line
25' Setback Line
35' Setback Line
50' Setback Line

S69°40'16"W 134.85'
R=775.84'
L=75.80'
5.00'
R=775.84'
L=75.80'
L=76.46'
R=780.84'
N20°30'00"W 331.23'
5.00'
N69°30'00"E
20.00'
21.17'
25' Setback Line
N69°30'00"E
Not Tan.
18.12'
N13°29'42"E
R=20.00'
L=14.45'
R=20.00'
L=7.90'
L=124.51'
N28°30'00"E 235.92'
N28°30'00"E
230.92'
228.37'
N28°30'00"E 232.78'
Proposed 20' Sewer & Drain Easement
S06°35'42"W
69.74'
73.81'
S06°35'47"W
20.00'
5' Utility Easement
23.69'
N11°26'24"E
65.49'
S76°29'42"W 101.78'
66.73'
R=20.00'
L=40.47'
N16.80'
R=30.00'
L=36.47'
N00°33'49"E
45.14'
R=20.00'
L=24.47'
Proposed 20' Wide Private Roadway
N00°33'49"E
122.60'
R=60.00'
L=173.40'
L=108.79'
R=110.00'
L=22.90'
S00°33'49"W 271.01'
S00°33'49"W 312.00'
N76°29'42"E
120.00'
L=38.01'
S80°07'35"W
37.26'
L=25.60'
38.28'
S80°07'35"W
Proposed 20' Wide Drain Easement
223.19'
S00°33'49"W
223.19'
L=37.42'
R=20.00'
Existing House #20
Existing House #31
Lawn Encroachment
Fence
Existing 20' Wide Sewer Easement
50' Buffer Line
100' Buffer Line
25' No Disturbance
Tennis Court
x Fence x
WF-B1 WF-B2 WF-B3 WF-B4 WF-B5 WF-B6 WF-B7 WF-B8 WF-B9 WF-B10 WF-B11 WF-B12 WF-B13 WF-B14 WF-B15 WF-B16 WF-B17 WF-B18 WF-B19 WF-B20 WF-B21 WF-B22 WF-B23 WF-B24 WF-B25 WF-B26
TP-U TP-W E.B.V.W.
N07°00'00"W 630'+/-
621'± To River Bank 4-26-22
RA1 RA2 RA3 RA4 RA5 RA6 RA7
Riparian Line
200' Outer Riparian Line
50' Buffer Line
100' Inner Riparian Line
Existing 30' Wide MDC Sewer Easement
Approx. Loc. Top Bank
Pathway
Contour Elevation 205.64
S00°33'49"W 1103'+/-
780'± To River Bank 4-26-22
Charles River
Marant Drive

Zone Rural Residence Conservation
43,560s.f. Minimum
150' Lot Frontage
50' Front Setback
25' Side Setback
25' Rear Setback
FAR Not Applicable
Max. Lot Coverage 15%
Max. Stories 2 1/2
Max. Height 35'

1. THIS PLAN WAS MADE FROM AN ACTUAL ON THE GROUND SURVEY BY THIS OFFICE

2. THE SUBJECT PROPERTY IS LOCATED IN THE RURAL RESIDENTIAL ZONE

3. ASSESSORS MAP 205 PARCEL 7

4. UTILITIES SHOWN WHERE COMPILED FROM BEST AVAILABLE INFORMATION AND ACTUAL FIELD LOCATIONS. THEY MAY OR MAY NOT BE COMPLETE OR CORRECT. CONTRACTOR TO FIELD VERIFY ALL LOCATIONS AND DEPTHS PRIOR TO ANY EXCAVATION.

5. THIS PLAN DOES NOT SHOW ANY UNRECORDED OR UNWRITTEN EASEMENTS WHICH MAY EXIST. A REASONABLE AND DILIGENT ATTEMPT HAS BEEN MADE TO OBSERVE ANY APPARENT, VISIBLE USES OF THE LAND: HOWEVER, THIS DOES NOT CONSTITUTE A GUARANTEE THAT NO SUCH EASEMENTS EXIST.

6. WETLANDS DELINEATIONS PERFORMED BY ECOTEC INC.

7. LOCUS IS LOCATED IN THE FOLLOWING FLOOD ZONE PER FEMA FLOOD INSURANCE RATE MAP NUMBER 25021C0038E DATED 7-17-2012

Total Lot Area=255,097±s.f.
Roadway Area=16,071±s.f.

DIRECTOR OF PUBLIC WORKS
DATE APPROVED
TOWN ENGINEER
DATE APPROVED
I, TOWN CLERK OF THE TOWN OF NEEDHAM, HEREBY CERTIFY THAT THE NOTICE OF THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE
DATE TOWN CLERK

APPROVAL IN ACCORDANCE WITH SECTION 91-U OF CHAPTER 41 OF THE GENERAL LAWS AS AMENDED
TOWN OF NEEDHAM PLANNING BOARD
BY:
APPROVED:

I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS PLAN IS TRUE AND CORRECT TO THE ACCURACY REQUIRED BY THE SUBDIVISION REGULATIONS AND PROCEDURAL RULES OF THE NEEDHAM PLANNING BOARD.

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS

9-28-22

Owner/Applicant:
Brian Connaughton
920 South Street
Needham, Ma. 02492
Cert. #207299

REVISIONS	
DATE	DESCRIPTION

COMMONWEALTH OF MASSACHUSETTS VERNE T. PORTER JR. LAND SURVEYOR 37381 REGISTERED PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS PAUL J. TYRELL CIVIL No. 45910 REGISTERED PROFESSIONAL ENGINEER

~Proposed Lotting Plan of Land~

920 South Street

Needham, Massachusetts

Scale: 1"=40' September 9, 2022

VERNE T. PORTER Jr, PLS
Land Surveyors - Civil Engineers
354 Elliot Street, Newton, Ma. 02464

0 40 80 120 160

Sheet 3 of 8

Project:	22019
Desinged By:	
Drawn By:	
Checked By:	

Dig Safe
•Excavators
Before you dig contact the Dig Safe Center. To prevent damage to telephone, gas or electric underground facilities of member utilities, call toll free
Massachusetts state law requires notification at least three business days before you start digging operations. In an emergency, call immediately.

DIG SAFE

For Registry Use Only

South Street

WF-A8 WF-A7 WF-A6 WF-A5 WF-A4 WF-A3 WF-A2 WF-A1

Approx. Loc. EBVW

25' No Disturbance

50' Buffer Line

100' Buffer Line

N20°30'00"W 331.23'
326.23'

Parcel "A"

Lot 1

Lot 2

N80°37'00"W 146.44'

Proposed 20' Sewer & Drain Easement

N28°30'00"E 235.92'
230.92'

Proposed 20' Wide Private Roadway
Proposed 18' Wide Travelled Way

Proposed 20' Wide Drain Easement

Existing 8" PVC Sewer

Existing 20' Wide Sewer Easement

Bituminous Driveway

Walkway

Patio

Shed

Dwl. House #920
T.C.=241.26±

SMH R=213.11

Approx. Location 16" Water Main

Approx. Loc. Drain Line

Approx. Location 4" Gas Main

Within Exist Wall, Wall To Be Protected

5' Utility Easement

S76°29'42"W 101.76'
66.73'

N76°29'42"E 31.40'

R=275.84'
L=75.90'

R=780.84'
L=76.46'

R=20.00'
L=31.45'

R=20.00'
L=40.43'

S76°29'42"W 116.90'

N13°26'24"E 94.68'

N12°26'24"E 65.49'

R=110.00'
L=22.80'

L=36.47'
R=90.00'

R=20.00'
L=36.47'

N00°33'49"E 45.11'

N00°33'49"E 122.60'

S00°33'49"W 312.00'

L=124.54'

103.83'@1.5%

R=60.00'
L=173.40'

50'@3%

50'@1%

50'VC

Benchmark:
Top Concrete Bound With X-Cut
Elevation=227.405

DIRECTOR OF PUBLIC WORKS
DATE APPROVED
TOWN ENGINEER
DATE APPROVED
I, TOWN CLERK OF THE TOWN OF NEEDHAM, HEREBY CERTIFY THAT THE NOTICE OF THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE
DATE — TOWN CLERK

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Owner/Applicant:
Brian Connaughton
920 South Street
Needham, Ma. 02492
Cert. #207299

REVISIONS	
DATE	DESCRIPTION

COMMONWEALTH OF MASSACHUSETTS — VERNE T. PORTER JR. — LAND SURVEYOR — 8708 — REGISTERED PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS — PAUL D. TURELL — CIVIL — No. 49810 — REGISTERED PROFESSIONAL ENGINEER

~Proposed Grading Plan~

920 South Street

Needham, Massachusetts

Scale: 1"=20' September 9, 2022

VERNE T. PORTER Jr, PLS
Land Surveyors – Civil Engineers
354 Elliot Street, Newton, Ma. 02464

0 20 40 60 80

Sheet 4 of 8

Project:22019
Desinged By:
Drawn By:
Checked By:

South Street

50' Buffer Line

100' Buffer Line

35' No Disturbance Area

Parcel "A"

Lot 1

Lot 2

Garage

Proposed Dwelling

Approx. Loc. & Size Proposed Infiltration Field

Proposed Leaching Field
4 rows of 9 Cultec Model 330XLHD 36 Units Total
Top Units El.=229.2
Invert=228.0
Btm. Unit=226.66
Btm. Stone=225.66
Overflow=229.4

Proposed Leaching Field
5 rows of 10 Cultec Model 330XLHD 50 Units Total
Top Units El.=212.0
Invert=210.8
Btm. Unit=209.46
Btm. Stone=208.46
Overflow El.=212.2

Prop. CB
R=231.32
I=228.80 Sump=224.40
Prop. 4' Throat Stone W/3' Side Transition Stones (Granite)

Prop. CB
R=231.46
I=229.0 Sump=225.0
Prop. 4' Throat Stone W/3' Side Transition Stones (Granite)

Prop. DMH
R=231.66
I=228.50

Prop. CB
R=233.28
I=229.0
I=225.0 Sump
Prop. 6" Throat Stone W/3' Side Transition Stones (Granite)

Prop. DMH
R=231.0
I=227.0

Prop. DMH
R=215.5
I=212.70 (in)
I=213.0(overflow)

Prop. DMH
R=214.8
I=212.0

Prop. SMH
R=235.0
I=230.0

Prop. SMH
R=217.0
I=211.28

Prop. SMH
R=213.0
I=208.0(in)
I=201.69(main)

SMH
R=213.16
I=201.48

SMH
R=209.62
I=202.03

Proposed Transformer

Approx. Service Connection

Approx. Service Connection

Proposed 20' Sewer & Drain Easement

Proposed 8" SDR-35 Sewer L=217' S=0.0662

Proposed 8" SDR-35 Sewer L=82' S=0.04

Existing 8" PVC Sewer

Existing 8" PVC Sewer

Existing 8" PVC Sewer

Existing 20' Wide Sewer Easement

Exist. Sewer Main L=122' S=0.0049

Proposed 20' Wide Private Roadway

Proposed 20' Wide Drain Easement

Proposed 12" RCP Drain Line L=134' S=0.1067

Prop 12" RCP Drain Line L=37'

Proposed 12" RCP Drain Line L=105' S=0.0180

Bypass 12"RCP L=19'

12" Sch 80

12" Sch 80 Overflow

Flared Outlet Inv.=211.0

Proposed Underground Elec/Tel/Cable

Proposed Underground Elec/Tel/Cable

Prop. 16"x16"x8" Tee W/2 16" & 1-8" Gate Valve

Prop. Street Light(S/L)Typ.

Proposed Gas Main

Proposed 8" DICL. Water Main

Approx. Loc. Proposed Water Service

Approx. Loc. Proposed Gas Service

Approx. Loc. Prop. Water Service Prop. Gas Service

Prop. Thrust Block (T/B)

Prop. WG

8"x6" Reducer

Prop. 1" Tap&Sleeve

Prop. 6" Gate Valve

Proposed 6"Hydrant

Benchmark:
Top Concrete Bound With X-Cut
Elevation=227.405

Exist. UP To Be Removed

Existing House #920

Shed

Overhead Wires

Bituminous Curbing

Approx. Location 16" Water Main VIF

Approx. Location 4" Gas Main VIF

Approx. Location Drain Line

Edge of Travelled Way

5' Utility Esement

For Registry Use Only

Owner/Applicant:
Brian Connaughton
920 South Street
Needham, Ma. 02492
Cert. #207299

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DIRECTOR OF PUBLIC WORKS	
DATE APPROVED	
TOWN ENGINEER	
DATE APPROVED	
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BY:
APPROVED:

REVISIONS	
DATE	DESCRIPTION

COMMONWEALTH OF MASSACHUSETTS — VERNE T. PORTER JR. — LAND SURVEYOR — 37738 — REGISTERED PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS — PAUL J. TYRELL — CIVIL — No. 45919 — REGISTERED PROFESSIONAL ENGINEER

~Proposed Utilities Plan~

920 South Street

Needham, Massachusetts

Scale: 1"=20' September 9, 2022

VERNE T. PORTER Jr, PLS

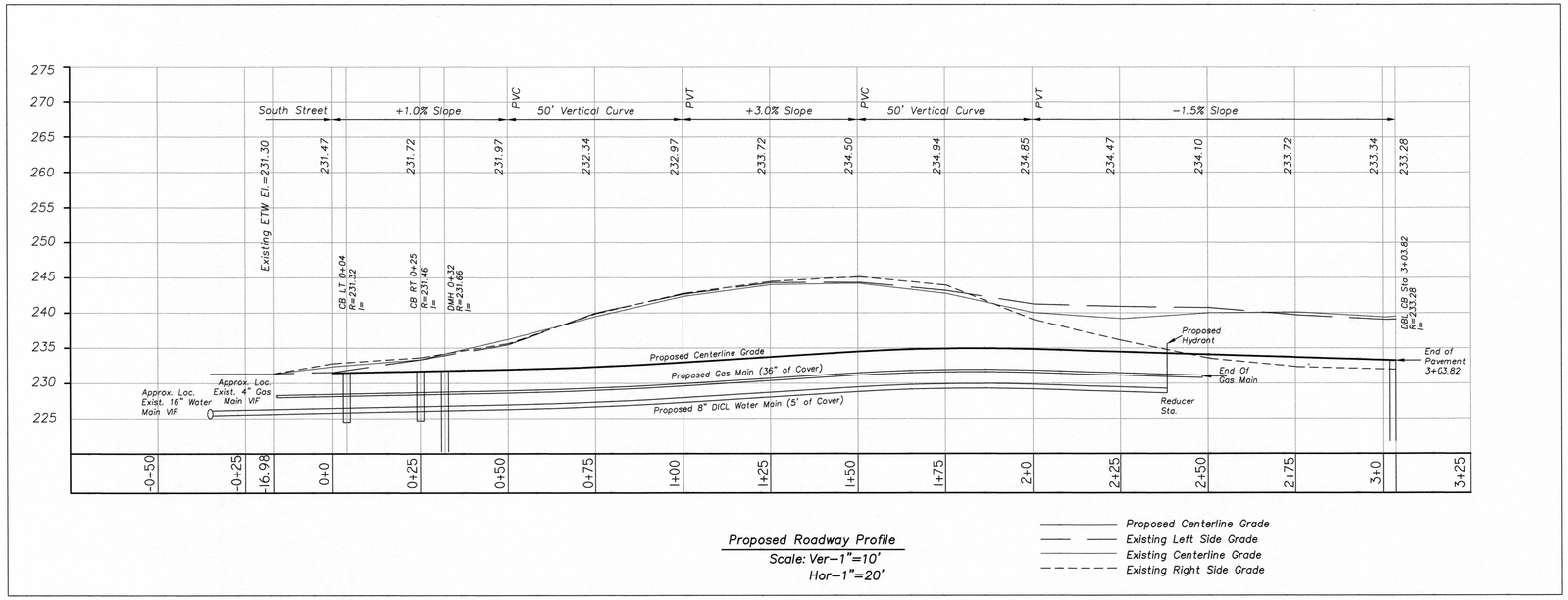
Land Surveyors - Civil Engineers

354 Elliot Street, Newton, Ma. 02464

0 20 40 60 80

Sheet 5 of 8

Project:	22019
Desinged By:	
Drawn By:	
Checked By:	



Proposed Roadway Profile
Scale: Ver-1"=10'
Hor-1"=20'

- Proposed Centerline Grade
- Existing Left Side Grade
- Existing Centerline Grade
- Existing Right Side Grade

Dig Safe
•Excavators
Before you dig contact the Dig Safe Center. To prevent damage to telephone, gas or electric underground facilities of member utilities, call toll free
Massachusetts state law requires notification at least three business days before you start digging operations. In an emergency, call immediately.

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TOWN ENGINEER	
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Owner/Applicant:
Brian Connaughton
920 South Street
Needham, Ma. 02492
Cert. #207299

REVISIONS	
DATE	DESCRIPTION

COMMONWEALTH OF MASSACHUSETTS — VERNE T. PORTER JR. LAND SURVEYOR 37736 — REGISTERED PROFESSIONAL LAND SURVEYOR

FRED T. HESKETT — REGISTERED LANDSCAPE ARCHITECT

~Plan, Profile & Detail Sheet~

920 South Street

Needham, Massachusetts

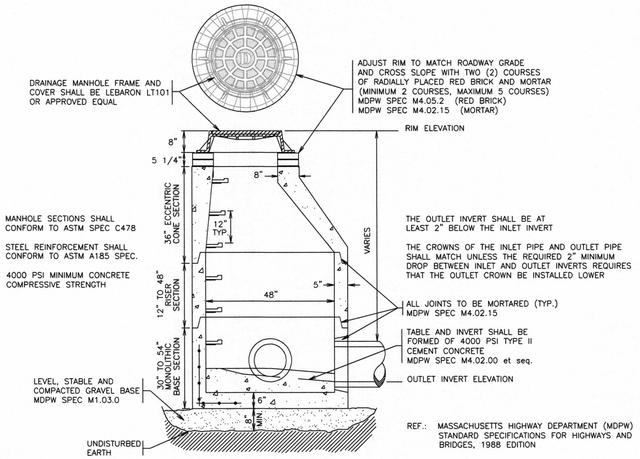
Scale: As Noted September 9, 2022

VERNE T. PORTER Jr, PLS
Land Surveyors - Civil Engineers
354 Elliot Street, Newton, Ma. 02464

0

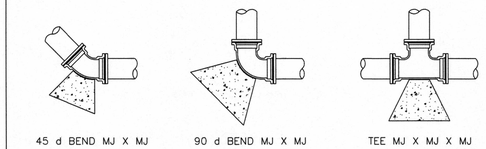
Sheet 6 of 8

Project:	22019
Desinged By:	
Drawn By:	
Checked By:	



TYPICAL DRAINAGE MANHOLE DETAIL

NO SCALE



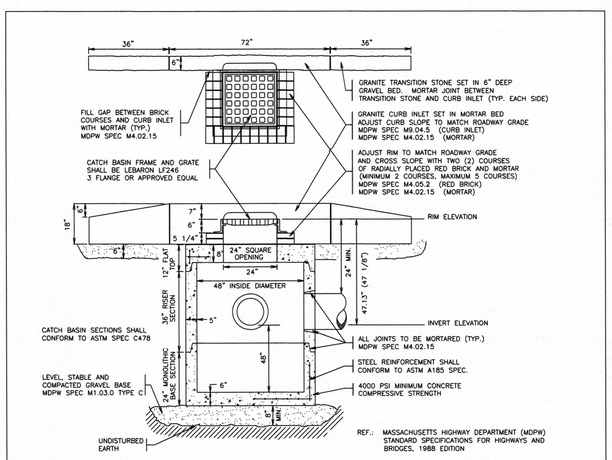
PIPE SIZE	MINIMUM SURFACE AREA (S.F.) OF CONCRETE AGAINST UNDISTURBED EARTH				
	11 1/4 d	22 1/2 d	45 d	90 d	TEE
6"	0.7	1.0	2.0	3.0	2.5
8"	1.0	1.5	3.0	3.5	3.0
10"	2.0	2.5	5.0	7.0	6.0
12"	3.0	3.5	7.0	10.0	9.0

NOTE: PIPE FITTINGS SHALL BE AS MANUFACTURED BY U.S. PIPE SPEC. U501, U503, U505, U507, U509 OR APPROVED EQUAL

CONCRETE SHALL BE 3000 PSI PORTLAND TYPE II CEMENT CONCRETE MEETING MDPW SPEC M4.02.00 et seq. AND SHALL BE PLACED SO AS TO NOT INTERFERE WITH THE JOINTS OF THE FITTING

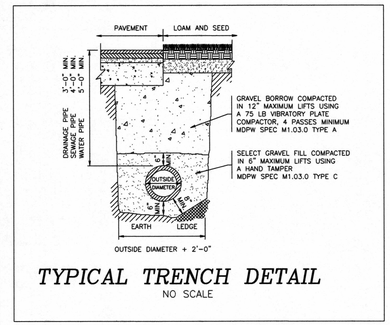
TYPICAL THRUST BLOCK DETAIL

NO SCALE



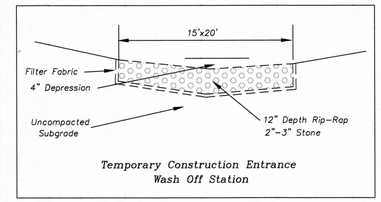
TYPICAL CATCH BASIN DETAIL

NO SCALE



TYPICAL TRENCH DETAIL

NO SCALE



Temporary Construction Entrance Wash Off Station

Dig Safe
•Excavators
Before you dig contact the Dig Safe Center. To prevent damage to telephone, gas or electric underground facilities of member utilities, call toll free
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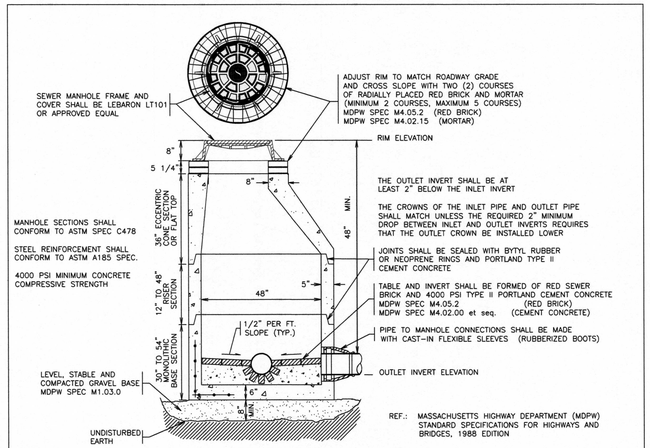
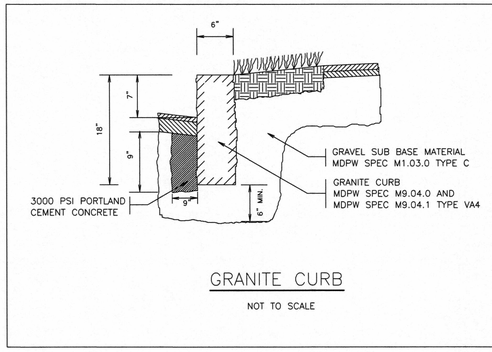


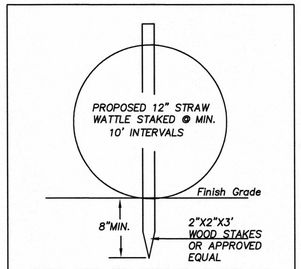
TYPICAL SEWER MANHOLE DETAIL

NO SCALE



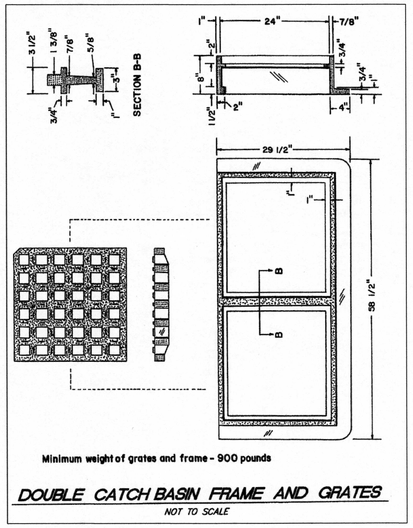
GRANITE CURB

NOT TO SCALE



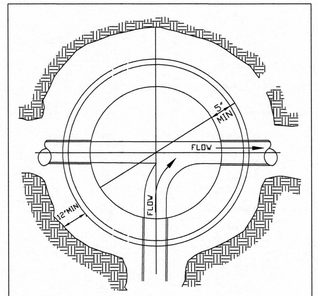
STRAW WATTLE DETAIL

NTS



DOUBLE CATCH BASIN FRAME AND GRATES

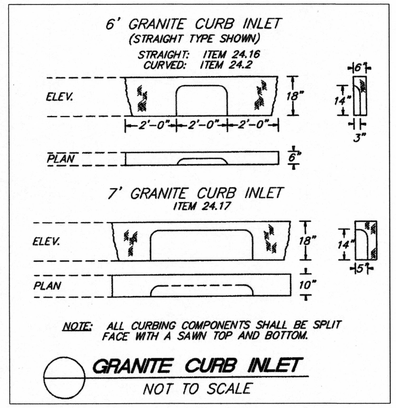
NOT TO SCALE



INVERT TABLE PLAN

TOP VIEW
(NOT TO SCALE)

NINV



NOTE: ALL CURBING COMPONENTS SHALL BE SPLIT FACE WITH A SAWN TOP AND BOTTOM.

GRANITE CURB INLET

NOT TO SCALE

DIRECTOR OF PUBLIC WORKS
DATE APPROVED
TOWN ENGINEER
DATE APPROVED
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9-28-22

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS

9-28-22

Owner/Applicant:
Brian Connaughton
920 South Street
Needham, Ma. 02492
Cert. #207299

REVISIONS	
DATE	DESCRIPTION

COMMONWEALTH OF MASSACHUSETTS — VERNE T. PORTER JR. — LAND SURVEYOR — 37138 — REGISTERED PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS — PAUL J. TYRELL — CIVIL — NO. 49319 — REGISTERED PROFESSIONAL ENGINEER

~Detail Sheet~

920 South Street

Needham, Massachusetts

Scale: As Noted September 9, 2022

VERNE T. PORTER Jr, PLS
Land Surveyors - Civil Engineers
354 Elliot Street, Newton, Ma. 02464

0

Sheet 7 of 8

Project:	22019
Desinged By:	
Drawn By:	
Checked By:	

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•Excavators
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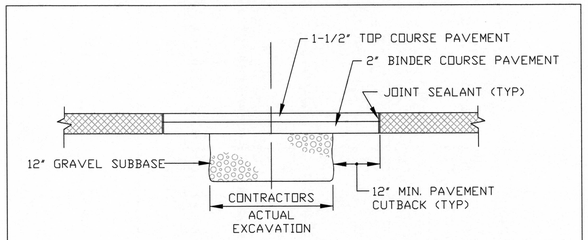
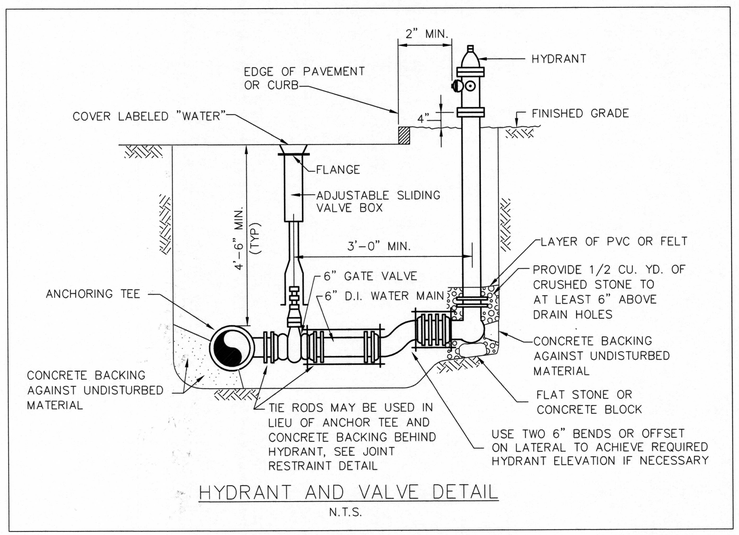
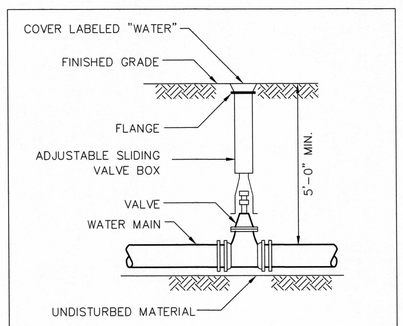


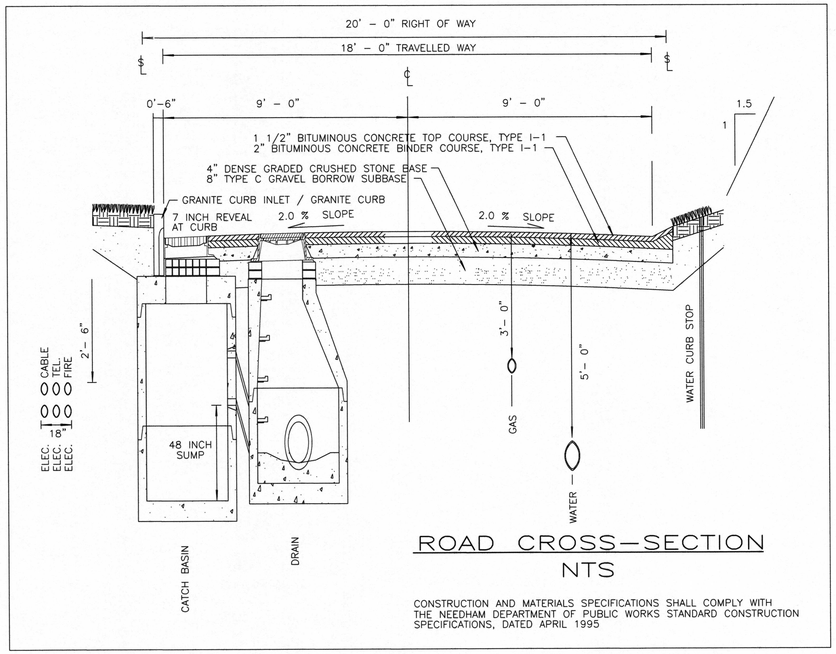
PAVEMENT REPLACEMENT DETAILS
N.T.S.



HYDRANT AND VALVE DETAIL
N.T.S.



VALVE AND BOX DETAIL
N.T.S.



ROAD CROSS-SECTION
NTS

CONSTRUCTION AND MATERIALS SPECIFICATIONS SHALL COMPLY WITH THE NEEDHAM DEPARTMENT OF PUBLIC WORKS STANDARD CONSTRUCTION SPECIFICATIONS, DATED APRIL 1995

DIRECTOR OF PUBLIC WORKS
DATE APPROVED
TOWN ENGINEER
DATE APPROVED
I, TOWN CLERK OF THE TOWN OF NEEDHAM, HEREBY CERTIFY THAT THE NOTICE OF THE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE
DATE — TOWN CLERK

APPROVAL IN ACCORDANCE WITH SECTION 91-U OF CHAPTER 41 OF THE GENERAL LAWS AS AMENDED
TOWN OF NEEDHAM PLANNING BOARD
BY:
APPROVED:

I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS PLAN IS TRUE AND CORRECT TO THE ACCURACY REQUIRED BY THE SUBDIVISION REGULATIONS AND PROCEDURAL RULES OF THE NEEDHAM PLANNING BOARD.

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS

9-24-22

REVISIONS	
DATE	DESCRIPTION

VERNE T. PORTER JR. LAND SURVEYOR 37705 — COMMONWEALTH OF MASSACHUSETTS — REGISTERED PROFESSIONAL LAND SURVEYOR

PAUL J. TYRELL CIVIL No. 45810 — COMMONWEALTH OF MASSACHUSETTS — REGISTERED PROFESSIONAL ENGINEER

~Detail Sheet~

920 South Street

Needham, Massachusetts

Scale: As Noted — September 9, 2022

VERNE T. PORTER Jr, PLS

Land Surveyors - Civil Engineers

354 Elliot Street, Newton, Ma. 02464

0

Sheet 8 of 8

Project:22019

Desinged By:

Drawn By:

Checked By:

DRAINAGE SUMMARY

PROPOSED TWO-LOT RESIDENTIAL SUBDIVISION 920 SOUTH STREET NEEDHAM, MASSACHUSETTS

September 28, 2022

VERNE T. PORTER JR., PLS
LAND SURVEYORS – CIVIL ENGINEERS
354 ELLIOT STREET
NEWTON, MA 02464

DRAINAGE SUMMARY
PROPOSED TWO-LOT
RESIDENTIAL SUBDIVISION
920 SOUTH STREET
NEEDHAM, MASSACHUSETTS

The proposed project consists of the demolition of an existing single-family dwelling, subdivision of the land and the construction of a two-lot subdivision, including two (2) single-family residential dwellings and a new roadway at 920 South St in Needham, MA, under the requirements of the City of Needham Stormwater By-Law.

The on-site soils in the area are shown as "103C – Charlton-Hollis-rock outcrop complex, 8 to 15 percent slopes" soils on the NRCS Soils Survey map of the area, which are areas that fall within the Hydrological Soil Groups B & D. For purposes of our design, we made a conservative assumption and assumed a C soil with an infiltration rate of 0.27 in/hr. in accordance with Table 2.3.3 Rawles Rates as found in the Massachusetts Stormwater Handbook. VTP will perform soil test pits in the area of the proposed infiltration systems to verify assumptions and provide revised drainage calculations if material differs.

Ground cover on the site is an existing single-family dwelling, bituminous concrete driveway and a shed. The majority of the site is wooded. The existing drainage on the site flows overland from a high point in the middle of the property towards South St and portions flowings towards the rear of the property. Overall, the site will maintain the current flow pattern, however new collection systems for the proposed roadway have been provided to collect the runoff and attenuate offsite flows.

There are bordering vegetated wetland Resource Areas within 100-feet of the lot, to both the east and south of the parcel. The proposed drainage controls are designed to capture & contain the runoff from the proposed building and proposed site improvements. This system will store the runoff from the roadway and allow the stored water to slowly infiltrate after the storm event and overflow offsite.

Under the proposed conditions, with the new buildings and new roadway, the rate of site runoff from the re-developed lot area will be greater than the existing conditions for the 2, 10, 25 & 100-year storm events. The proposed controls have been designed to store this increase to maintain the pre and post runoff rates.

COMPLIANCE WITH STORMWATER STANDARDS

Untreated Stormwater (Standard 1)

The project is designed so that new stormwater conveyances (outfalls/discharges) do not discharge untreated stormwater into, or cause erosion to, existing wetlands.

Post-Development Peak Rates (Standard 2)

A hydrologic study was performed to determine the rate of runoff for the 2, 10, 25 and 100-year storm events under pre-development (existing) conditions. Unmitigated post-development rates were then computed in a similar manner. The study point where the peak rates were compared were taken at two (2) locations at the existing offsite flow areas. From these analyses, it was determined that the proposed project and its stormwater management system would not increase the peak runoff rates above existing levels. It is the intent of the stormwater management system to minimize impacts to drainage patterns, and downstream property prior to its release from the site or discharge to wetlands.

The *United States Department of Agriculture (U.S.D.A)*. Soil Conservation Service (SCS) Technical Release 55 (TR-55), 1986, was used as the procedure for estimating runoff. A SCS TR-20-based computer program was used for estimating peak discharges. TR-55 is a generally accepted model for use on small sites that begin with a rainfall amount uniformly imposed on the watershed over a specified time distribution. Mass rainfall is converted to mass runoff by using a runoff curve number (CN). CN is based on soils, plant cover, impervious areas, interception, and surface storage. Runoff is then transformed into a hydrograph that depends on runoff travel time through segments of the watershed.

Development in a watershed changes the watershed's response to precipitation. The most common effects are reduced infiltration and decreased travel time, which can result in significantly higher peak rates of runoff. The volume of runoff is determined primarily by the amount of precipitation and by infiltration characteristics related to soil type, antecedent rainfall, type of vegetal cover, impervious surfaces, and surface retention. Travel time is determined primarily by slope, flow length, depth of flow, and roughness of flow surfaces. Peak rates of discharge are based on the relationship of the above parameters, as well as the total drainage area of the watershed, the location of the development in relation to the total drainage area, and the effect of any flood control works or other manmade storage. Peak rates of discharge are also influenced by the distribution of rainfall within a given storm event.

Stormwater management computations for the full-build were performed using a SCS-based *HYDROCAD* for existing and proposed conditions, curve numbers, time of concentrations and unit hydrograph computations.

Existing Conditions

Table 1. Shows the curve numbers, areas and times of concentration used to develop the pre-development hydrologic model of the site.

Table 1. – Existing Conditions					
Sub-Areas	**Surface Cover**	**Curve Number (CN)**	**Area (SF)**	**Tc (Mins.)**	**Remarks**
Area #1				6.0	
	Exist Bldgs.	98	3,365		Incls. Shed
	Exist. Imp.	98	14,690		Incls. Walks & patios
	Lawn/Woods	76	42,006		
Area #2					
	Lawn/Woods	76	64,724		
		Total Area	124,785		
*CN based on Class C soils.					

Proposed Conditions

The proposed conditions will result in a new collection system that will collect the site run-off from the proposed roadway and proposed dwellings and direct it to underground leaching systems prior to overflowing off-site. For purposes of this report, we have assumed

Table 2. Shows the curve numbers, areas and times of concentration used to develop the post-development hydrologic model of the site.

Table 2. – Proposed Conditions					
Sub-Areas	**Surface Cover**	**Curve Number (CN)**	**Area (SF)**	**Tc (Mins.)**	**Remarks**
Area #1				6.0	
	1-Acre Lot	79	43,609		20% Impervious
Area #2				6.0	
	2-Acre Lot	77	61,320		12% Impervious
Area #3				6.0	
	Bit. Conc. Road	98	5,728		
	Lawn Area	77	6,076		Road shoulder
Area #4				6.0	
	Bit. Conc. Road	98	3,052		
	Lawn Area	77	5,000		Road shoulder
		Total Area	124,785		
*CN based on Class C soils.					

Peak Rate Summary

Table 3. Shows the peak runoff for the existing, as well as for the developed site at 100-year design storms.

Areas	Design Storm	Existing Runoff* (CFS)	Existing Volume* (Ac-Ft)	Proposed Runoff* (CFS)	Proposed Volume* (Ac-Ft)
Offsite Flow					
South St	2-yr.	2.57	0.187	1.54	0.113
	10-yr.	4.81	0.350	3.09	0.224
	25-yr.	6.61	0.486	4.37	0.318
	100-yr.	10.31	0.774	7.06	0.555
Wetland					
	2-yr.	1.93	0.144	1.93	0.143
	10-yr.	4.13	0.299	4.05	0.293
	25-yr.	5.99	0.434	5.83	0.423
	100-yr.	9.95	0.729	9.58	0.754

Recharge to Groundwater (Standard 3)

The change in groundcover for the new development will change by increasing the impervious areas by approximately 6,533 sf. Groundwater infiltration will be achieved through the individual underground storage areas.

Required Recharge Volume for the entire site was calculated in accordance with the Massachusetts Stormwater Management Standards:

Rv = F * impervious area (in acres)
Rv = (0.25/12) * 0.564 = 0.012 Ac-ft. = 512.25 CF

Rv = Required Recharge Volume;
F = Target Depth Factor (0.25 in. for soils of Hydrologic Soil Group C);
Impervious area = building, pavement on site in post development condition (0.546 Ac).

The proposed onsite leaching systems will store and infiltrate over 512.25 cf in just the 2-year storm event.

In addition to MA Stormwater Standards for recharge, the Town of Needham has a requirement of 1" of the total proposed impervious area to be recharged.

The total SF of the impervious area in the proposed development is 24,588 sf (based on Lot 1 and Lot 2 percentages). This results in 2,049 cf of runoff. The proposed infiltration sytsems provide 3,746.16 cf of available storage.

Removal of TSS (Standard 4)

To handle the TSS removal of the proposed roadway, a 4' deep sump has been provided in the proposed catchbasins..

Land Uses with Higher Potential Pollutant Loads (Standard 5)

The use proposed does not differ from the current use of the space and has no higher potential for pollution.

Critical Areas (Standard 6 – Water Quality Treatments)

This site does not lie within a critical area. One-half inch (1/2") of runoff is the standard for treatment relative to water quality, but as stated prior, the proposed use will not create pollutants in excess of what exists today, and per the Town of Needham standards we are storing an infiltration over 1" of run-off.

Redevelopment (Standard 7)

Redevelopment projects are those that involve development, rehabilitation or expansion on previously developed sites provided the redevelopment results in no net increase in impervious area. Furthermore, components of redevelopment project, which include development of previously undeveloped sites, do not fall under Standard 7. In addition, redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable. However, if it is not practicable to meet all the Standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions.

The project, as proposed, is new two-lot residential subdivision building on an existing developed site, with an increase in impervious areas. VTP has considered this project a development and we have met all the applicable standards of the Massachusetts Stormwater Policy.

Erosion and Sedimentation Controls (Standard 8)

Erosion Control measures have been provided on the plans that accompany this application.

Operation and Maintenance Plan (Standard 9)

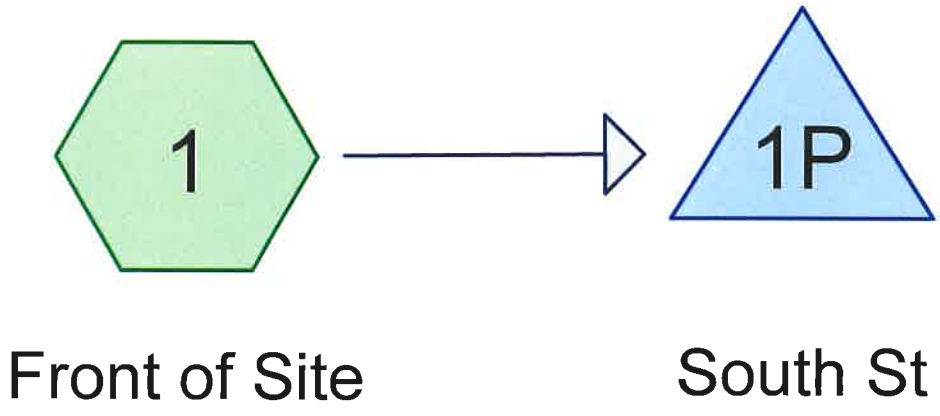
An Operation and Maintenance (O&M) Plan is provided as part of the application.

Prohibition of Illicit Discharges

The Owner and Users of the facility, assures that there will not be illicit discharges to the nearby wetlands from the proposed facility.

Floodplain (310 CMR 10.57)

The project site does not fall with a floodplain district.



Subcat Reach Pond Link

Routing Diagram for South St - Pre Development
Prepared by HP, Printed 9/28/2022

South St - Pre Development
Prepared by HP

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.337	98	Existing Drives and Walks (1)
0.077	98	Existing Dwelling & Shed (1)
2.450	76	Woods/grass comb., Fair, HSG C (1, 2)
2.865	**79**	**TOTAL AREA**

Summary for Subcatchment 1: Front of Site

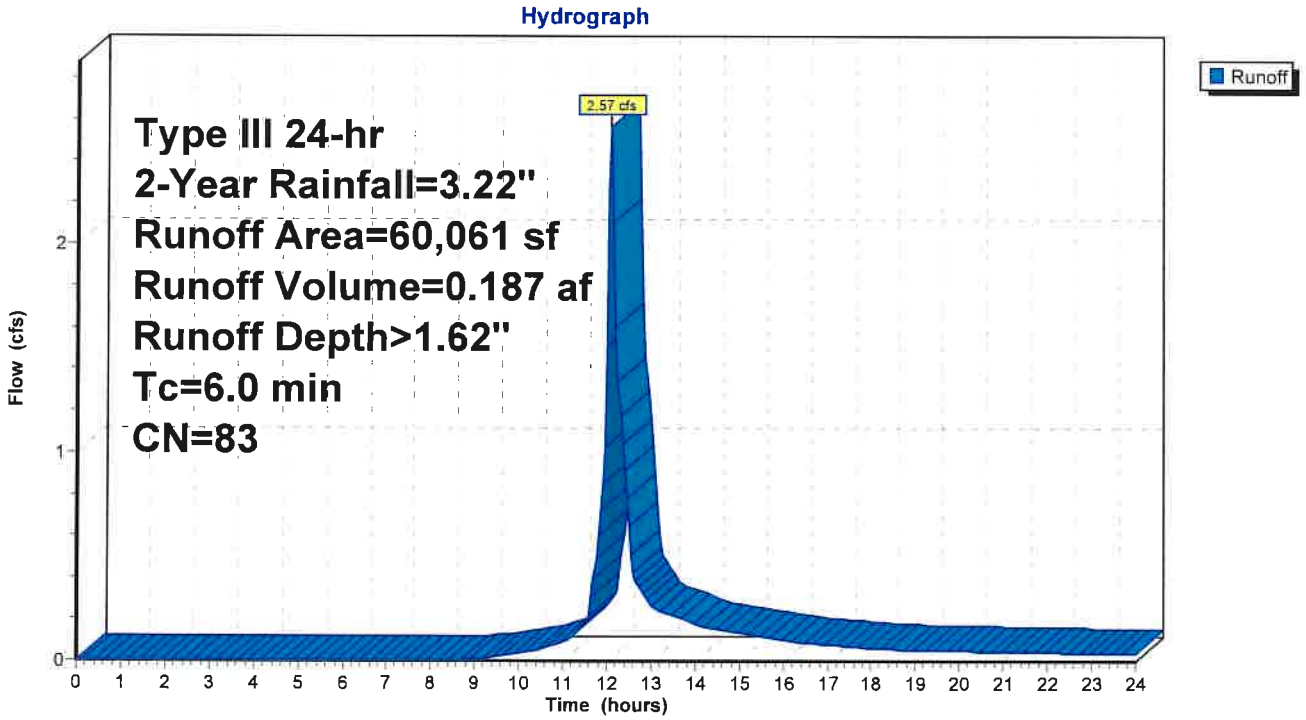
Runoff = 2.57 cfs @ 12.09 hrs, Volume= 0.187 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.22"

	Area (sf)	CN	Description
	42,006	76	Woods/grass comb., Fair, HSG C
*	3,365	98	Existing Dwelling & Shed
*	14,690	98	Existing Drives and Walks
	60,061	83	Weighted Average
	42,006		69.94% Pervious Area
	18,055		30.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 1: Front of Site



Summary for Subcatchment 2: Rear of Site

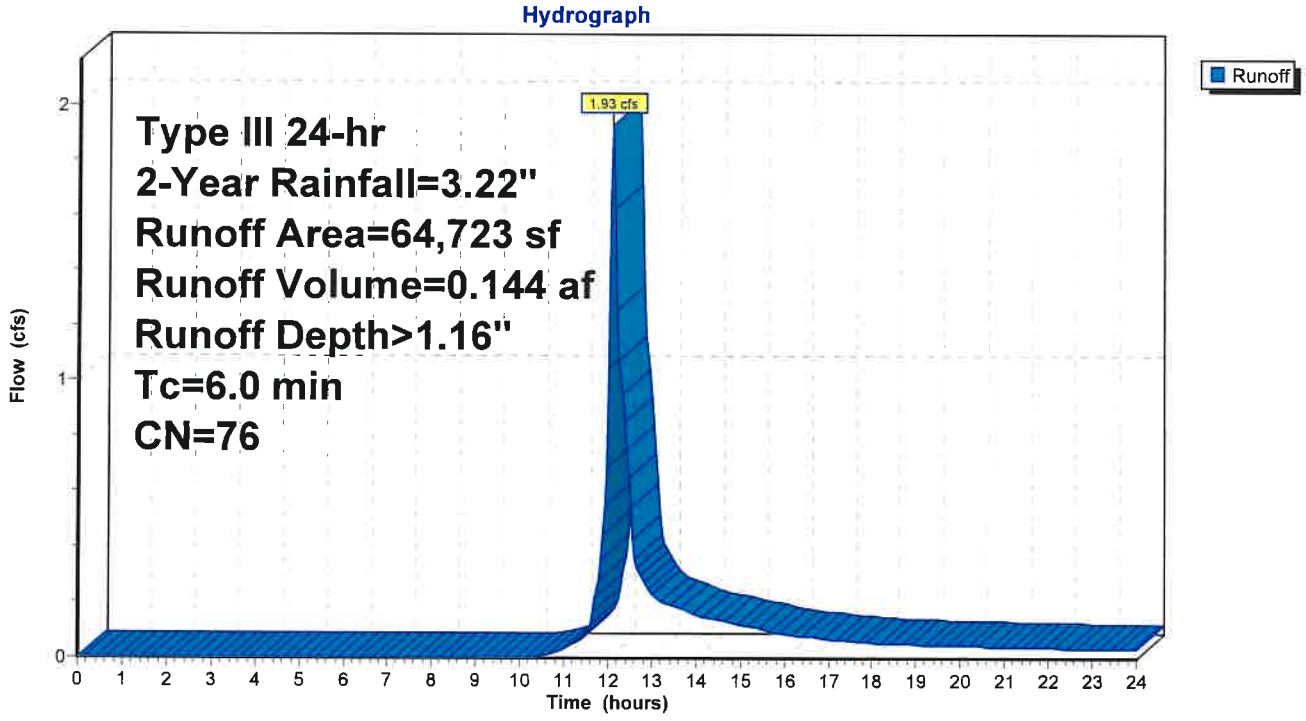
Runoff = 1.93 cfs @ 12.10 hrs, Volume= 0.144 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
64,723	76	Woods/grass comb., Fair, HSG C
64,723		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 2: Rear of Site

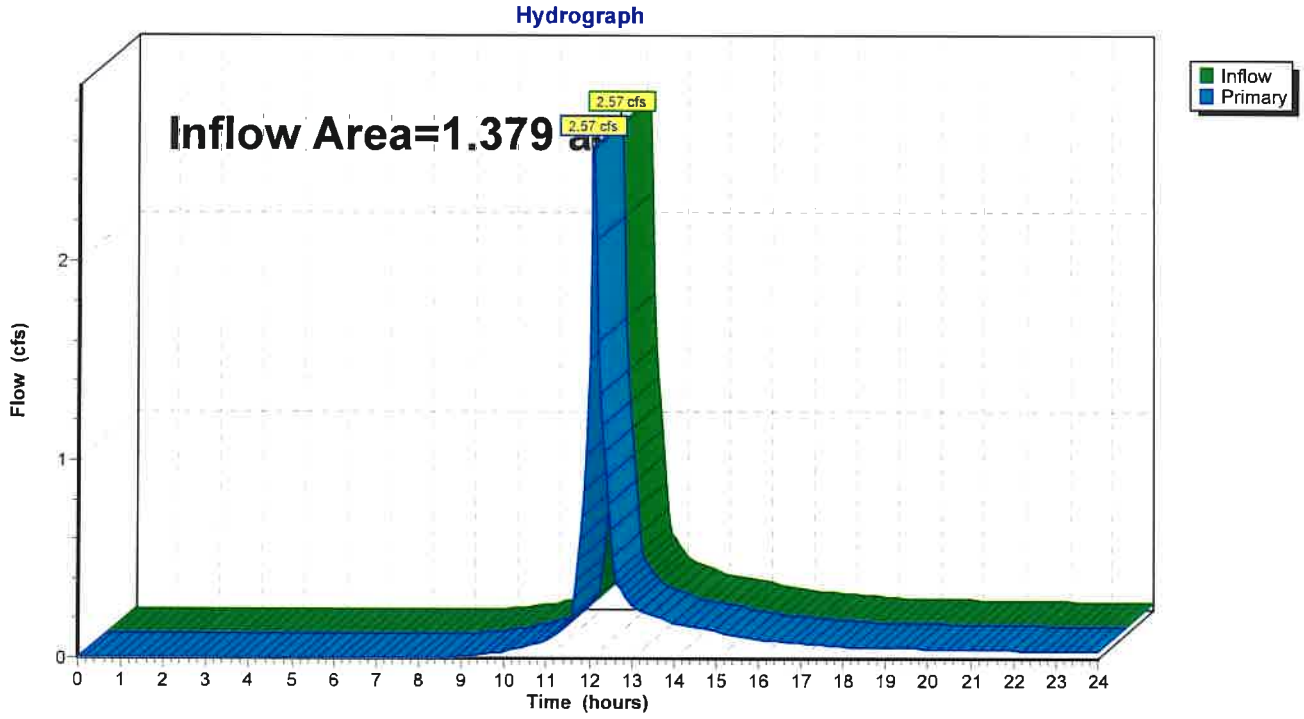


Summary for Pond 1P: South St

Inflow Area = 1.379 ac, 30.06% Impervious, Inflow Depth > 1.62" for 2-Year event
Inflow = 2.57 cfs @ 12.09 hrs, Volume= 0.187 af
Primary = 2.57 cfs @ 12.09 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 1P: South St

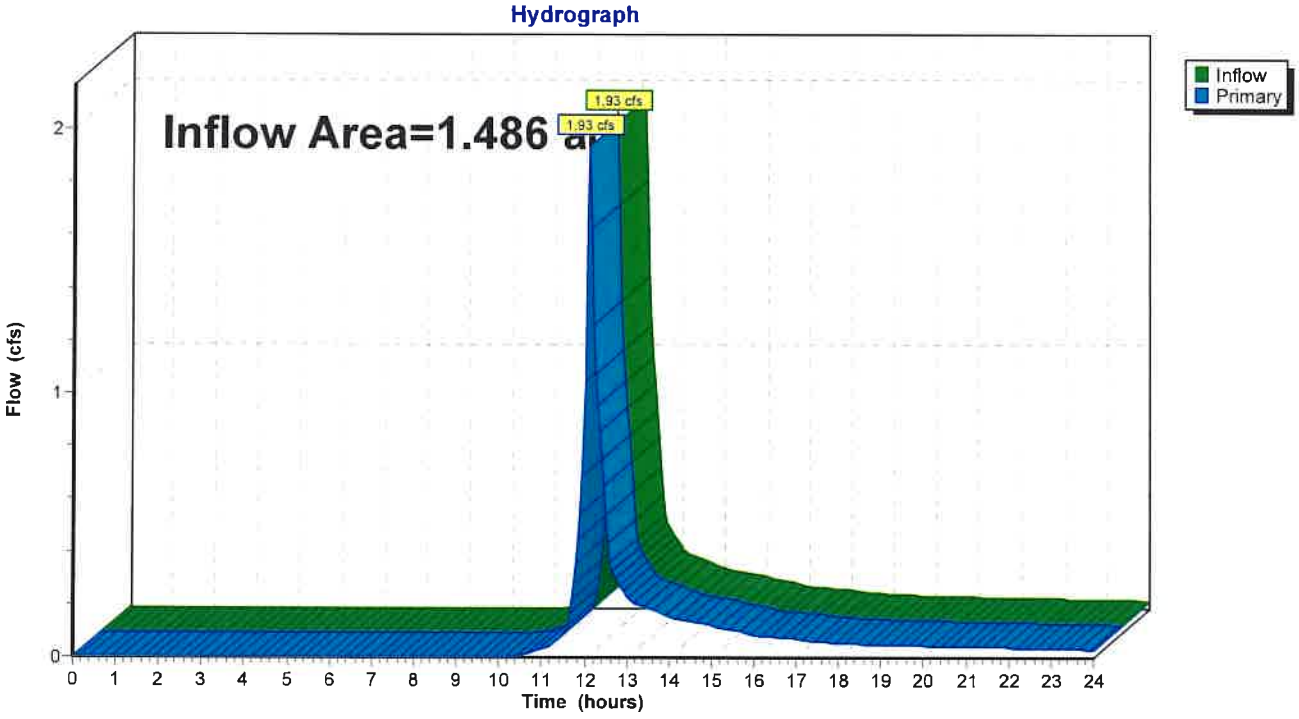


Summary for Pond 2P: Wetland

Inflow Area = 1.486 ac, 0.00% Impervious, Inflow Depth > 1.16" for 2-Year event
Inflow = 1.93 cfs @ 12.10 hrs, Volume= 0.144 af
Primary = 1.93 cfs @ 12.10 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 2P: Wetland



Summary for Subcatchment 1: Front of Site

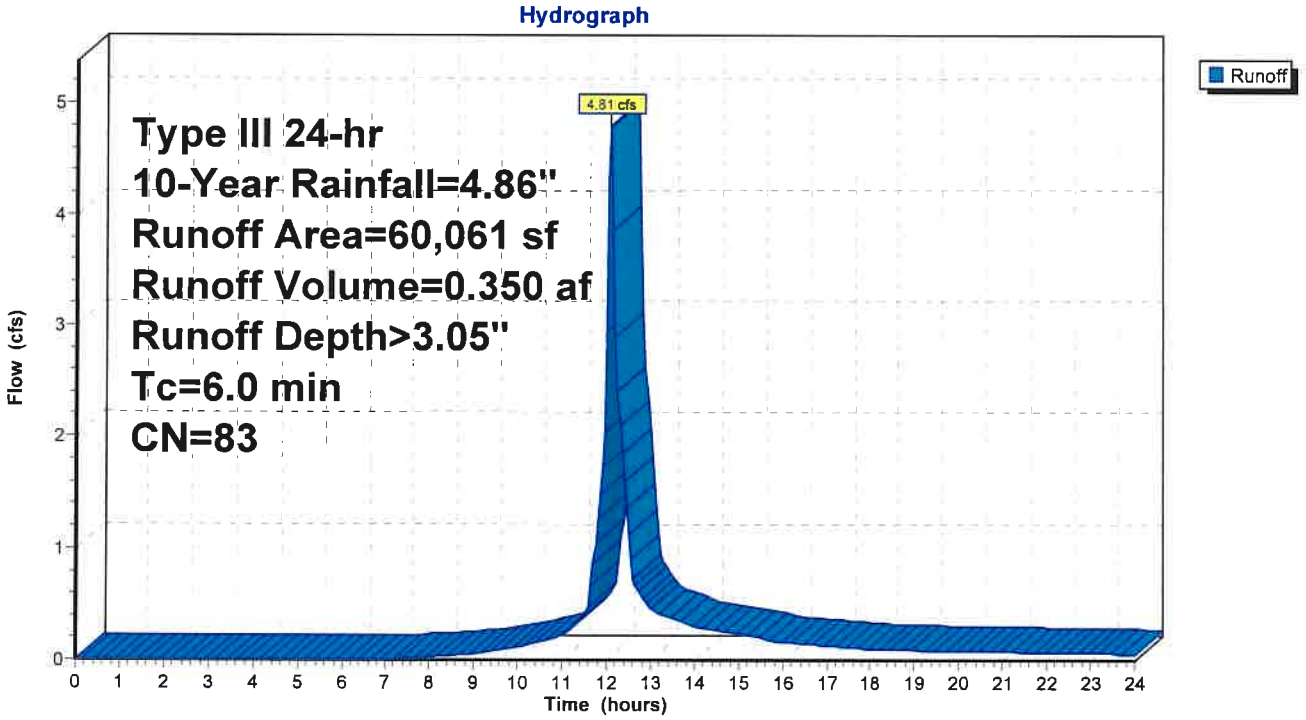
Runoff = 4.81 cfs @ 12.09 hrs, Volume= 0.350 af, Depth> 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	42,006	76	Woods/grass comb., Fair, HSG C
*	3,365	98	Existing Dwelling & Shed
*	14,690	98	Existing Drives and Walks
	60,061	83	Weighted Average
	42,006		69.94% Pervious Area
	18,055		30.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 1: Front of Site



Summary for Subcatchment 2: Rear of Site

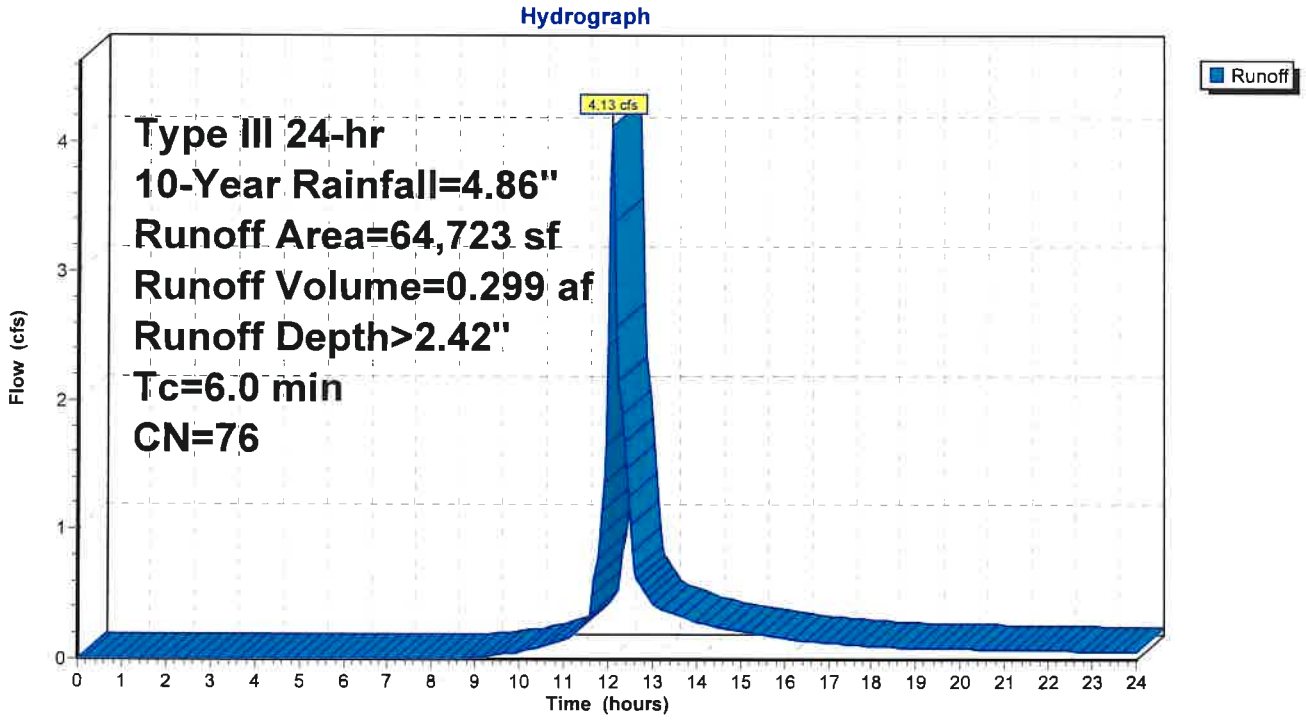
Runoff = 4.13 cfs @ 12.09 hrs, Volume= 0.299 af, Depth> 2.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

Area (sf)	CN	Description
64,723	76	Woods/grass comb., Fair, HSG C
64,723		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 2: Rear of Site

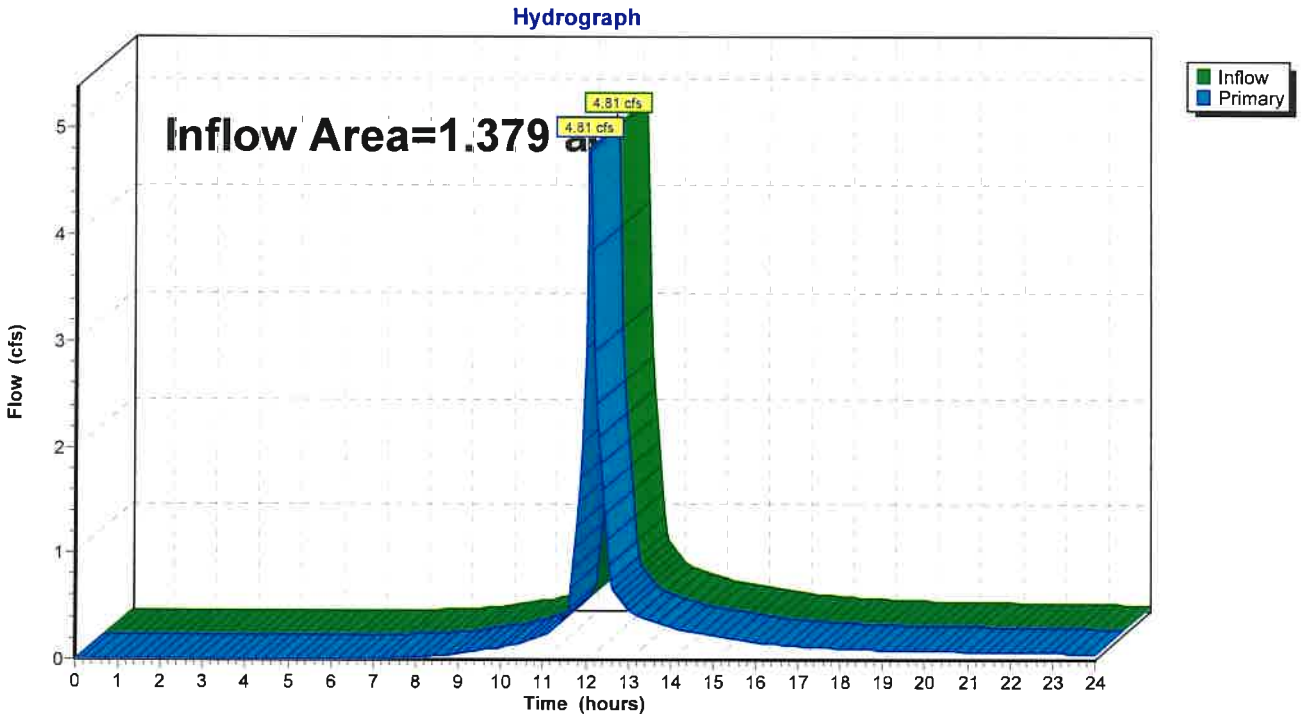


Summary for Pond 1P: South St

Inflow Area = 1.379 ac, 30.06% Impervious, Inflow Depth > 3.05" for 10-Year event
Inflow = 4.81 cfs @ 12.09 hrs, Volume= 0.350 af
Primary = 4.81 cfs @ 12.09 hrs, Volume= 0.350 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 1P: South St

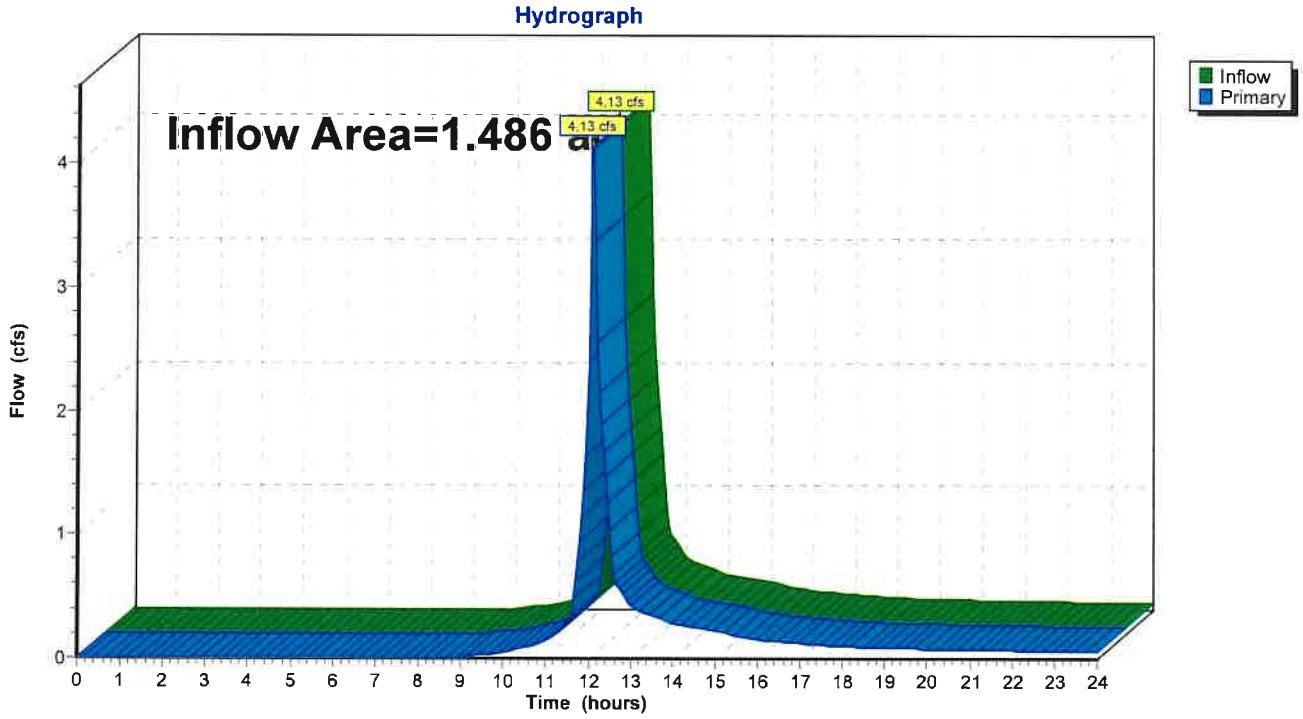


Summary for Pond 2P: Wetland

Inflow Area = 1.486 ac, 0.00% Impervious, Inflow Depth > 2.42" for 10-Year event
Inflow = 4.13 cfs @ 12.09 hrs, Volume= 0.299 af
Primary = 4.13 cfs @ 12.09 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 2P: Wetland



Summary for Subcatchment 1: Front of Site

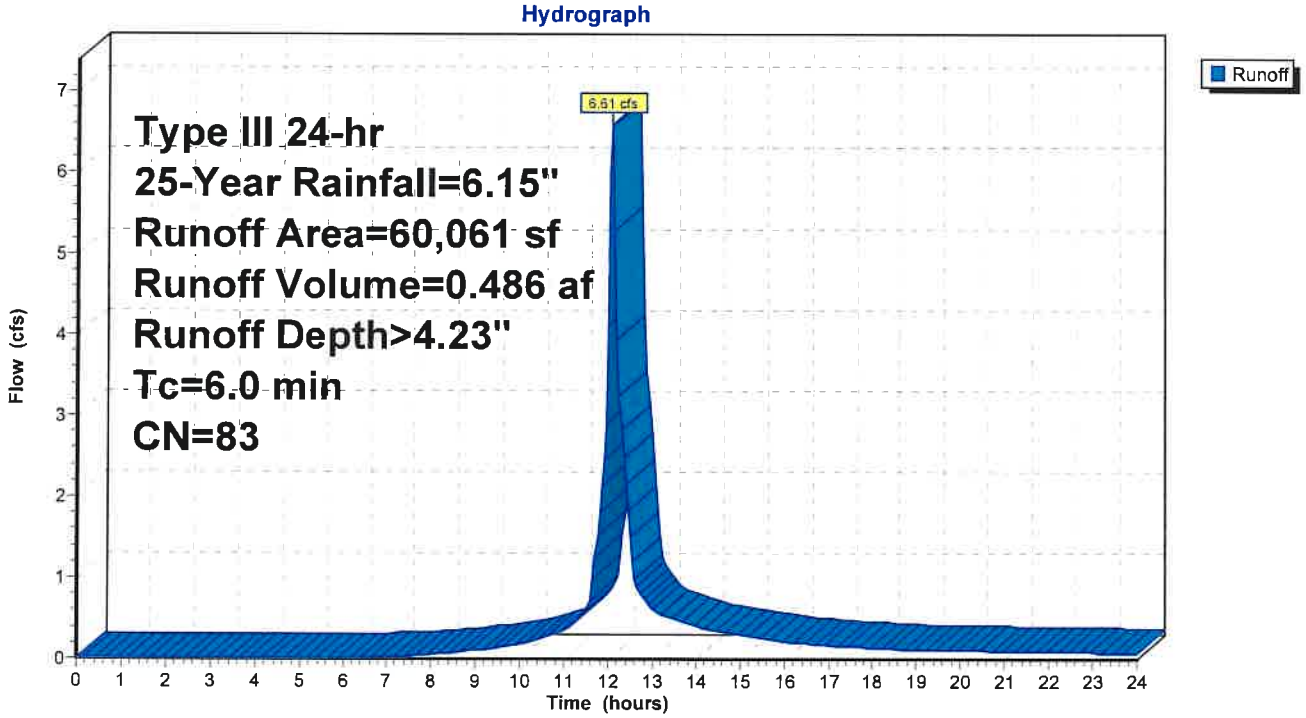
Runoff = 6.61 cfs @ 12.09 hrs, Volume= 0.486 af, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.15"

	Area (sf)	CN	Description
	42,006	76	Woods/grass comb., Fair, HSG C
*	3,365	98	Existing Dwelling & Shed
*	14,690	98	Existing Drives and Walks
	60,061	83	Weighted Average
	42,006		69.94% Pervious Area
	18,055		30.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 1: Front of Site



Summary for Subcatchment 2: Rear of Site

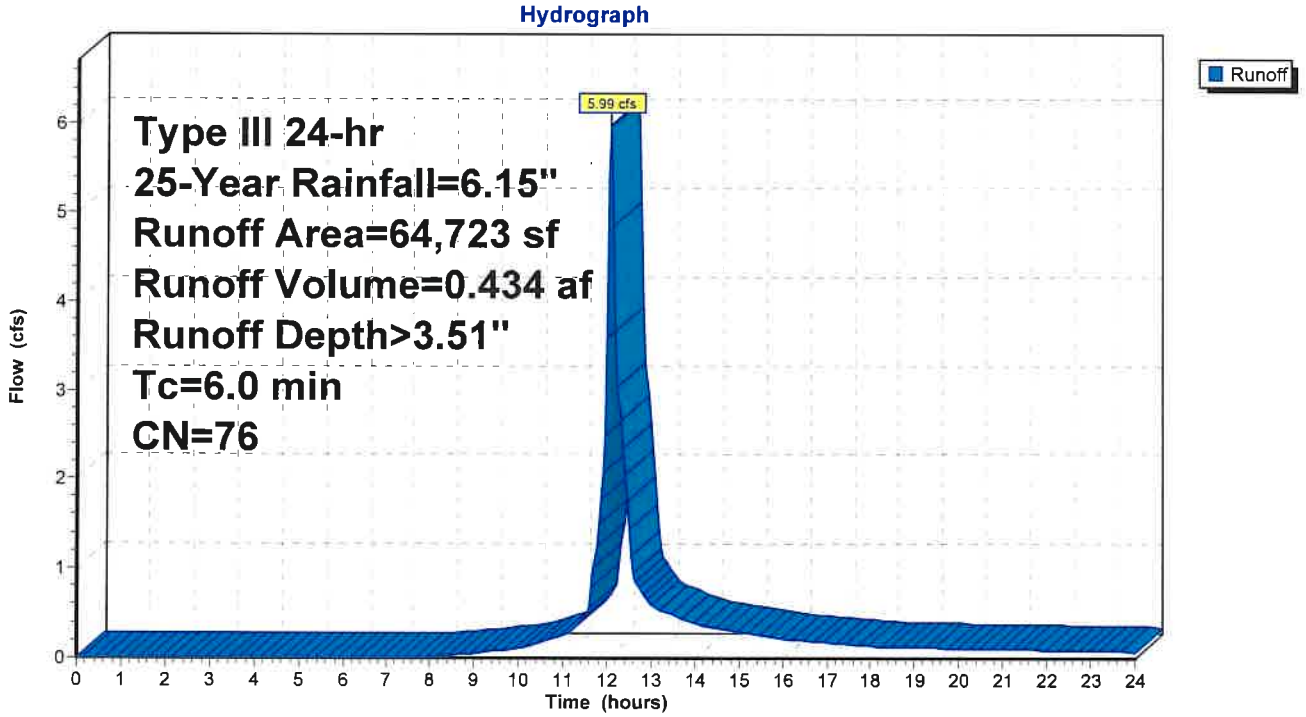
Runoff = 5.99 cfs @ 12.09 hrs, Volume= 0.434 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.15"

Area (sf)	CN	Description
64,723	76	Woods/grass comb., Fair, HSG C
64,723		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 2: Rear of Site

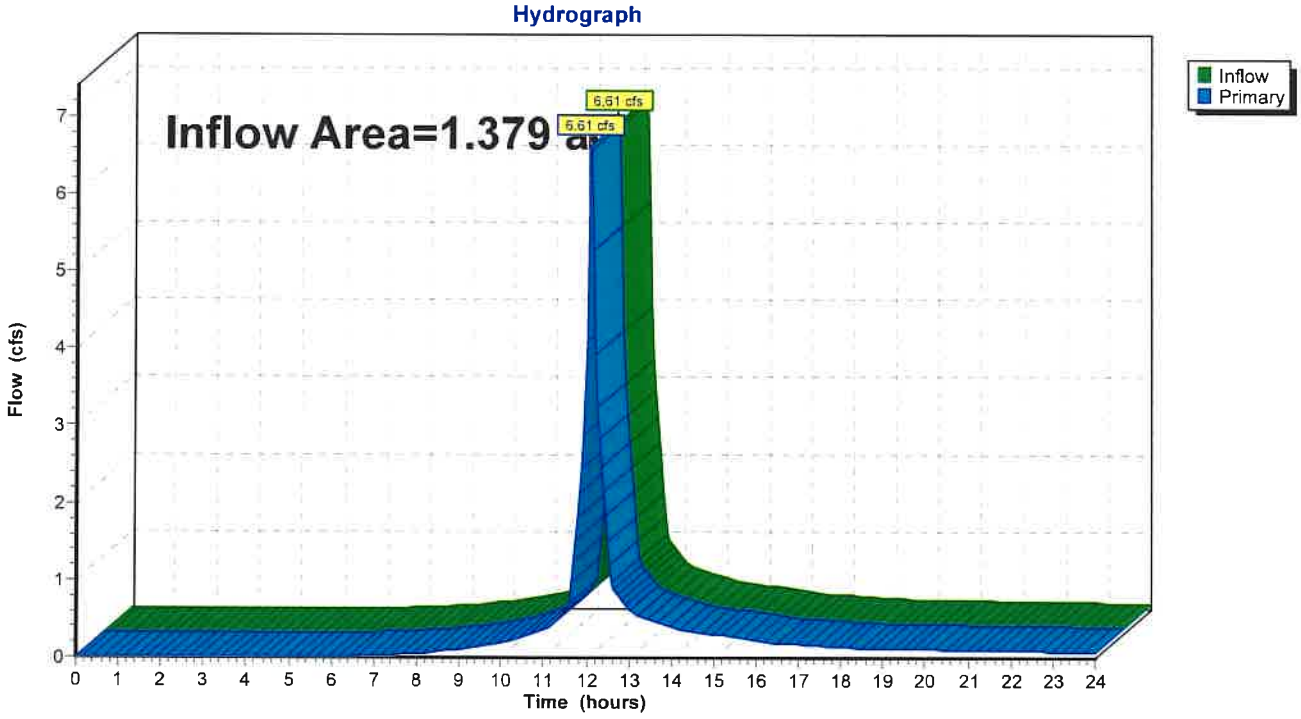


Summary for Pond 1P: South St

Inflow Area = 1.379 ac, 30.06% Impervious, Inflow Depth > 4.23" for 25-Year event
Inflow = 6.61 cfs @ 12.09 hrs, Volume= 0.486 af
Primary = 6.61 cfs @ 12.09 hrs, Volume= 0.486 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 1P: South St

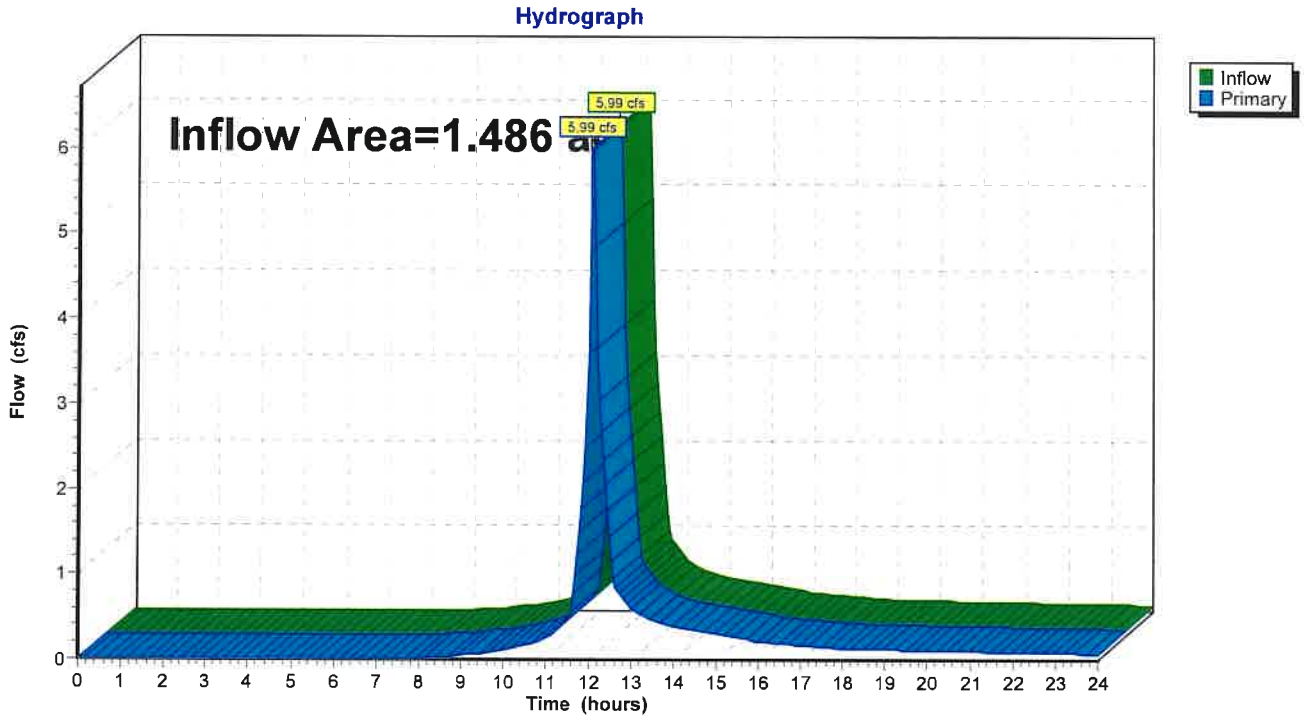


Summary for Pond 2P: Wetland

Inflow Area = 1.486 ac, 0.00% Impervious, Inflow Depth > 3.51" for 25-Year event
Inflow = 5.99 cfs @ 12.09 hrs, Volume= 0.434 af
Primary = 5.99 cfs @ 12.09 hrs, Volume= 0.434 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 2P: Wetland



Summary for Subcatchment 1: Front of Site

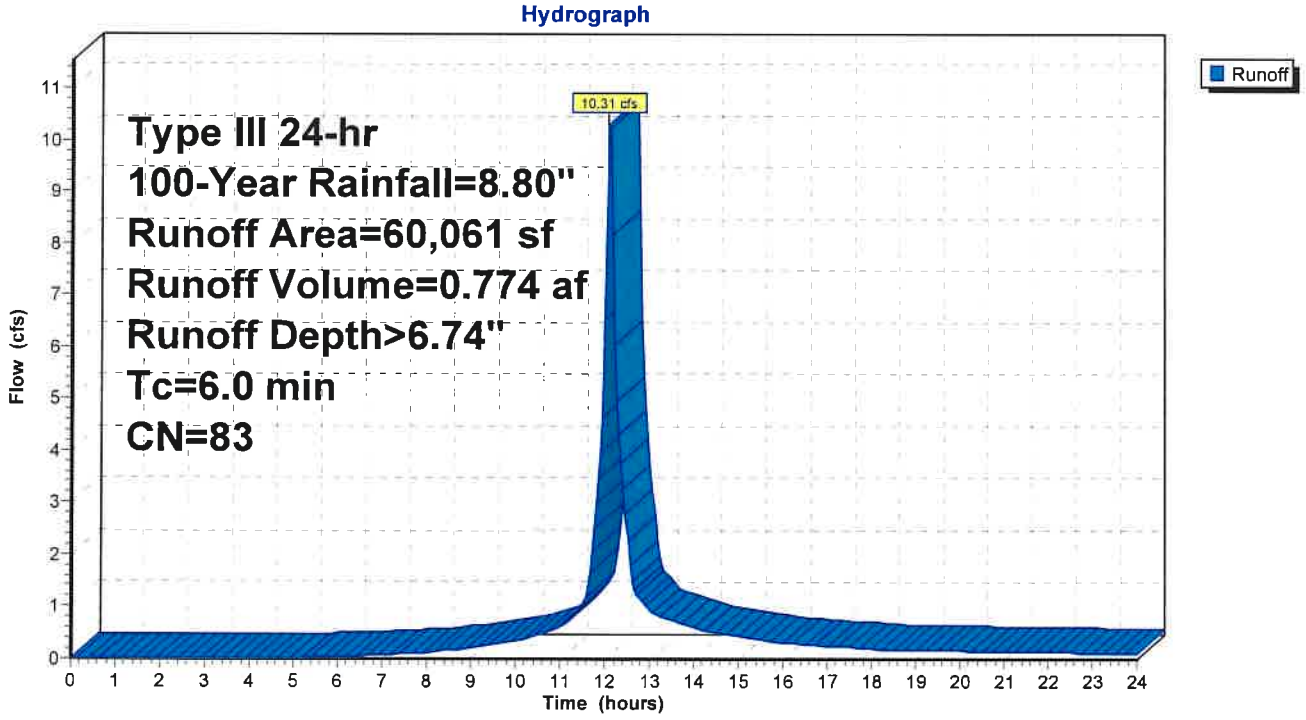
Runoff = 10.31 cfs @ 12.09 hrs, Volume= 0.774 af, Depth> 6.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.80"

	Area (sf)	CN	Description
	42,006	76	Woods/grass comb., Fair, HSG C
*	3,365	98	Existing Dwelling & Shed
*	14,690	98	Existing Drives and Walks
	60,061	83	Weighted Average
	42,006		69.94% Pervious Area
	18,055		30.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 1: Front of Site



Summary for Subcatchment 2: Rear of Site

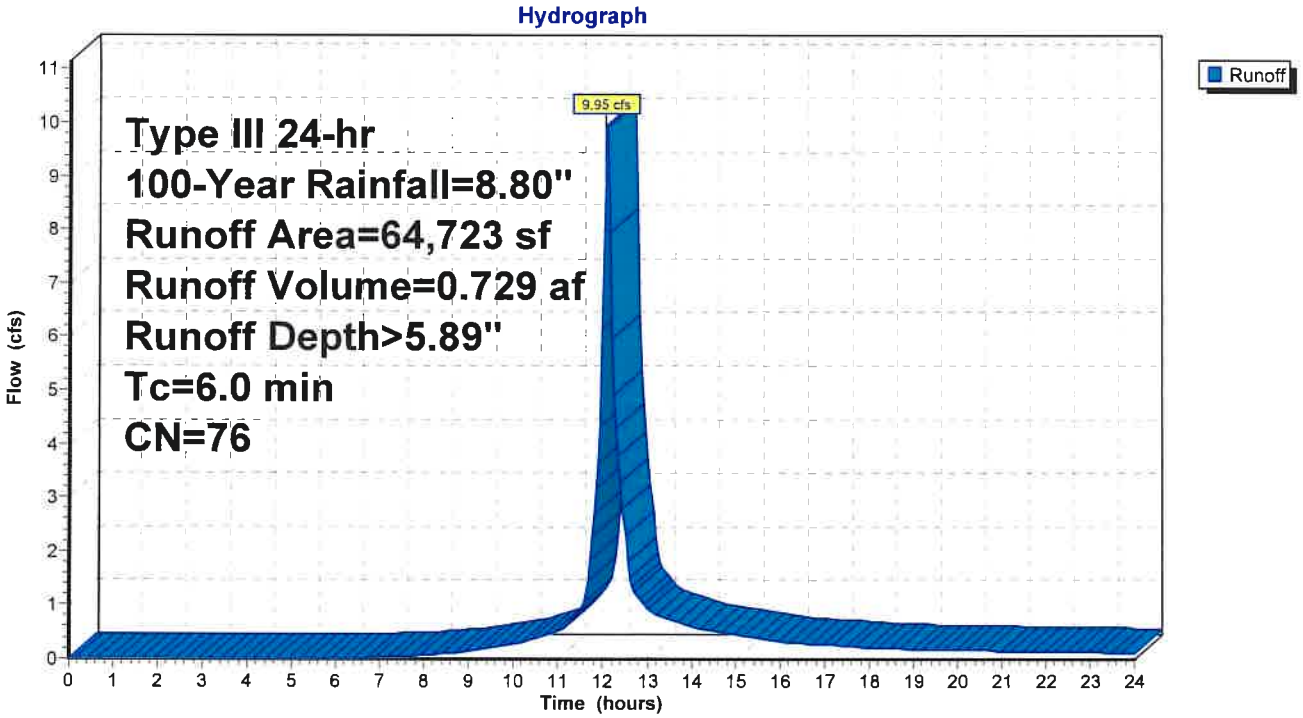
Runoff = 9.95 cfs @ 12.09 hrs, Volume= 0.729 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.80"

Area (sf)	CN	Description
64,723	76	Woods/grass comb., Fair, HSG C
64,723		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 2: Rear of Site

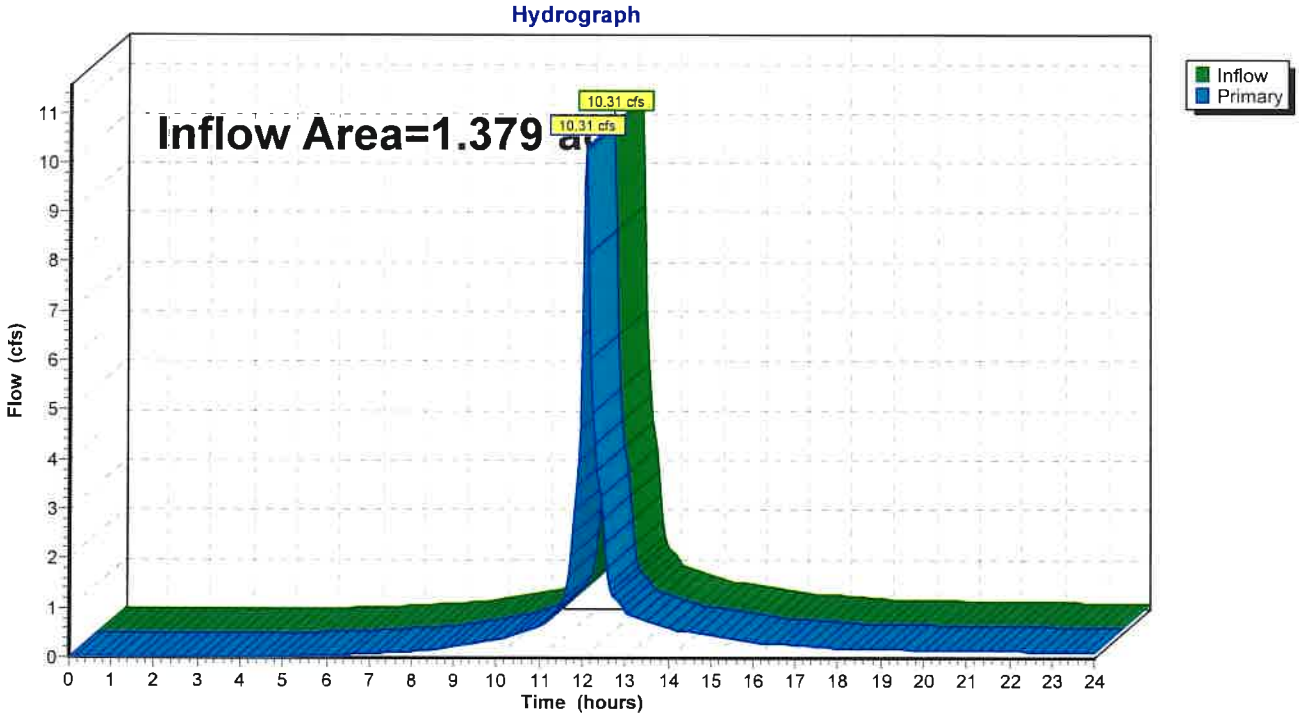


Summary for Pond 1P: South St

Inflow Area = 1.379 ac, 30.06% Impervious, Inflow Depth > 6.74" for 100-Year event
Inflow = 10.31 cfs @ 12.09 hrs, Volume= 0.774 af
Primary = 10.31 cfs @ 12.09 hrs, Volume= 0.774 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 1P: South St

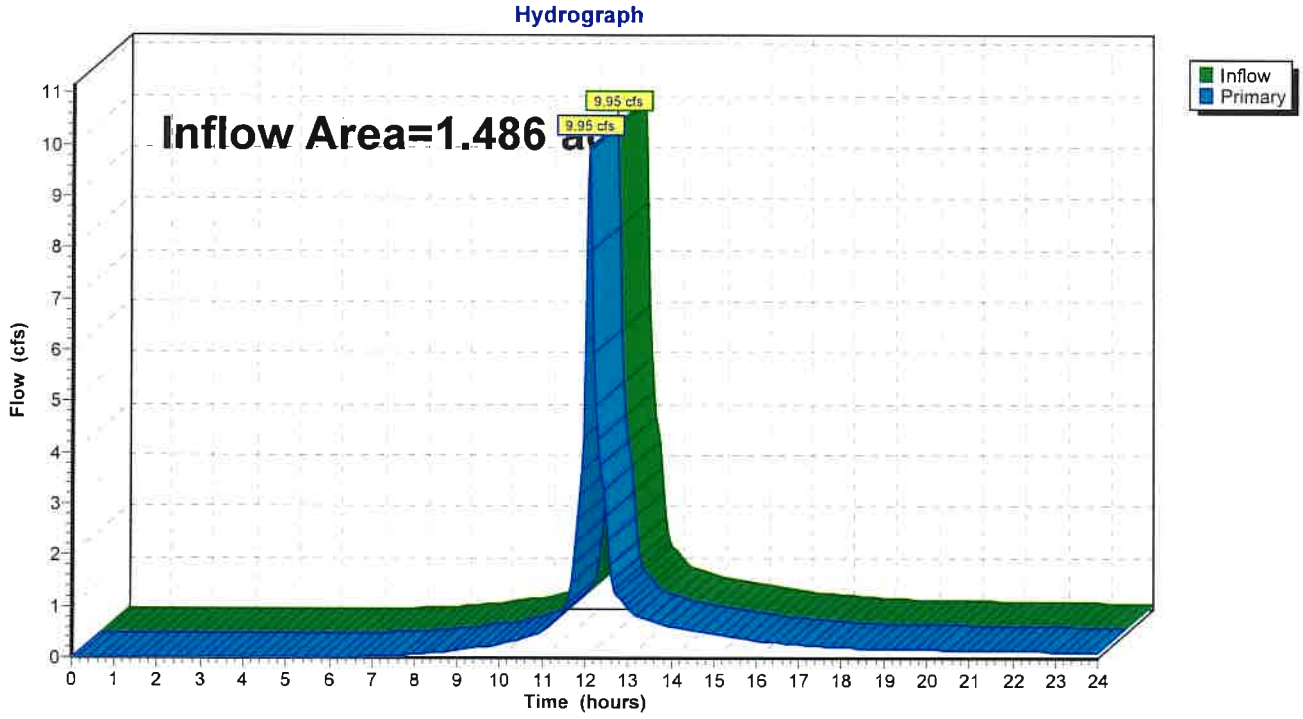


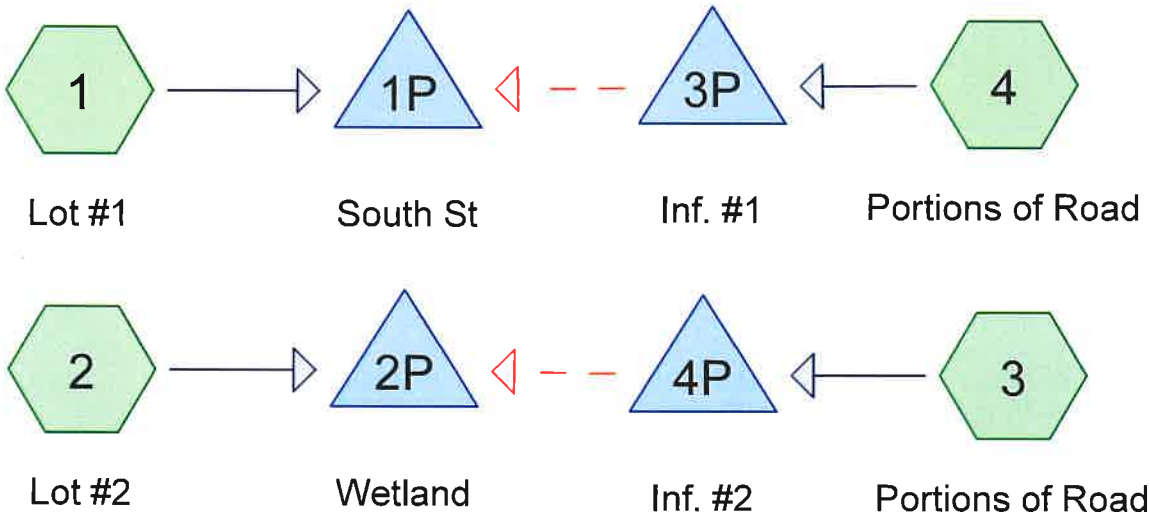
Summary for Pond 2P: Wetland

Inflow Area = 1.486 ac, 0.00% Impervious, Inflow Depth > 5.89" for 100-Year event
Inflow = 9.95 cfs @ 12.09 hrs, Volume= 0.729 af
Primary = 9.95 cfs @ 12.09 hrs, Volume= 0.729 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 2P: Wetland





Subcat Reach Pond Link

Routing Diagram for South St - Post Development
Prepared by HP, Printed 9/28/2022

South St - Post Development

Prepared by HP

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.001	79	1 acre lots, 20% imp, HSG C (1)
1.406	77	2 acre lots, 12% imp, HSG C (2)
0.254	74	>75% Grass cover, Good, HSG C (3, 4)
0.131	98	Portions of Road (3)
0.070	98	Prop. Roadway (4)
2.863	**79**	**TOTAL AREA**

Summary for Subcatchment 1: Lot #1

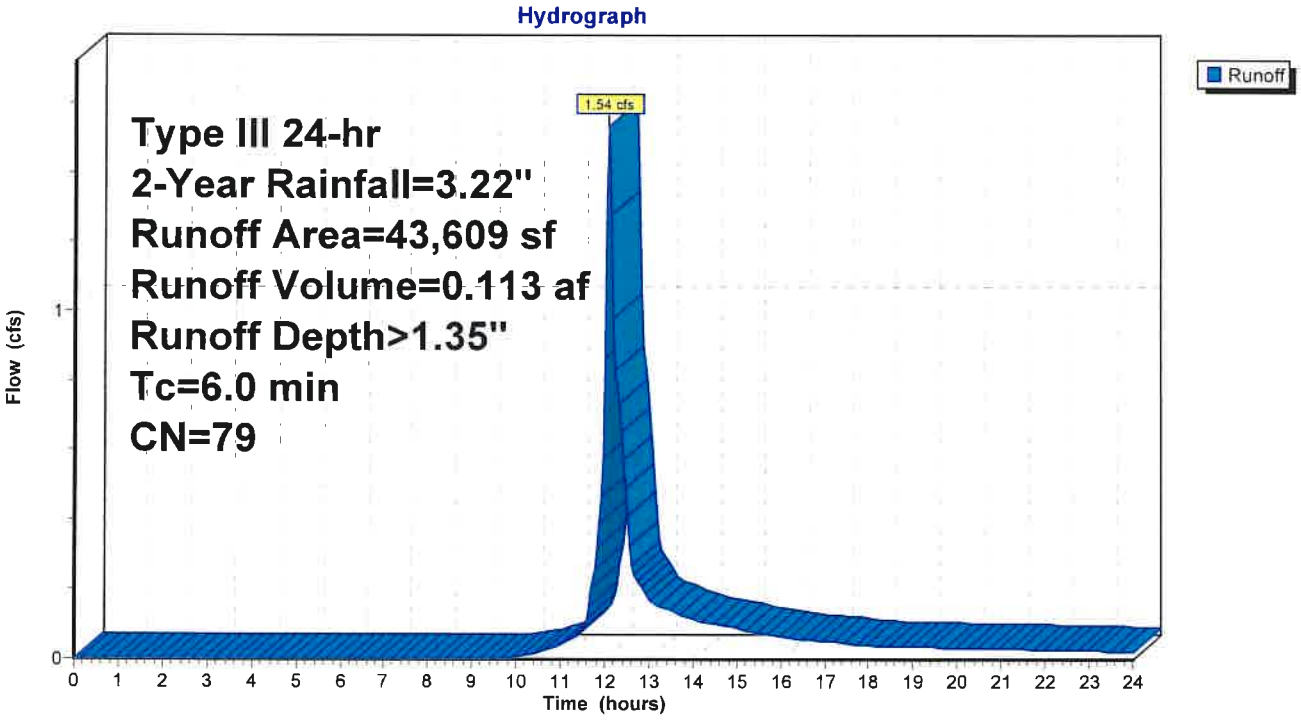
Runoff = 1.54 cfs @ 12.10 hrs, Volume= 0.113 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
43,609	79	1 acre lots, 20% imp, HSG C
34,887		80.00% Pervious Area
8,722		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 1: Lot #1



Summary for Subcatchment 2: Lot #2

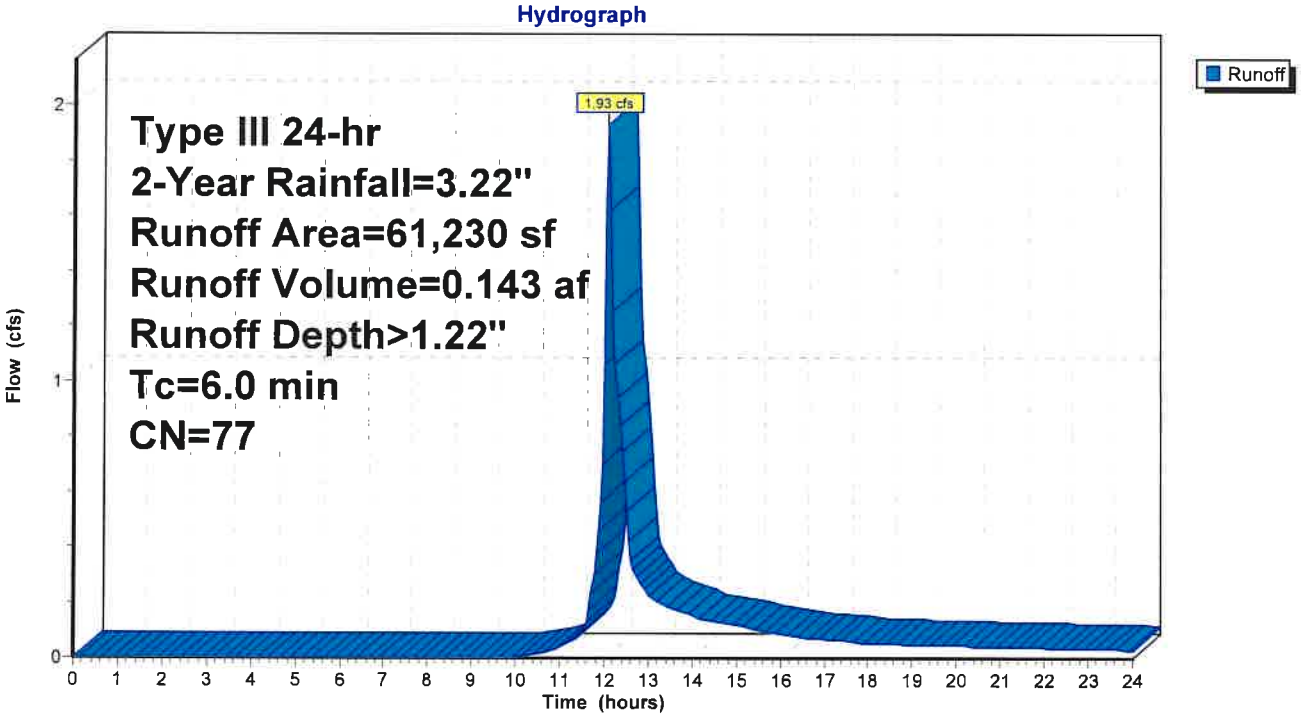
Runoff = 1.93 cfs @ 12.10 hrs, Volume= 0.143 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
61,230	77	2 acre lots, 12% imp, HSG C
53,882		88.00% Pervious Area
7,348		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 2: Lot #2



Summary for Subcatchment 3: Portions of Road

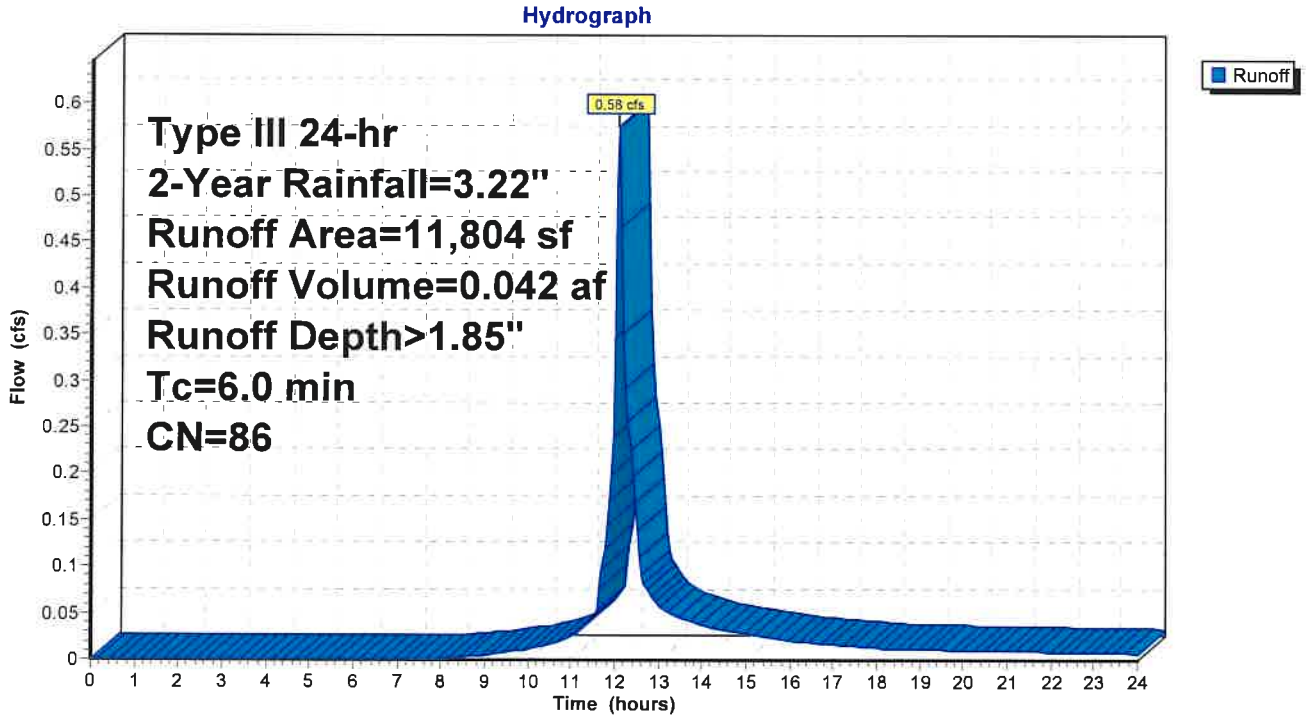
Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.042 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.22"

	Area (sf)	CN	Description
*	5,728	98	Portions of Road
	6,076	74	>75% Grass cover, Good, HSG C
	11,804	86	Weighted Average
	6,076		51.47% Pervious Area
	5,728		48.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3: Portions of Road



Summary for Subcatchment 4: Portions of Road

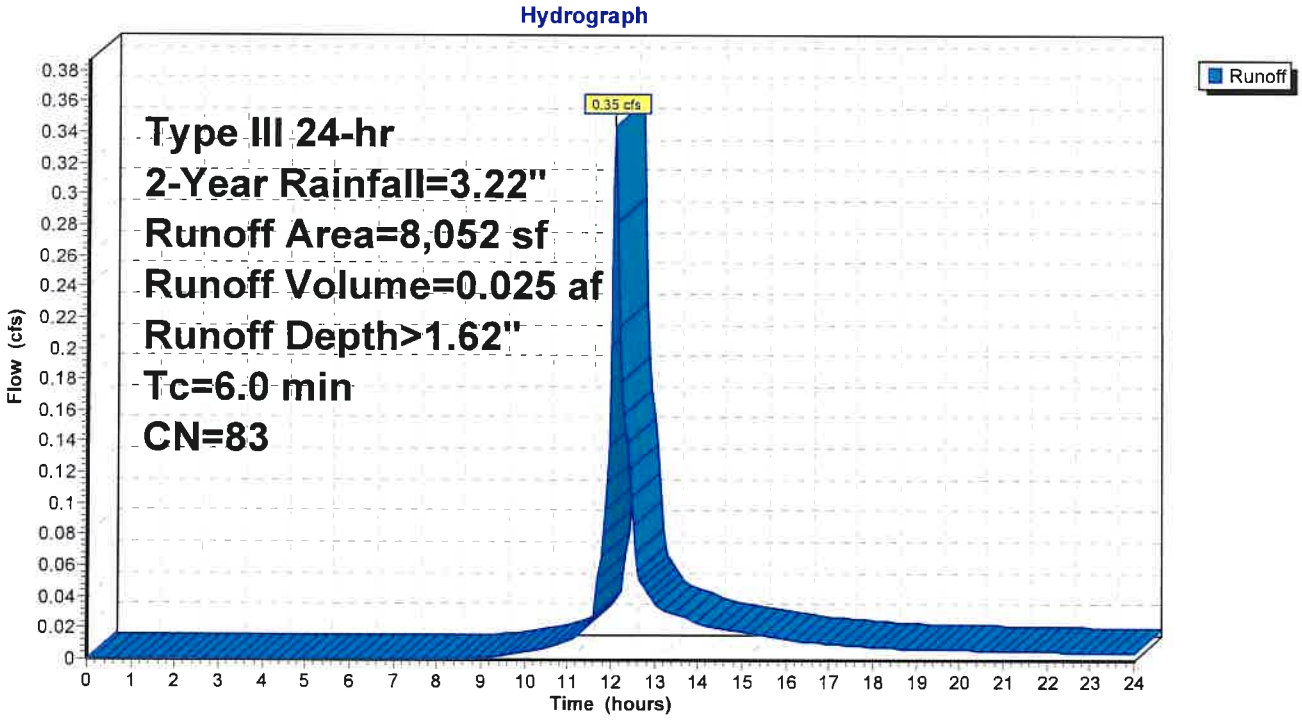
Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.22"

	Area (sf)	CN	Description
*	3,052	98	Prop. Roadway
	5,000	74	>75% Grass cover, Good, HSG C
	8,052	83	Weighted Average
	5,000		62.10% Pervious Area
	3,052		37.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4: Portions of Road

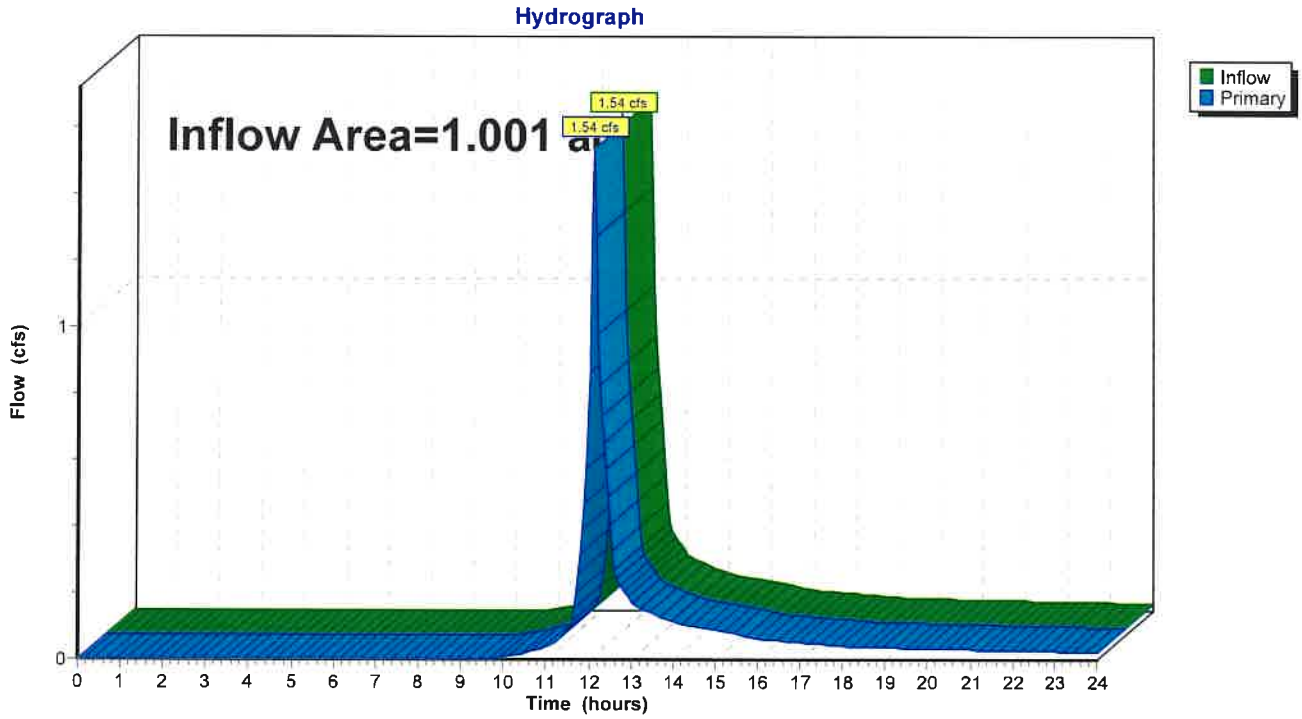


Summary for Pond 1P: South St

Inflow Area = 1.001 ac, 20.00% Impervious, Inflow Depth > 1.35" for 2-Year event
Inflow = 1.54 cfs @ 12.10 hrs, Volume= 0.113 af
Primary = 1.54 cfs @ 12.10 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 1P: South St

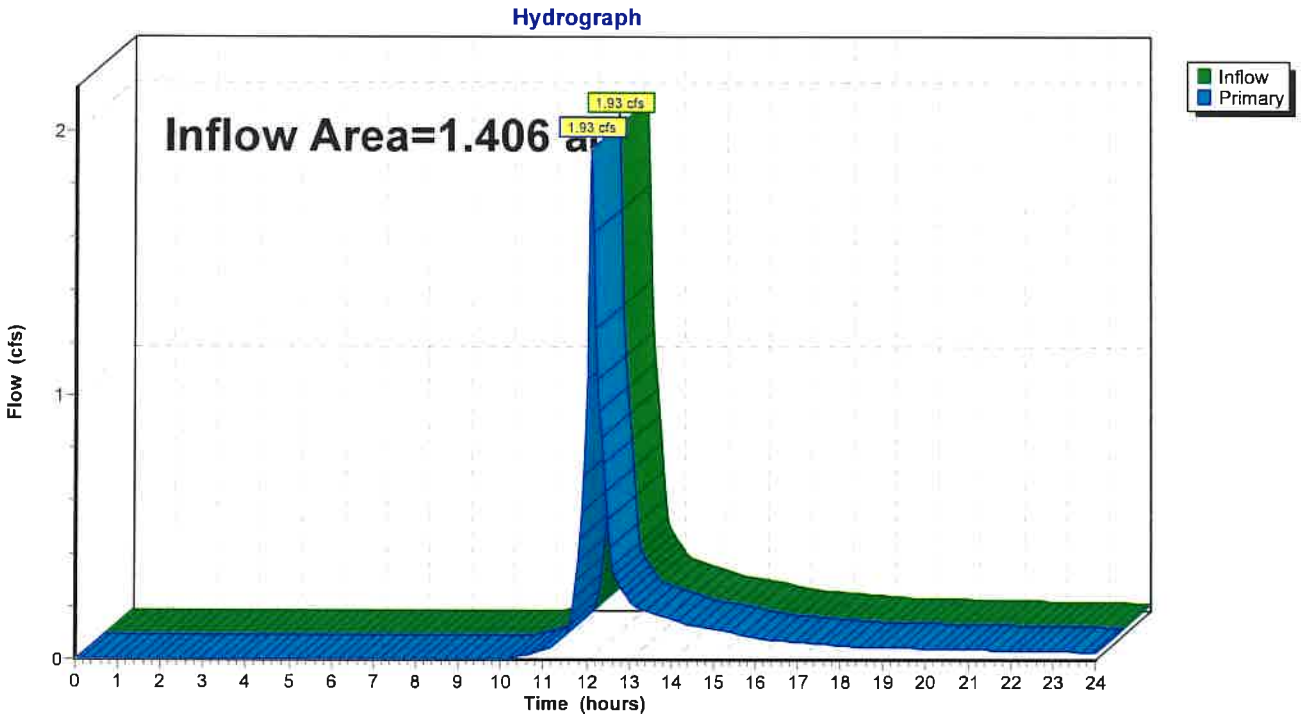


Summary for Pond 2P: Wetland

Inflow Area = 1.406 ac, 12.00% Impervious, Inflow Depth > 1.22" for 2-Year event
Inflow = 1.93 cfs @ 12.10 hrs, Volume= 0.143 af
Primary = 1.93 cfs @ 12.10 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 2P: Wetland



Summary for Pond 3P: Inf. #1

Inflow Area = 0.185 ac, 37.90% Impervious, Inflow Depth > 1.62" for 2-Year event
Inflow = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af
Outflow = 0.01 cfs @ 11.15 hrs, Volume= 0.010 af, Atten= 97%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.15 hrs, Volume= 0.010 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 224.34' @ 17.70 hrs Surf.Area= 0.032 ac Storage= 0.017 af

Plug-Flow detention time= 320.8 min calculated for 0.010 af (39% of inflow)
Center-of-Mass det. time= 197.4 min (1,029.4 - 832.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	223.46'	0.027 af	**20.83'W x 66.50'L x 3.54'H Field A** 0.113 af Overall - 0.044 af Embedded = 0.069 af x 40.0% Voids
#2A	223.96'	0.044 af	**Cultec R-330XLHD** x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		0.072 af	Total Available Storage

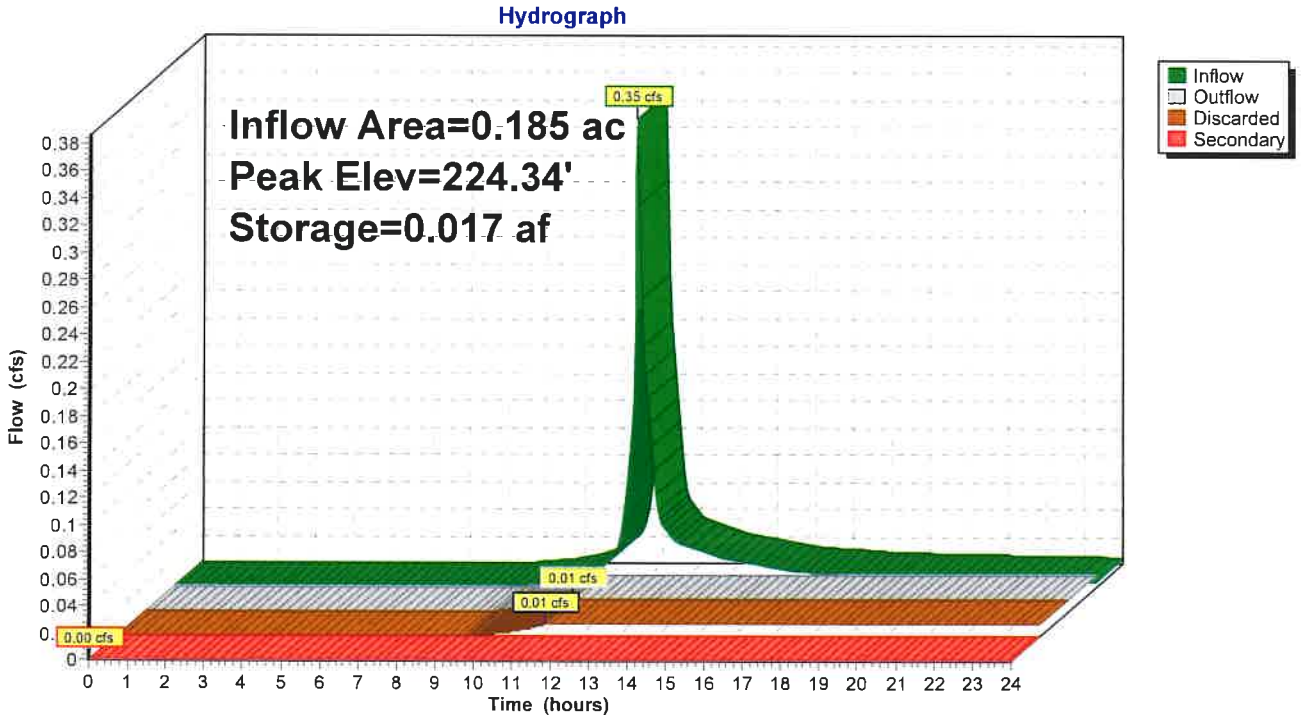
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	223.46'	**0.270 in/hr Exfiltration over Surface area**
#2	Secondary	226.00'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.15 hrs HW=223.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=223.46' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: Inf. #1


Hydrograph
Inflow Area=0.185 ac
Peak Elev=224.34'
Storage=0.017 af
0.35 cfs
0.01 cfs
0.01 cfs
0.00 cfs
Inflow
Outflow
Discarded
Secondary
Flow (cfs)
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Summary for Pond 4P: Inf. #2

Inflow Area = 0.271 ac, 48.53% Impervious, Inflow Depth > 1.85" for 2-Year event
Inflow = 0.58 cfs @ 12.09 hrs, Volume= 0.042 af
Outflow = 0.01 cfs @ 10.70 hrs, Volume= 0.014 af, Atten= 98%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.70 hrs, Volume= 0.014 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 226.06' @ 18.33 hrs Surf.Area= 0.043 ac Storage= 0.029 af

Plug-Flow detention time= 315.4 min calculated for 0.014 af (33% of inflow)
Center-of-Mass det. time= 188.7 min (1,010.4 - 821.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	225.00'	0.037 af	**25.67'W x 73.50'L x 3.54'H Field A** 0.153 af Overall - 0.061 af Embedded = 0.092 af x 40.0% Voids
#2A	225.50'	0.061 af	**Cultec R-330XLHD** x 50 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		0.098 af	Total Available Storage

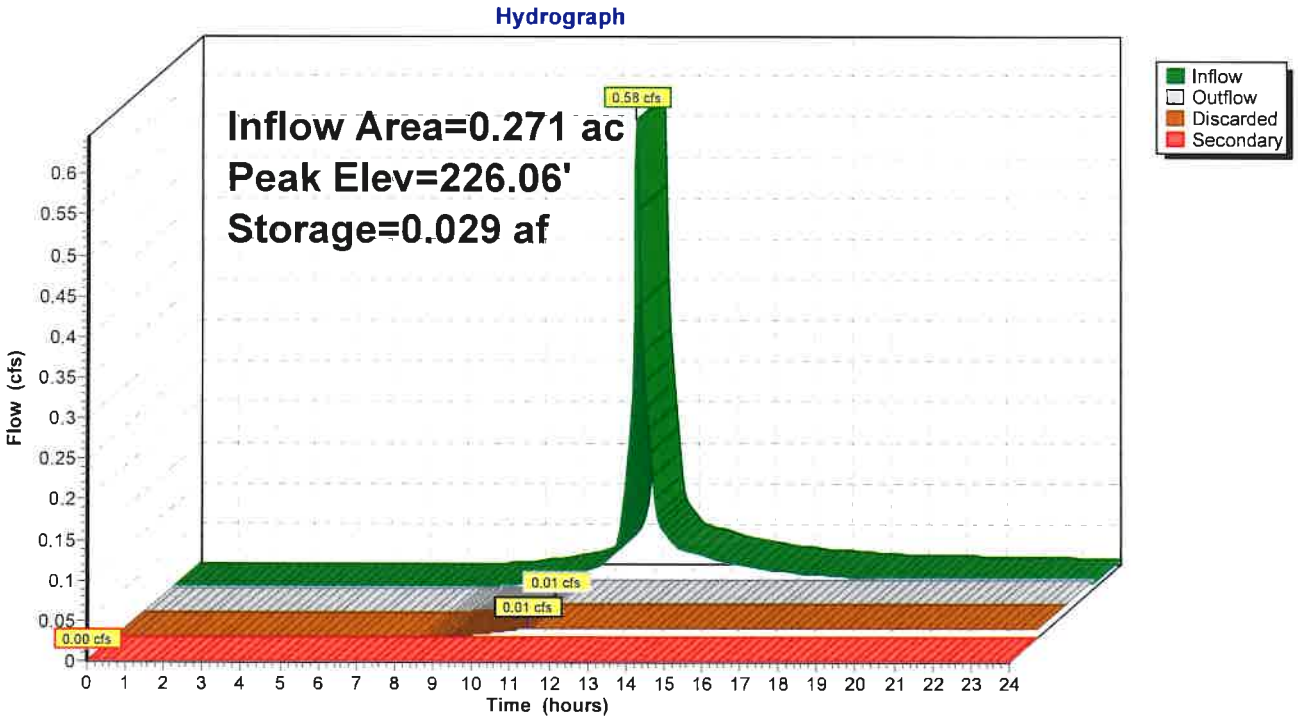
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	225.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Secondary	228.14'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 10.70 hrs HW=225.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=225.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: Inf. #2


Hydrograph
Inflow Area=0.271 ac
Peak Elev=226.06'
Storage=0.029 af
0.58 cfs
0.01 cfs
0.01 cfs
0.00 cfs
Inflow
Outflow
Discarded
Secondary
Flow (cfs)
Time (hours)

Summary for Subcatchment 1: Lot #1

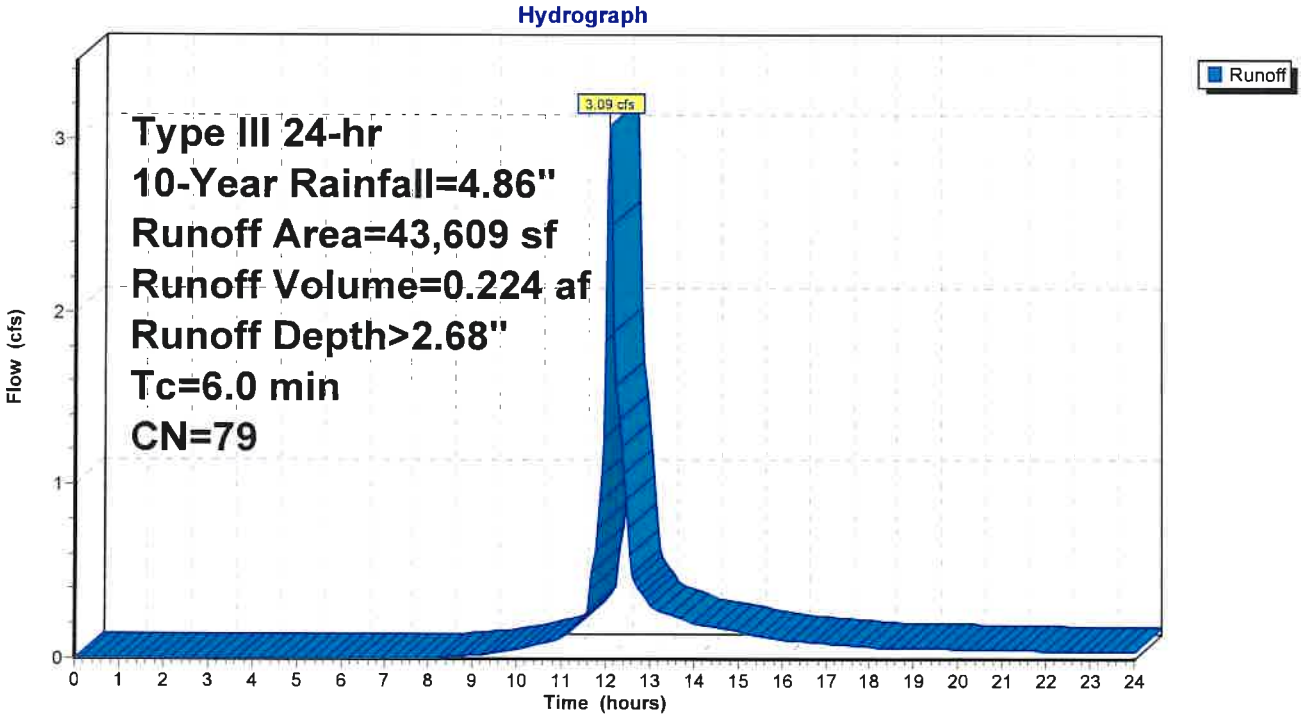
Runoff = 3.09 cfs @ 12.09 hrs, Volume= 0.224 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

Area (sf)	CN	Description
43,609	79	1 acre lots, 20% imp, HSG C
34,887		80.00% Pervious Area
8,722		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 1: Lot #1



Summary for Subcatchment 2: Lot #2

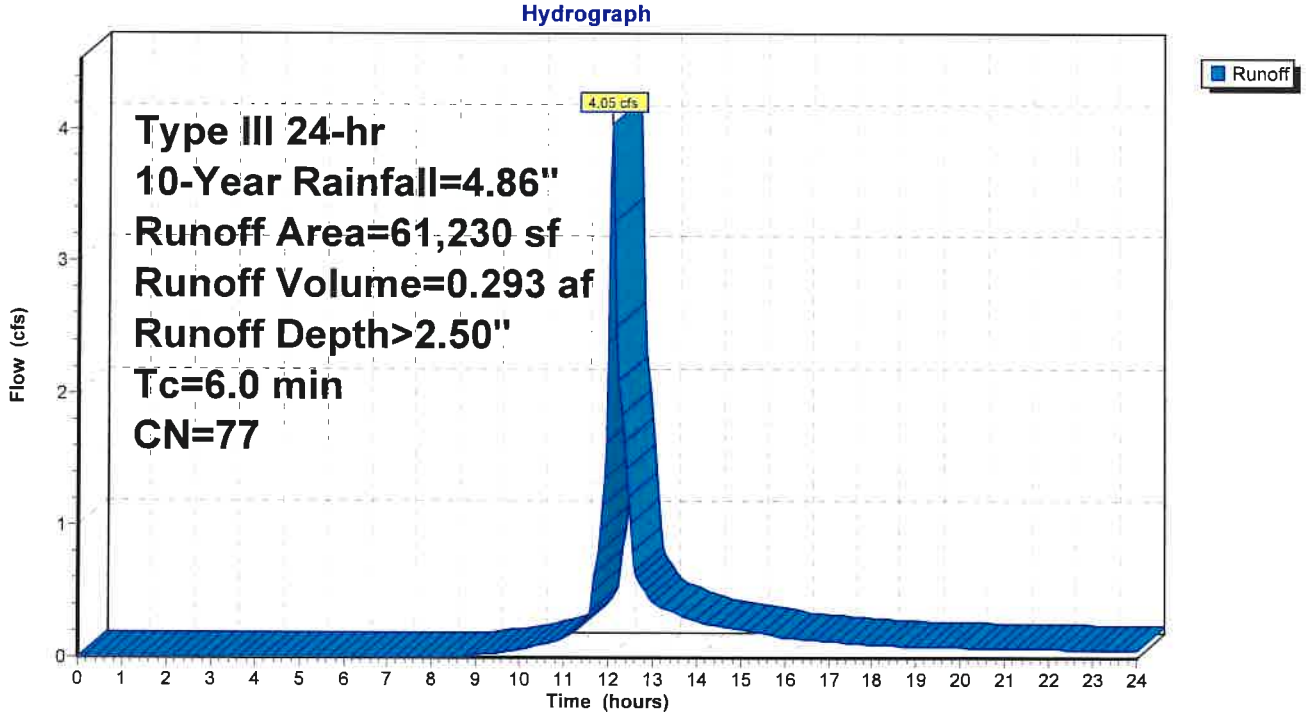
Runoff = 4.05 cfs @ 12.09 hrs, Volume= 0.293 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

Area (sf)	CN	Description
61,230	77	2 acre lots, 12% imp, HSG C
53,882		88.00% Pervious Area
7,348		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 2: Lot #2



Summary for Subcatchment 3: Portions of Road

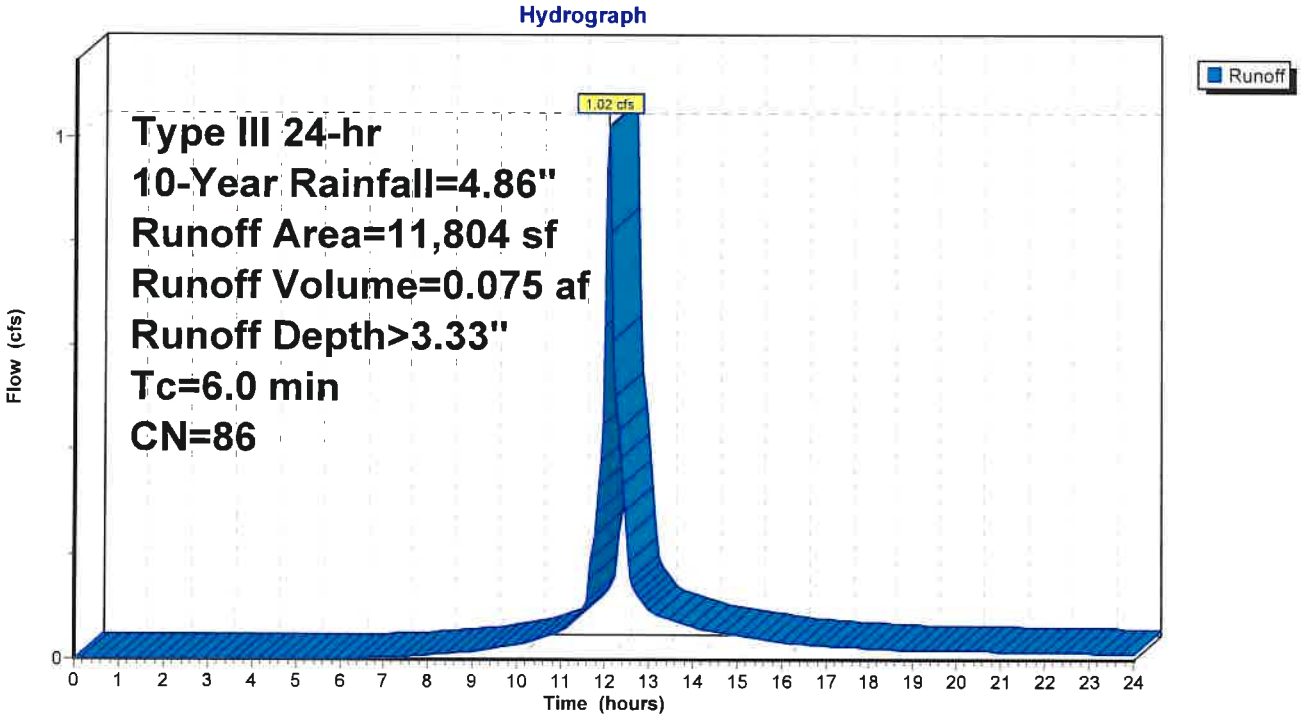
Runoff = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	5,728	98	Portions of Road
	6,076	74	>75% Grass cover, Good, HSG C
	11,804	86	Weighted Average
	6,076		51.47% Pervious Area
	5,728		48.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3: Portions of Road



Summary for Subcatchment 4: Portions of Road

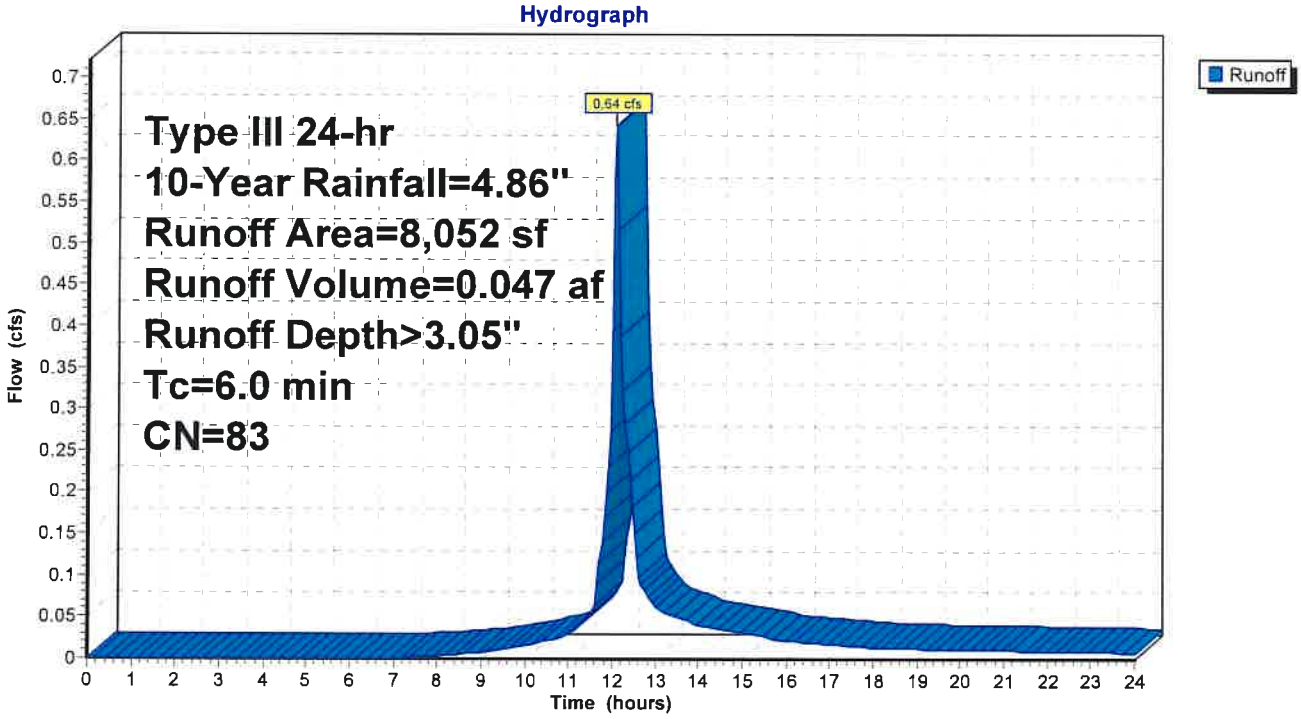
Runoff = 0.64 cfs @ 12.09 hrs, Volume= 0.047 af, Depth> 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	3,052	98	Prop. Roadway
	5,000	74	>75% Grass cover, Good, HSG C
	8,052	83	Weighted Average
	5,000		62.10% Pervious Area
	3,052		37.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4: Portions of Road

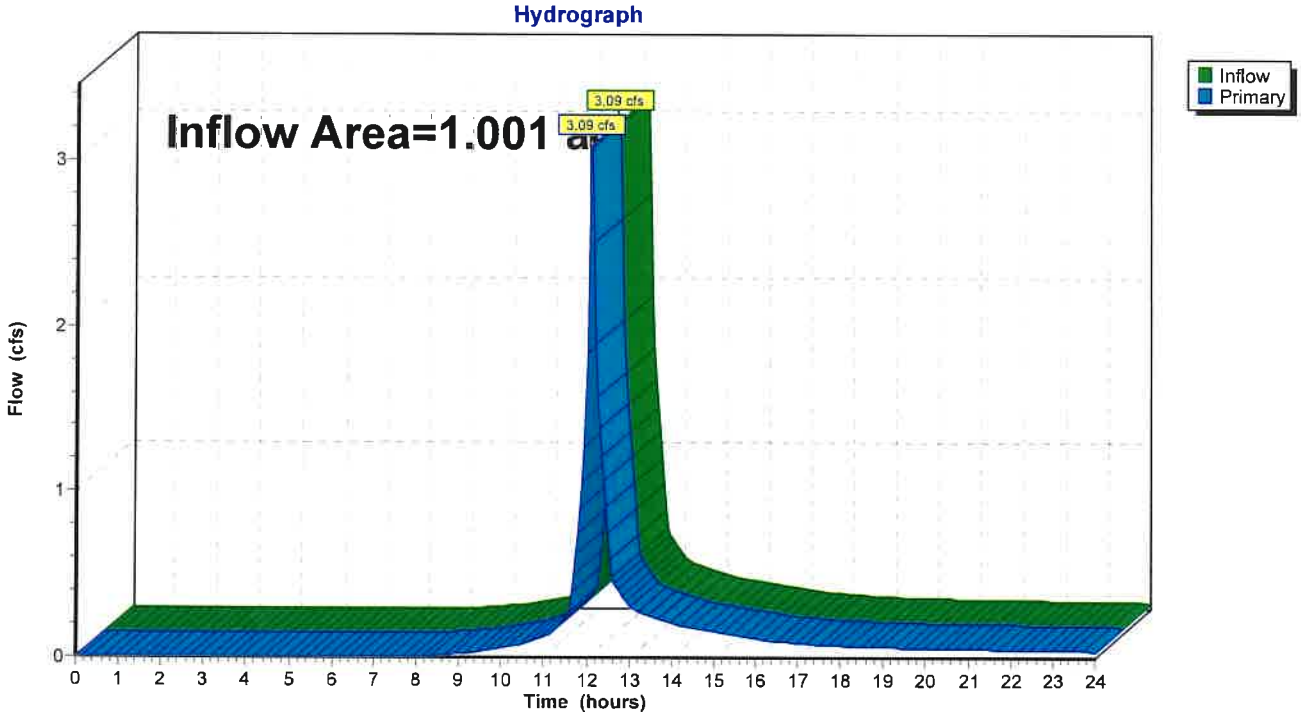


Summary for Pond 1P: South St

Inflow Area = 1.001 ac, 20.00% Impervious, Inflow Depth > 2.68" for 10-Year event
Inflow = 3.09 cfs @ 12.09 hrs, Volume= 0.224 af
Primary = 3.09 cfs @ 12.09 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 1P: South St

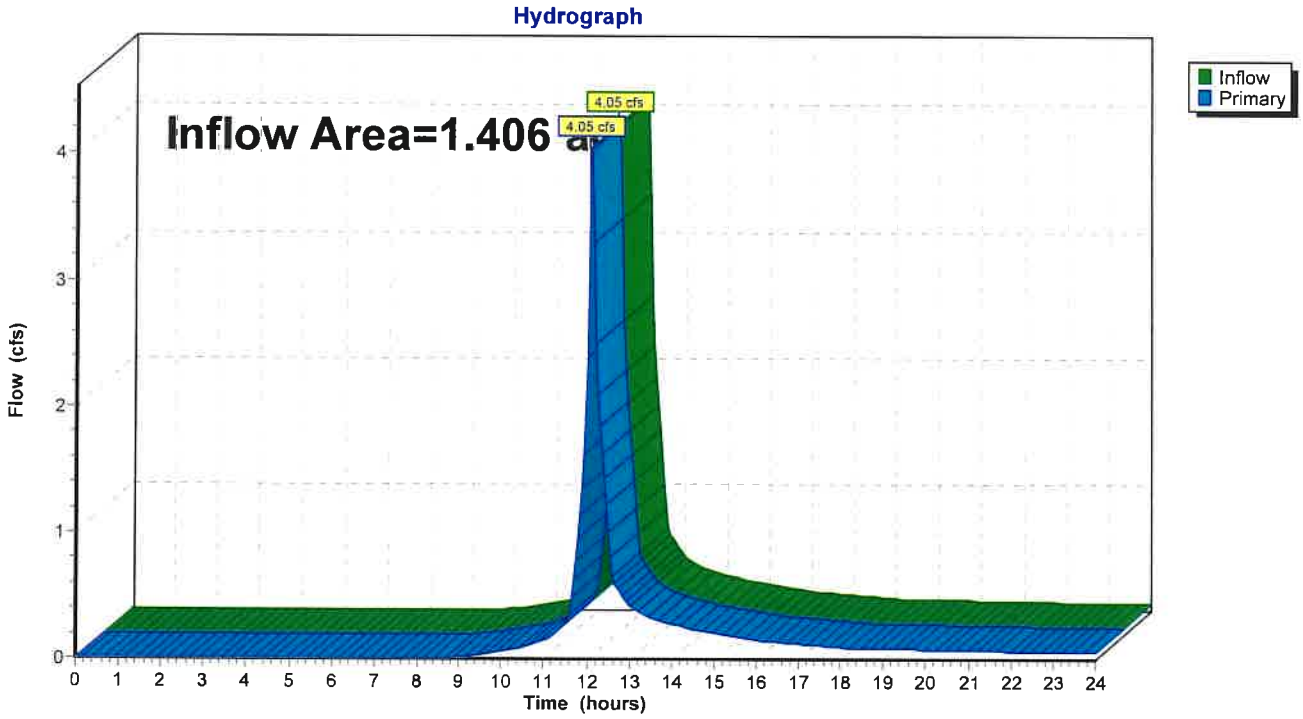


Summary for Pond 2P: Wetland

Inflow Area = 1.406 ac, 12.00% Impervious, Inflow Depth > 2.50" for 10-Year event
Inflow = 4.05 cfs @ 12.09 hrs, Volume= 0.293 af
Primary = 4.05 cfs @ 12.09 hrs, Volume= 0.293 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 2P: Wetland



Summary for Pond 3P: Inf. #1

Inflow Area = 0.185 ac, 37.90% Impervious, Inflow Depth > 3.05" for 10-Year event
Inflow = 0.64 cfs @ 12.09 hrs, Volume= 0.047 af
Outflow = 0.01 cfs @ 9.75 hrs, Volume= 0.011 af, Atten= 99%, Lag= 0.0 min
Discarded = 0.01 cfs @ 9.75 hrs, Volume= 0.011 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 225.10' @ 22.19 hrs Surf.Area= 0.032 ac Storage= 0.036 af

Plug-Flow detention time= 313.3 min calculated for 0.011 af (23% of inflow)
Center-of-Mass det. time= 169.1 min (983.2 - 814.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	223.46'	0.027 af	**20.83'W x 66.50'L x 3.54'H Field A** 0.113 af Overall - 0.044 af Embedded = 0.069 af x 40.0% Voids
#2A	223.96'	0.044 af	**Cultec R-330XLHD** x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		0.072 af	Total Available Storage

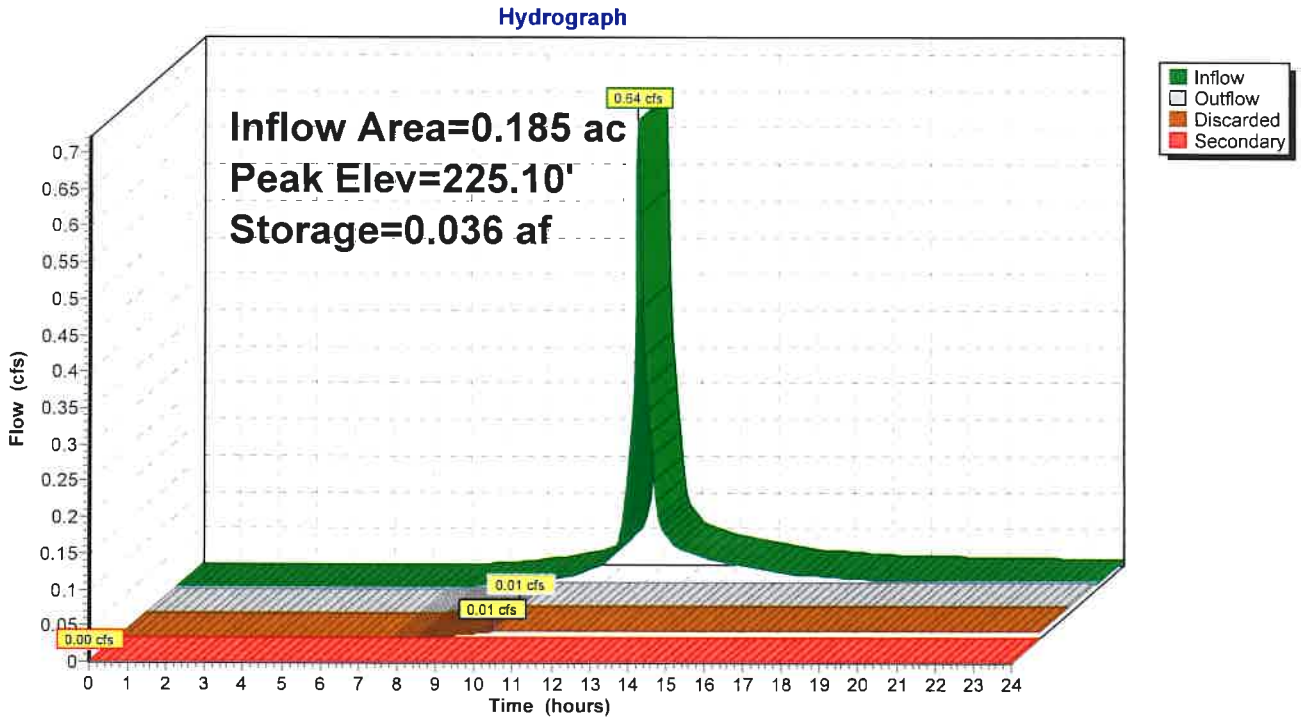
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	223.46'	**0.270 in/hr Exfiltration over Surface area**
#2	Secondary	226.00'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 9.75 hrs HW=223.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=223.46' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: Inf. #1


Hydrograph
Inflow Area=0.185 ac
Peak Elev=225.10'
Storage=0.036 af
0.64 cfs
0.01 cfs
0.01 cfs
0.00 cfs
Inflow
Outflow
Discarded
Secondary
Flow (cfs)
Time (hours)

Summary for Pond 4P: Inf. #2

Inflow Area = 0.271 ac, 48.53% Impervious, Inflow Depth > 3.33" for 10-Year event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 0.01 cfs @ 9.20 hrs, Volume= 0.016 af, Atten= 99%, Lag= 0.0 min
Discarded = 0.01 cfs @ 9.20 hrs, Volume= 0.016 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 226.94' @ 23.16 hrs Surf.Area= 0.043 ac Storage= 0.060 af

Plug-Flow detention time= 315.8 min calculated for 0.016 af (21% of inflow)
Center-of-Mass det. time= 157.5 min (962.5 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	225.00'	0.037 af	**25.67'W x 73.50'L x 3.54'H Field A** 0.153 af Overall - 0.061 af Embedded = 0.092 af x 40.0% Voids
#2A	225.50'	0.061 af	**Cultec R-330XLHD** x 50 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		0.098 af	Total Available Storage

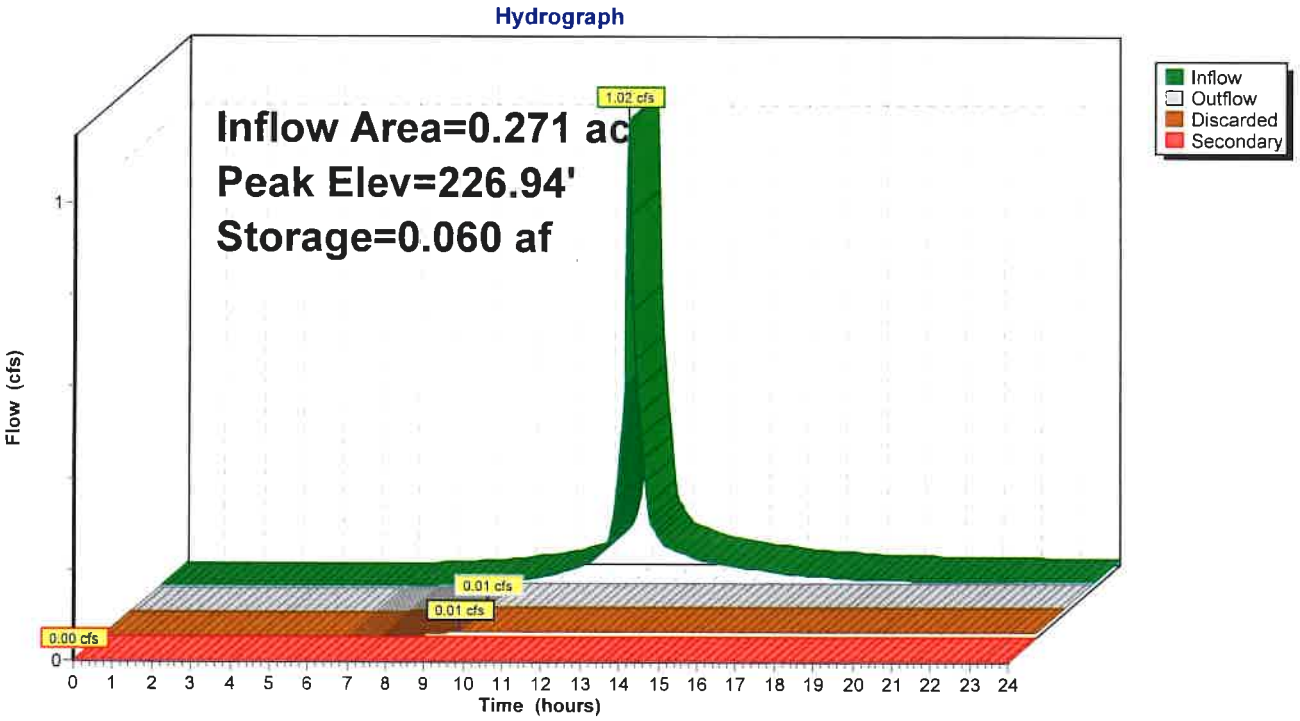
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	225.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Secondary	228.14'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 9.20 hrs HW=225.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=225.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: Inf. #2


Hydrograph
Inflow Area=0.271 ac
Peak Elev=226.94'
Storage=0.060 af
1.02 cfs
0.01 cfs
0.01 cfs
0.00 cfs
Inflow
Outflow
Discarded
Secondary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Summary for Subcatchment 1: Lot #1

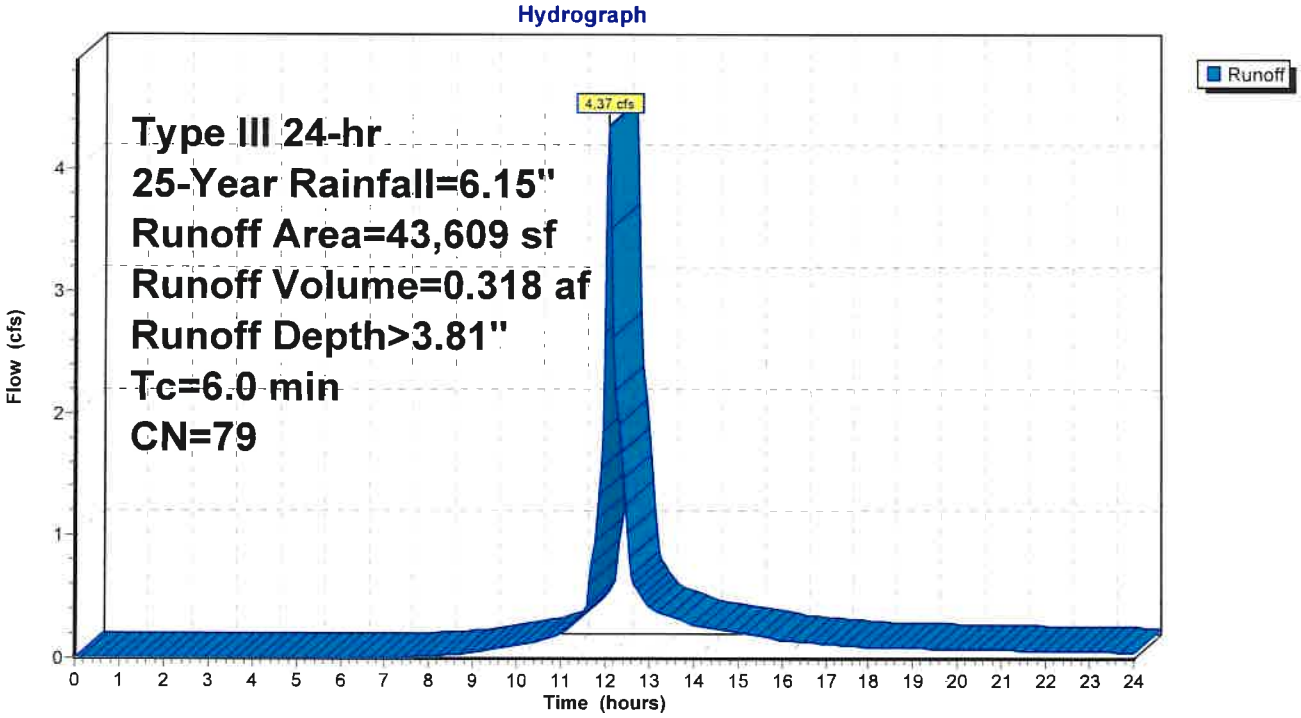
Runoff = 4.37 cfs @ 12.09 hrs, Volume= 0.318 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.15"

Area (sf)	CN	Description
43,609	79	1 acre lots, 20% imp, HSG C
34,887		80.00% Pervious Area
8,722		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 1: Lot #1



Summary for Subcatchment 2: Lot #2

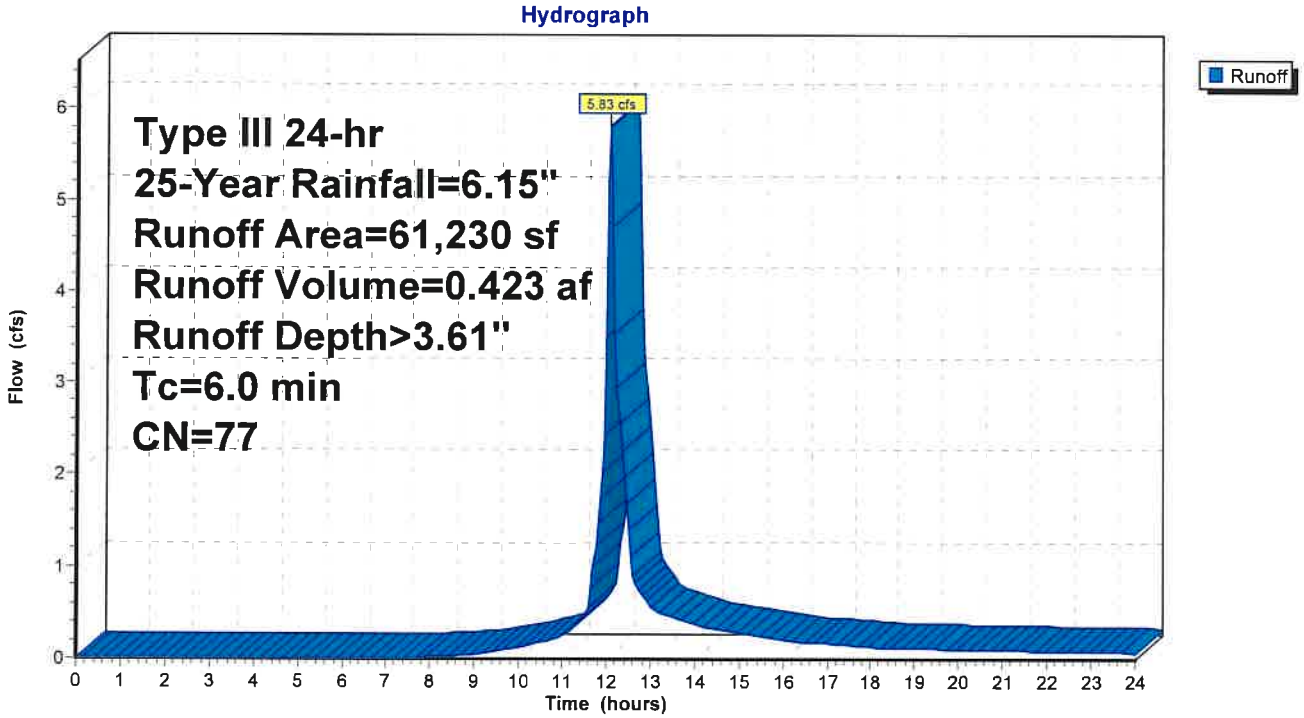
Runoff = 5.83 cfs @ 12.09 hrs, Volume= 0.423 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.15"

Area (sf)	CN	Description
61,230	77	2 acre lots, 12% imp, HSG C
53,882		88.00% Pervious Area
7,348		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 2: Lot #2



Summary for Subcatchment 3: Portions of Road

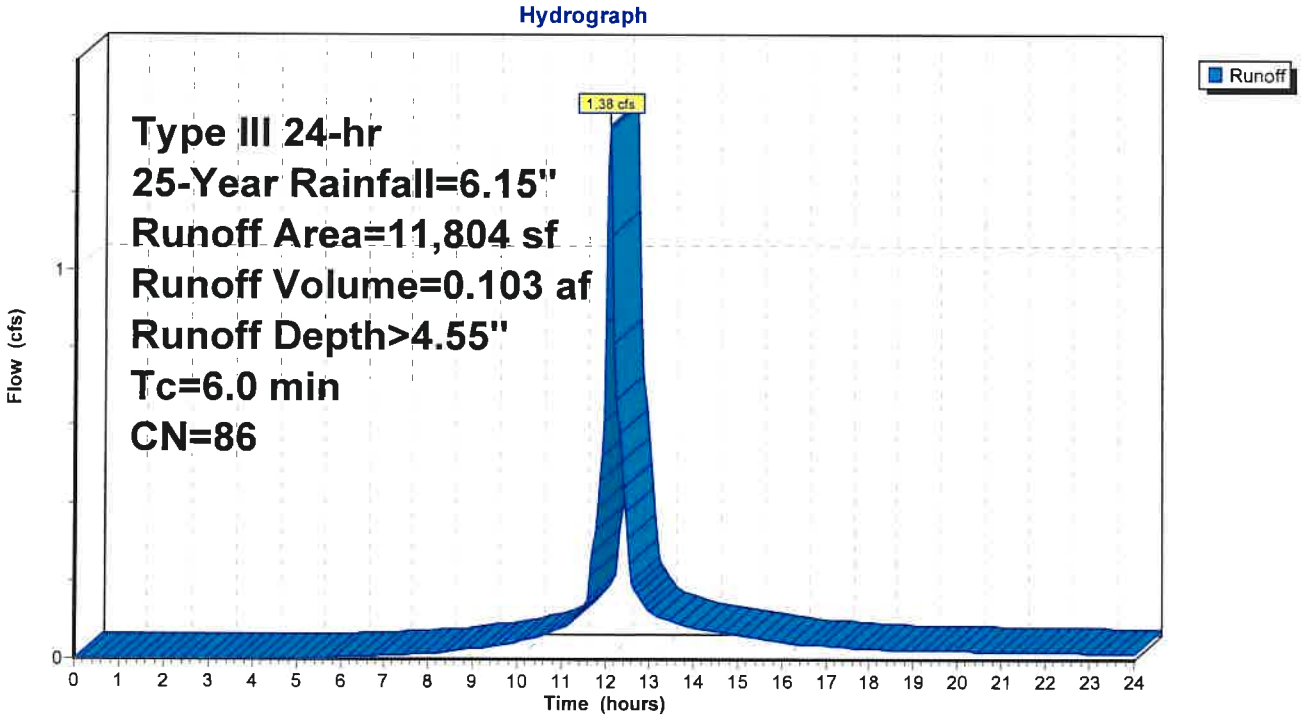
Runoff = 1.38 cfs @ 12.09 hrs, Volume= 0.103 af, Depth> 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.15"

	Area (sf)	CN	Description
*	5,728	98	Portions of Road
	6,076	74	>75% Grass cover, Good, HSG C
	11,804	86	Weighted Average
	6,076		51.47% Pervious Area
	5,728		48.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3: Portions of Road



Summary for Subcatchment 4: Portions of Road

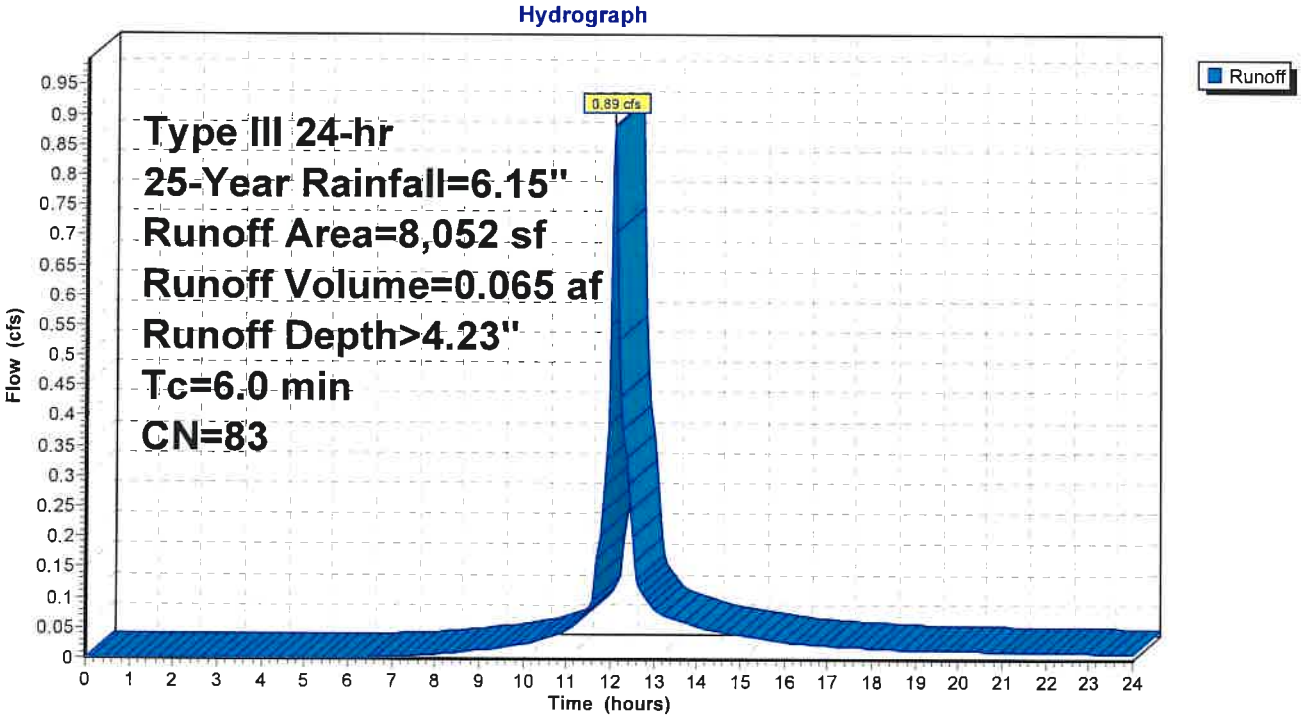
Runoff = 0.89 cfs @ 12.09 hrs, Volume= 0.065 af, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.15"

	Area (sf)	CN	Description
*	3,052	98	Prop. Roadway
	5,000	74	>75% Grass cover, Good, HSG C
	8,052	83	Weighted Average
	5,000		62.10% Pervious Area
	3,052		37.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4: Portions of Road

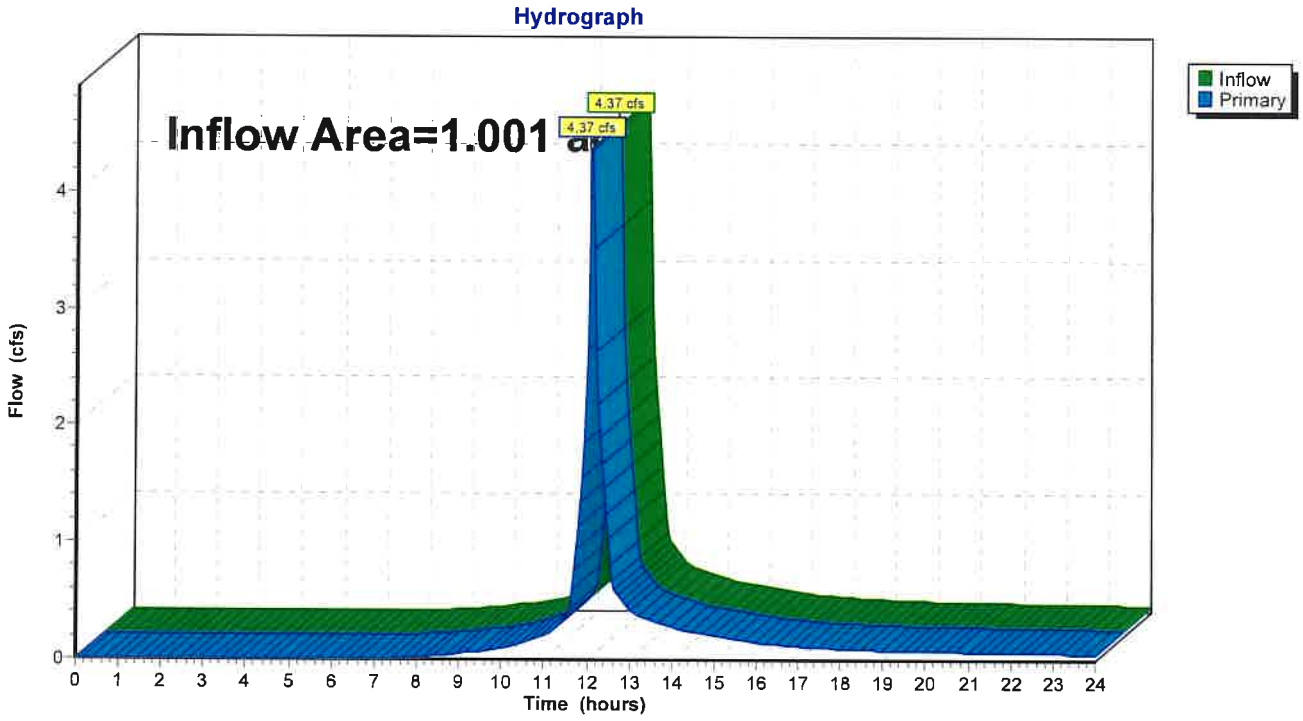


Summary for Pond 1P: South St

Inflow Area = 1.001 ac, 20.00% Impervious, Inflow Depth > 3.81" for 25-Year event
Inflow = 4.37 cfs @ 12.09 hrs, Volume= 0.318 af
Primary = 4.37 cfs @ 12.09 hrs, Volume= 0.318 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 1P: South St

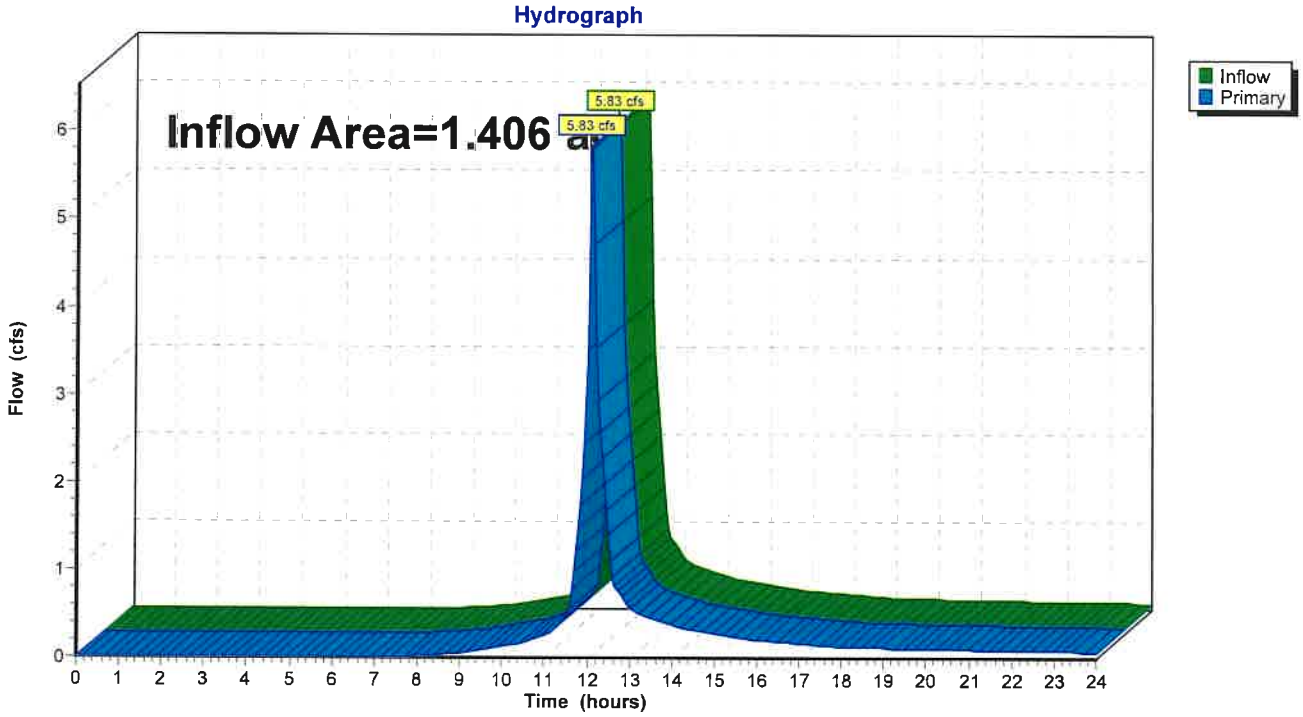


Summary for Pond 2P: Wetland

Inflow Area = 1.406 ac, 12.00% Impervious, Inflow Depth > 3.61" for 25-Year event
Inflow = 5.83 cfs @ 12.09 hrs, Volume= 0.423 af
Primary = 5.83 cfs @ 12.09 hrs, Volume= 0.423 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 2P: Wetland



Summary for Pond 3P: Inf. #1

Inflow Area =	0.185 ac,	37.90% Impervious,	Inflow Depth >	4.23"	for 25-Year event
Inflow =	0.89 cfs @	12.09 hrs,	Volume=	0.065 af	
Outflow =	0.01 cfs @	8.90 hrs,	Volume=	0.012 af,	Atten= 99%, Lag= 0.0 min
Discarded =	0.01 cfs @	8.90 hrs,	Volume=	0.012 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 225.84' @ 24.00 hrs Surf.Area= 0.032 ac Storage= 0.054 af

Plug-Flow detention time= 318.9 min calculated for 0.012 af (18% of inflow)
Center-of-Mass det. time= 150.2 min (955.0 - 804.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	223.46'	0.027 af	**20.83'W x 66.50'L x 3.54'H Field A** 0.113 af Overall - 0.044 af Embedded = 0.069 af x 40.0% Voids
#2A	223.96'	0.044 af	**Cultec R-330XLHD** x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		0.072 af	Total Available Storage

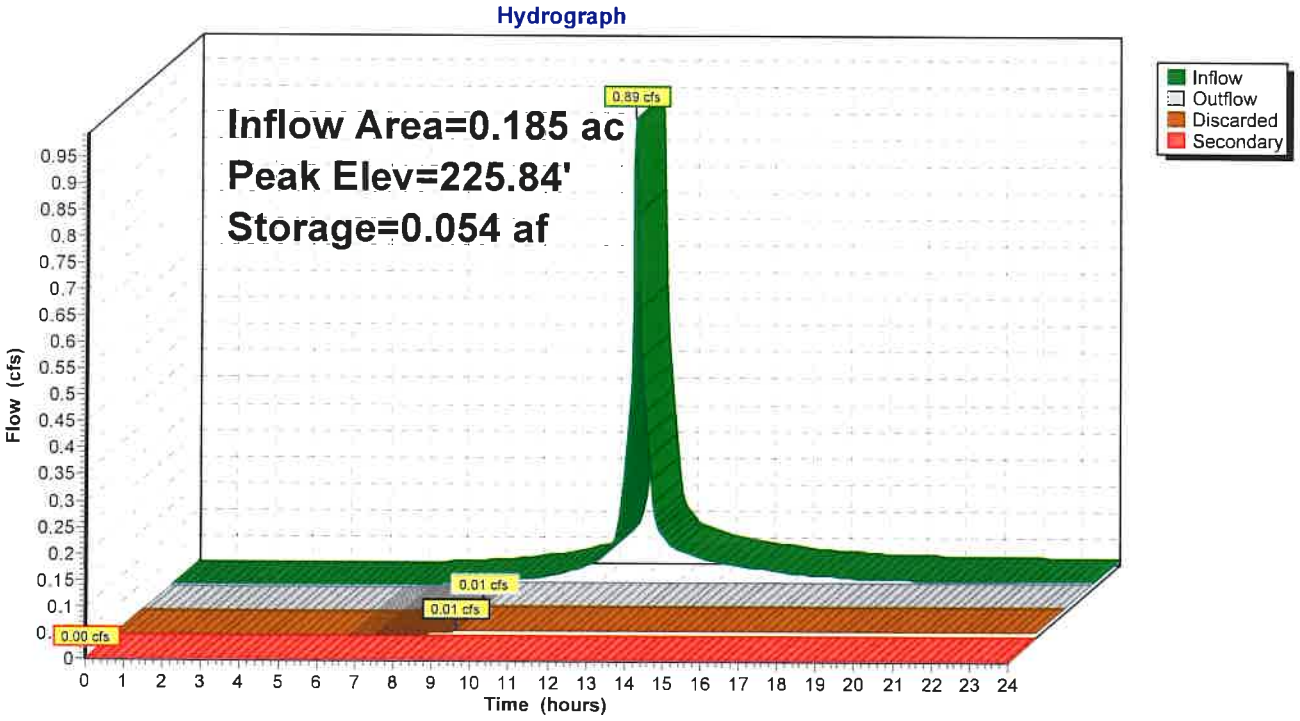
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	223.46'	**0.270 in/hr Exfiltration over Surface area**
#2	Secondary	226.00'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 8.90 hrs HW=223.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=223.46' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: Inf. #1


Hydrograph
Inflow Area=0.185 ac
Peak Elev=225.84'
Storage=0.054 af
0.89 cfs
0.01 cfs
0.01 cfs
0.00 cfs
Inflow
Outflow
Discarded
Secondary
Flow (cfs)
Time (hours)

Summary for Pond 4P: Inf. #2

Inflow Area = 0.271 ac, 48.53% Impervious, Inflow Depth > 4.55" for 25-Year event
Inflow = 1.38 cfs @ 12.09 hrs, Volume= 0.103 af
Outflow = 0.01 cfs @ 8.35 hrs, Volume= 0.016 af, Atten= 99%, Lag= 0.0 min
Discarded = 0.01 cfs @ 8.35 hrs, Volume= 0.016 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 227.87' @ 24.00 hrs Surf.Area= 0.043 ac Storage= 0.086 af

Plug-Flow detention time= 326.2 min calculated for 0.016 af (16% of inflow)
Center-of-Mass det. time= 136.7 min (933.0 - 796.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	225.00'	0.037 af	**25.67'W x 73.50'L x 3.54'H Field A** 0.153 af Overall - 0.061 af Embedded = 0.092 af x 40.0% Voids
#2A	225.50'	0.061 af	**Cultec R-330XLHD** x 50 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		0.098 af	Total Available Storage

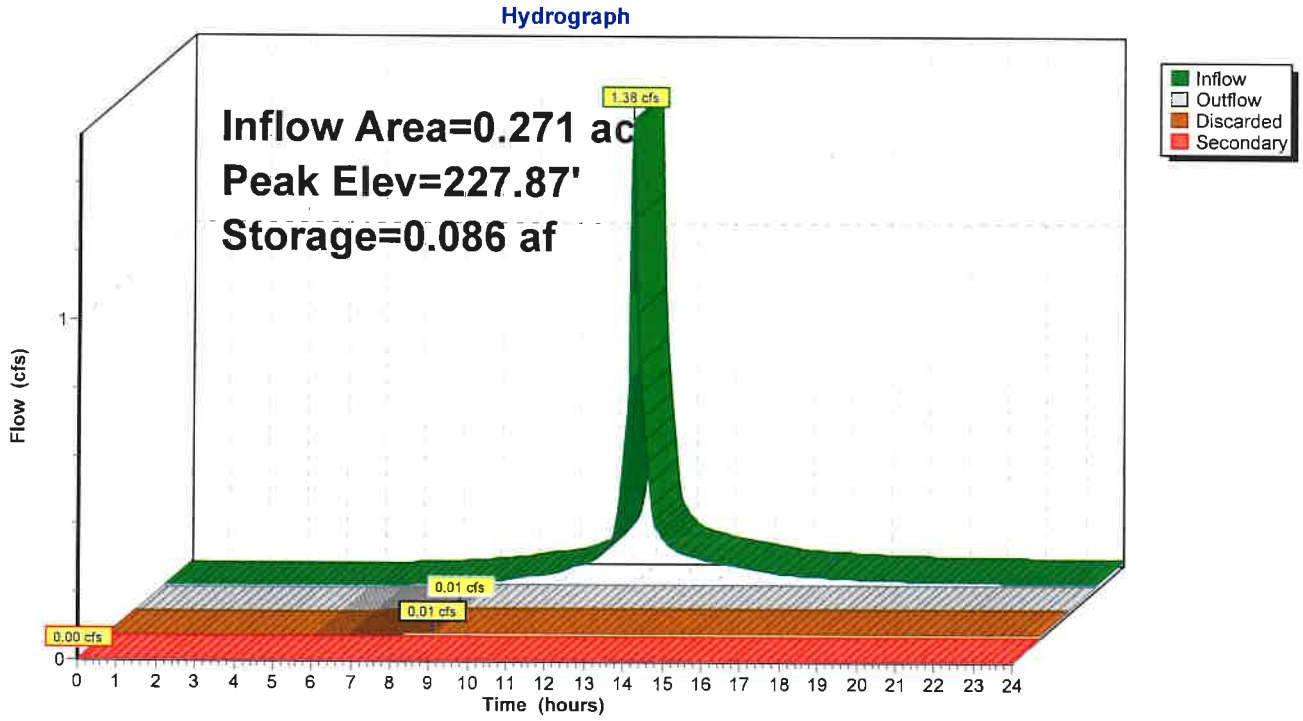
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	225.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Secondary	228.14'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 8.35 hrs HW=225.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=225.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: Inf. #2


Hydrograph
Inflow Area=0.271 ac
Peak Elev=227.87'
Storage=0.086 af
1.38 cfs
0.01 cfs
0.01 cfs
0.00 cfs
Inflow
Outflow
Discarded
Secondary
Flow (cfs)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Summary for Subcatchment 1: Lot #1

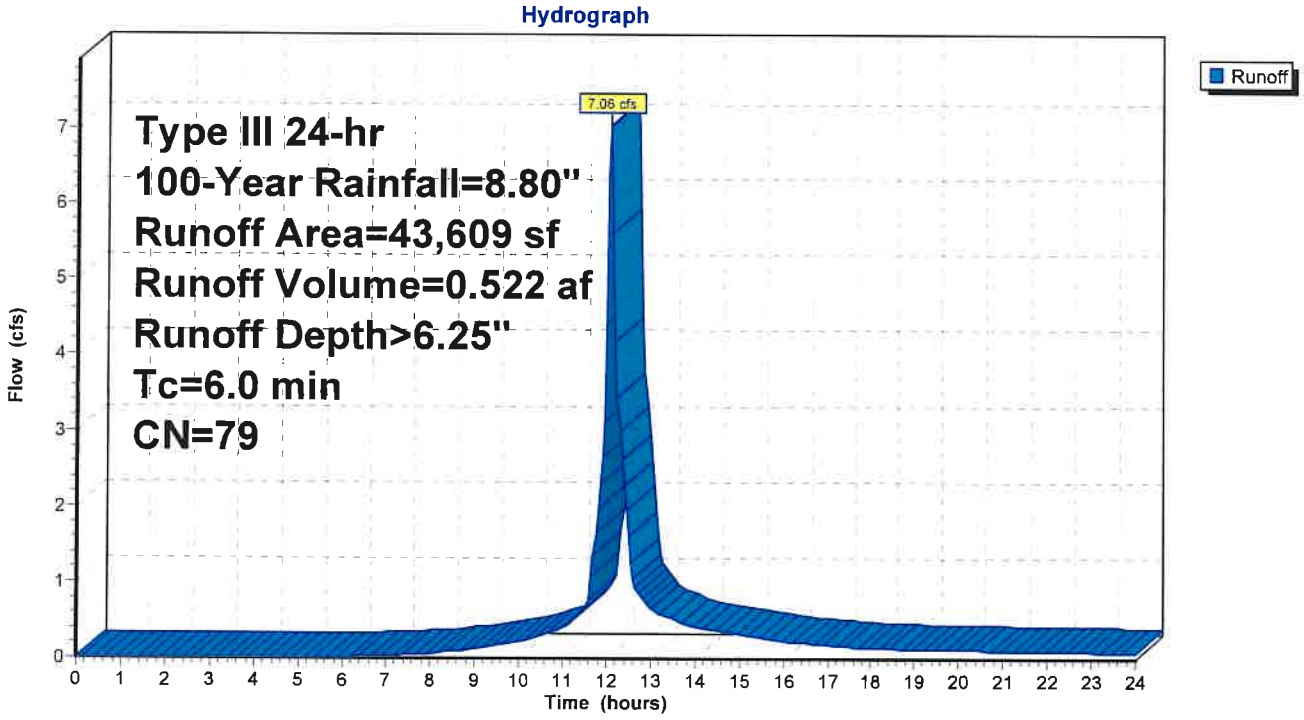
Runoff = 7.06 cfs @ 12.09 hrs, Volume= 0.522 af, Depth> 6.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.80"

Area (sf)	CN	Description
43,609	79	1 acre lots, 20% imp, HSG C
34,887		80.00% Pervious Area
8,722		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 1: Lot #1



Summary for Subcatchment 2: Lot #2

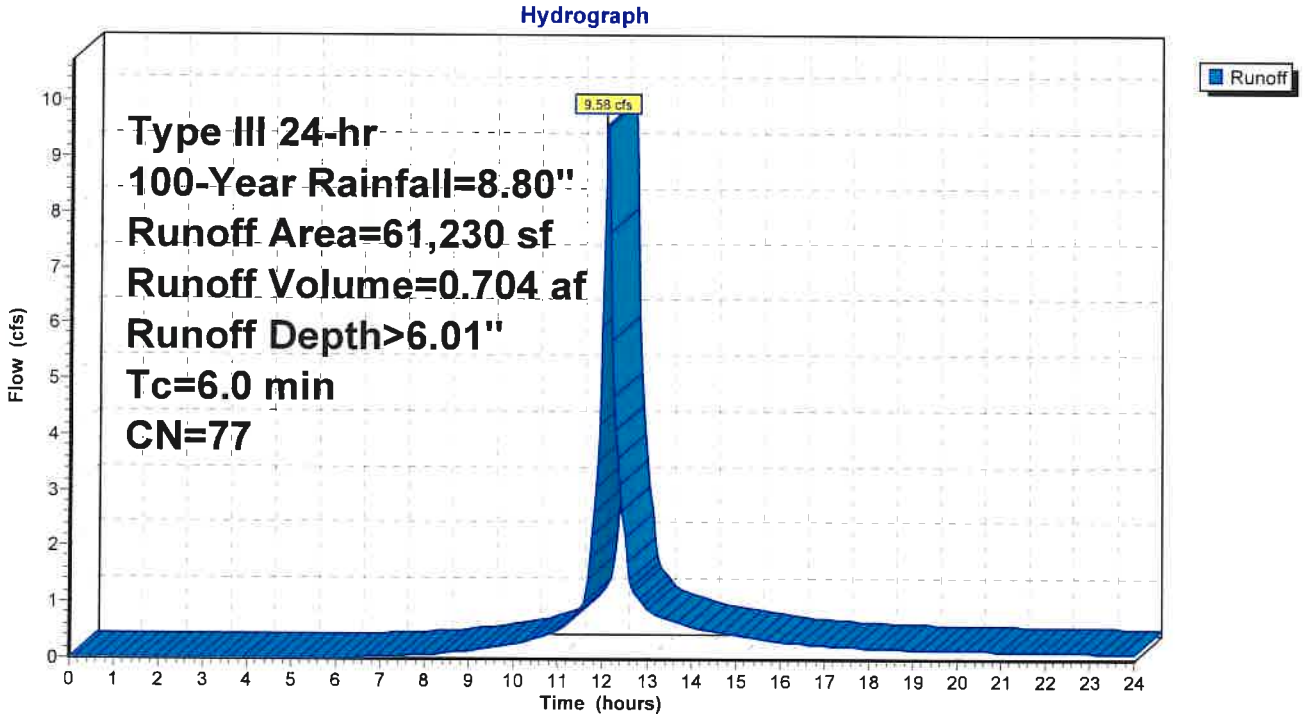
Runoff = 9.58 cfs @ 12.09 hrs, Volume= 0.704 af, Depth> 6.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.80"

Area (sf)	CN	Description
61,230	77	2 acre lots, 12% imp, HSG C
53,882		88.00% Pervious Area
7,348		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 2: Lot #2



Summary for Subcatchment 3: Portions of Road

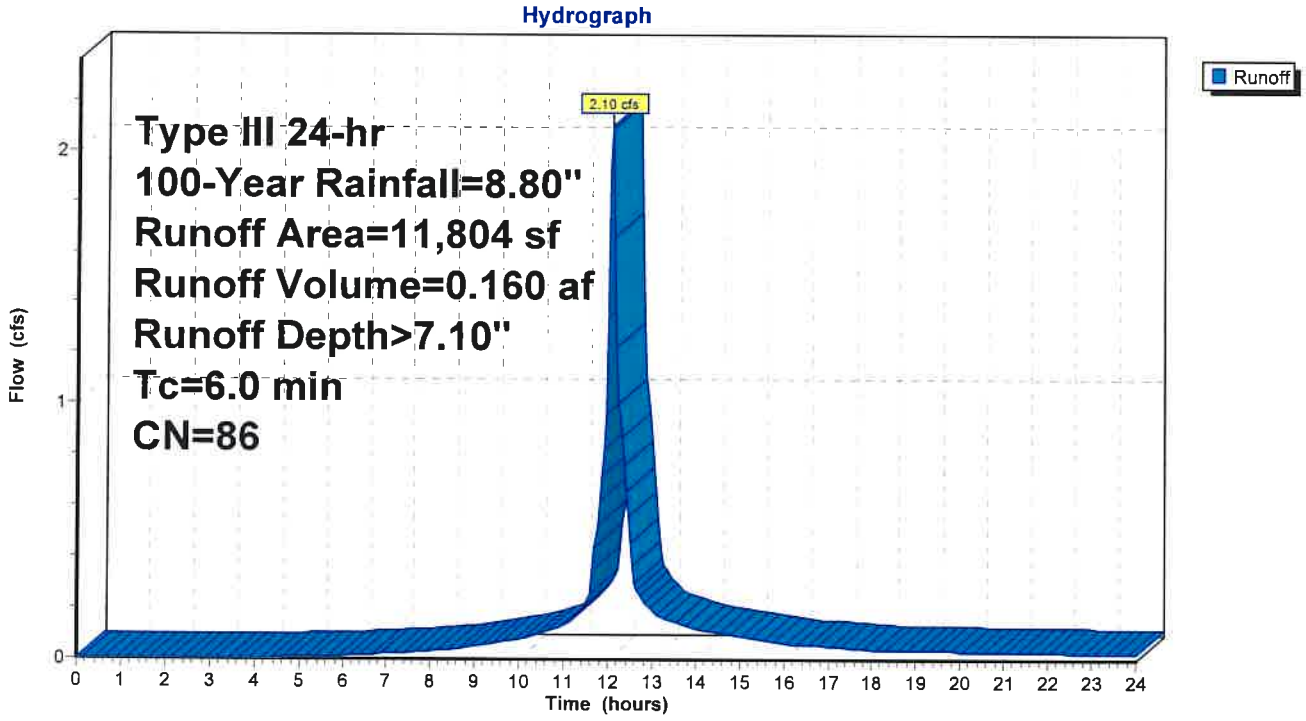
Runoff = 2.10 cfs @ 12.09 hrs, Volume= 0.160 af, Depth> 7.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.80"

	Area (sf)	CN	Description
*	5,728	98	Portions of Road
	6,076	74	>75% Grass cover, Good, HSG C
	11,804	86	Weighted Average
	6,076		51.47% Pervious Area
	5,728		48.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3: Portions of Road



Summary for Subcatchment 4: Portions of Road

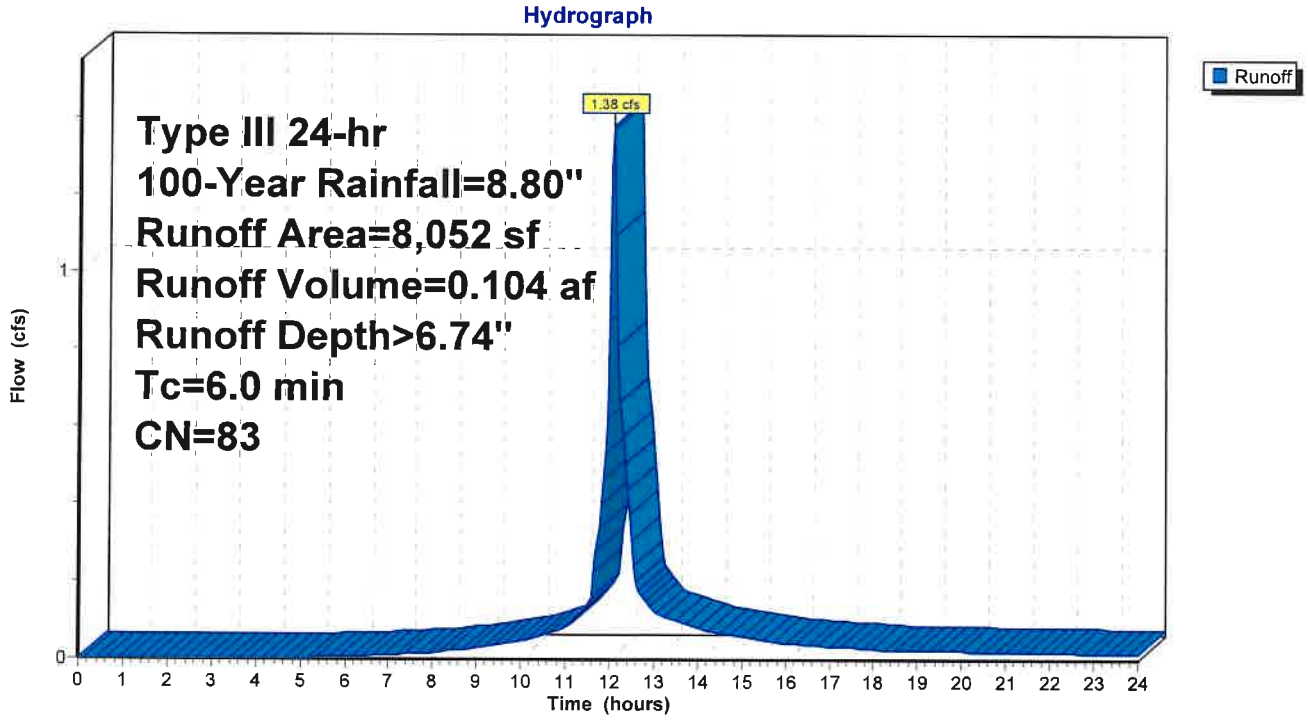
Runoff = 1.38 cfs @ 12.09 hrs, Volume= 0.104 af, Depth> 6.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.80"

	Area (sf)	CN	Description
*	3,052	98	Prop. Roadway
	5,000	74	>75% Grass cover, Good, HSG C
	8,052	83	Weighted Average
	5,000		62.10% Pervious Area
	3,052		37.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4: Portions of Road

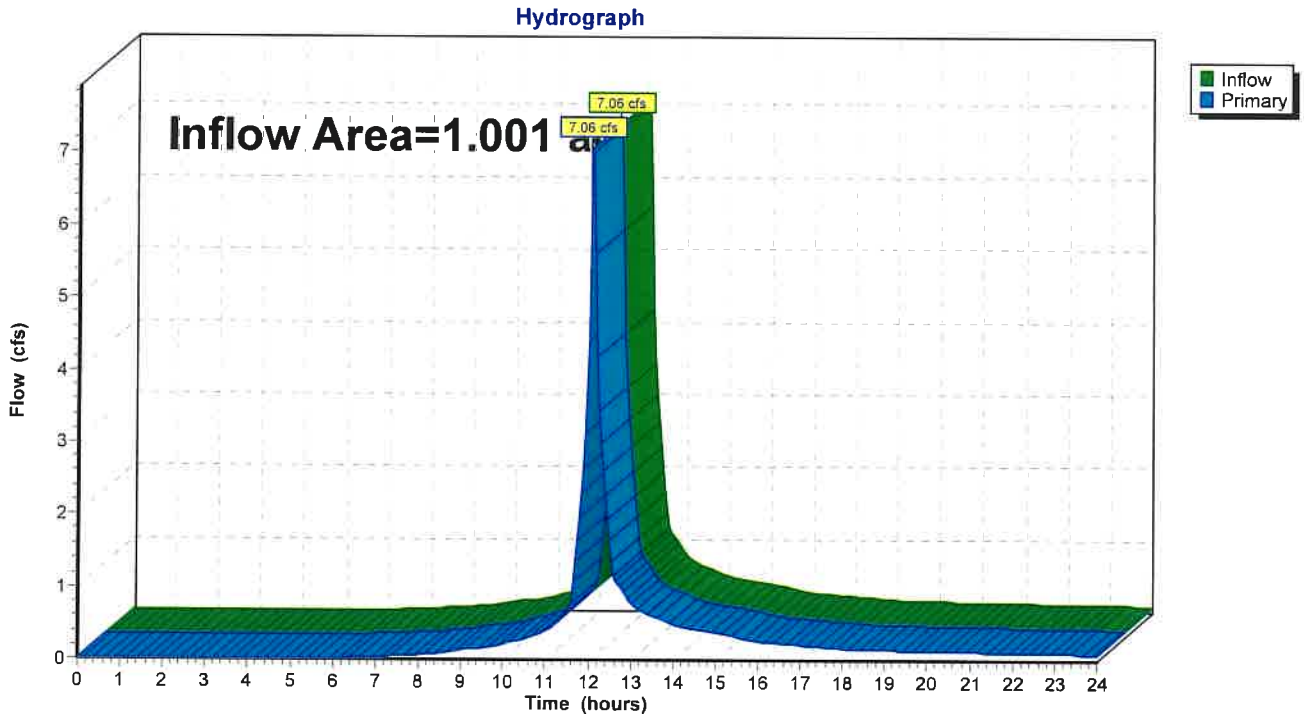


Summary for Pond 1P: South St

Inflow Area = 1.001 ac, 20.00% Impervious, Inflow Depth > 6.65" for 100-Year event
Inflow = 7.06 cfs @ 12.09 hrs, Volume= 0.555 af
Primary = 7.06 cfs @ 12.09 hrs, Volume= 0.555 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 1P: South St

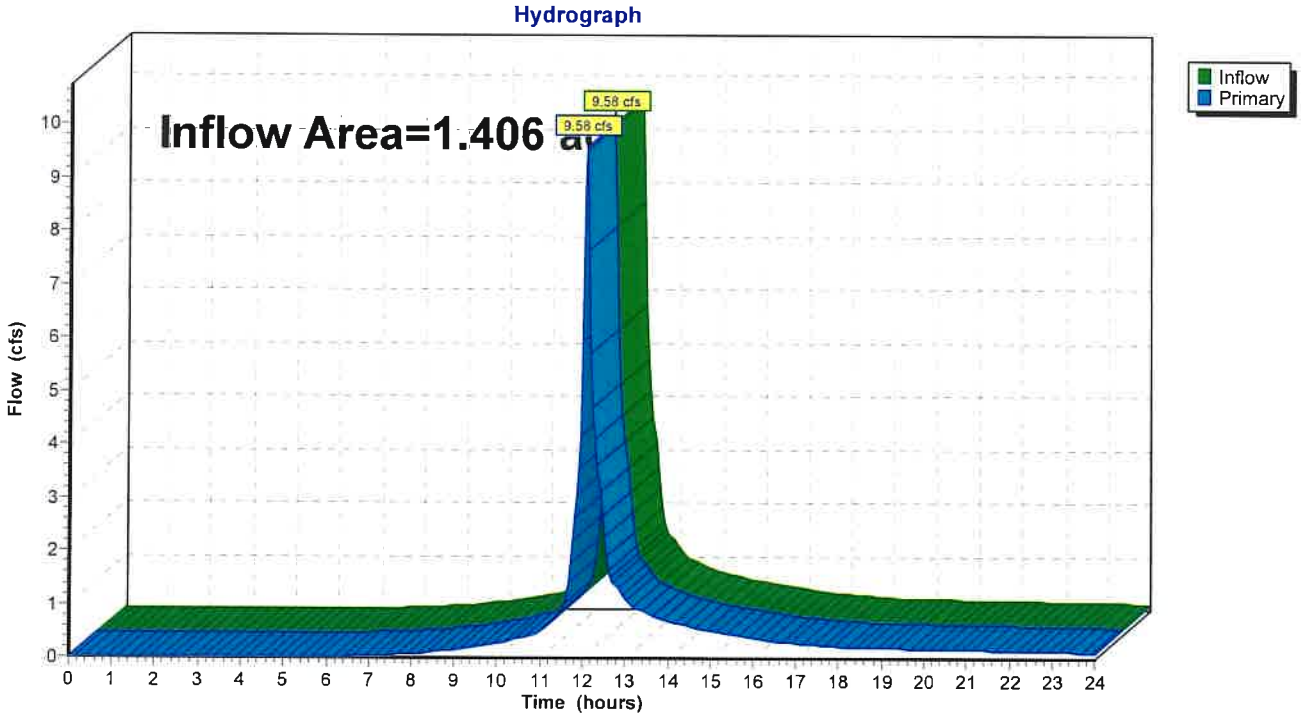


Summary for Pond 2P: Wetland

Inflow Area = 1.406 ac, 12.00% Impervious, Inflow Depth > 6.44" for 100-Year event
Inflow = 9.58 cfs @ 12.09 hrs, Volume= 0.754 af
Primary = 9.58 cfs @ 12.09 hrs, Volume= 0.754 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Pond 2P: Wetland



Summary for Pond 3P: Inf. #1

Inflow Area =	0.185 ac,	37.90% Impervious,	Inflow Depth >	6.74" for 100-Year event
Inflow =	1.38 cfs @	12.09 hrs, Volume=	0.104 af	
Outflow =	0.16 cfs @	12.76 hrs, Volume=	0.046 af,	Atten= 88%, Lag= 40.5 min
Discarded =	0.01 cfs @	7.45 hrs, Volume=	0.013 af	
Secondary =	0.15 cfs @	12.76 hrs, Volume=	0.033 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 226.19' @ 12.76 hrs Surf.Area= 0.032 ac Storage= 0.061 af

Plug-Flow detention time= 248.4 min calculated for 0.046 af (44% of inflow)
Center-of-Mass det. time= 129.1 min (921.0 - 791.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	223.46'	0.027 af	**20.83'W x 66.50'L x 3.54'H Field A** 0.113 af Overall - 0.044 af Embedded = 0.069 af x 40.0% Voids
#2A	223.96'	0.044 af	**Cultec R-330XLHD** x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		0.072 af	Total Available Storage

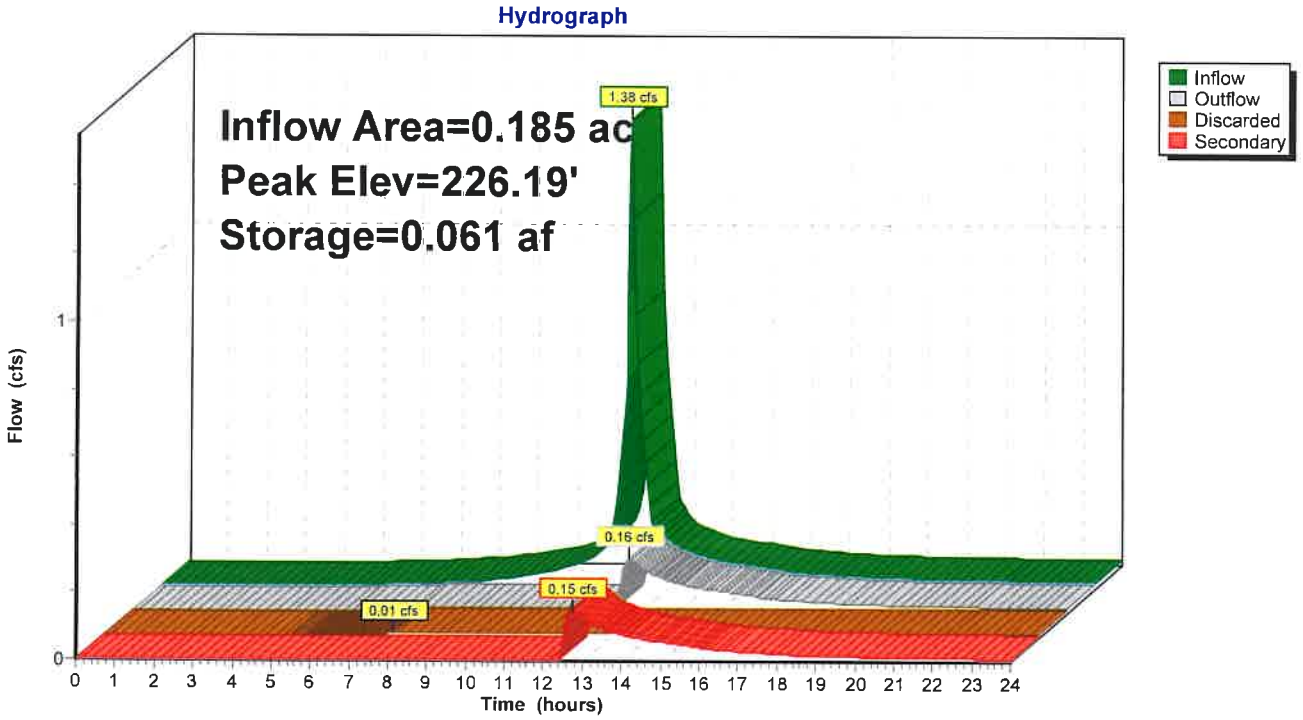
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	223.46'	**0.270 in/hr Exfiltration over Surface area**
#2	Secondary	226.00'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 7.45 hrs HW=223.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.15 cfs @ 12.76 hrs HW=226.19' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.47 fps)

Pond 3P: Inf. #1


Hydrograph
Inflow Area=0.185 ac
Peak Elev=226.19'
Storage=0.061 af
1.38 cfs
0.16 cfs
0.15 cfs
0.01 cfs
Inflow
Outflow
Discarded
Secondary
Flow (cfs)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Summary for Pond 4P: Inf. #2

Inflow Area = 0.271 ac, 48.53% Impervious, Inflow Depth > 7.10" for 100-Year event
Inflow = 2.10 cfs @ 12.09 hrs, Volume= 0.160 af
Outflow = 0.26 cfs @ 12.70 hrs, Volume= 0.069 af, Atten= 88%, Lag= 36.6 min
Discarded = 0.01 cfs @ 6.80 hrs, Volume= 0.018 af
Secondary = 0.24 cfs @ 12.70 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 228.38' @ 12.70 hrs Surf.Area= 0.043 ac Storage= 0.095 af

Plug-Flow detention time= 253.8 min calculated for 0.068 af (43% of inflow)
Center-of-Mass det. time= 130.7 min (915.0 - 784.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	225.00'	0.037 af	**25.67'W x 73.50'L x 3.54'H Field A** 0.153 af Overall - 0.061 af Embedded = 0.092 af x 40.0% Voids
#2A	225.50'	0.061 af	**Cultec R-330XLHD** x 50 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		0.098 af	Total Available Storage

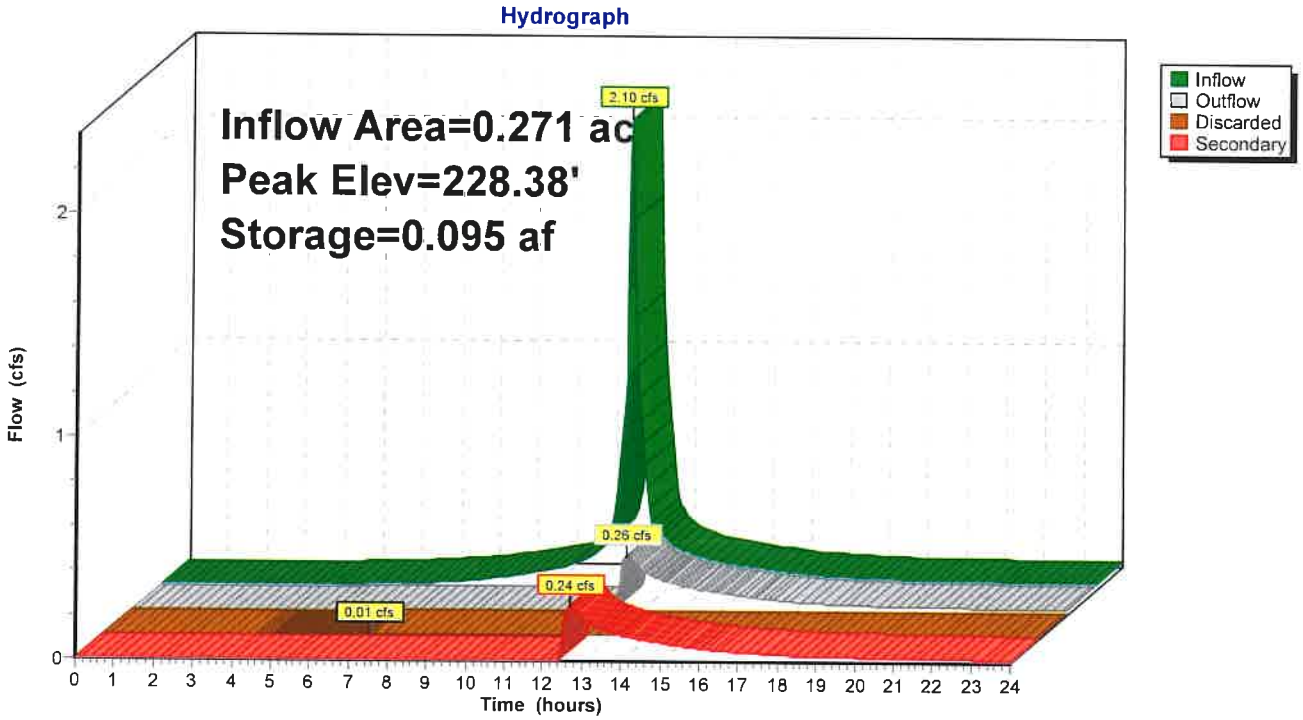
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	225.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Secondary	228.14'	**12.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 6.80 hrs HW=225.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.24 cfs @ 12.70 hrs HW=228.38' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.24 cfs @ 1.67 fps)

Pond 4P: Inf. #2


Hydrograph
Inflow Area=0.271 ac
Peak Elev=228.38'
Storage=0.095 af
2.10 cfs
0.26 cfs
0.24 cfs
0.01 cfs
Inflow
Outflow
Discarded
Secondary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Norfolk and Suffolk Counties, Massachusetts

103C—Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2wzp1
Elevation: 0 to 1,390 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, extremely stony, and similar soils: 50 percent
Hollis, extremely stony, and similar soils: 20 percent
Rock outcrop: 10 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Extremely Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Hollis, Extremely Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges, hills
Parent material: Igneous and metamorphic rock

Typical profile

R - 0 to 79 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Woodbridge, extremely stony

Percent of map unit: 8 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Canton, extremely stony

Percent of map unit: 5 percent
Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Chatfield, extremely stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 2 percent
Landform: Hills, drainageways, drumlins, depressions, ground moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 17, Sep 3, 2021

Map Scale: 1:909 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFOR

The soil surveys that comprise your 1:25,000.

Warning: Soil Map may not be valid

Enlargement of maps beyond the s misunderstanding of the detail of m line placement. The maps do not sh contrasting soils that could have be scale.

Please rely on the bar scale on eac measurements.

Source of Map: Natural Resource
Web Soil Survey URL:
Coordinate System: Web Mercatc

Maps from the Web Soil Survey are projection, which preserves directio distance and area. A projection that Albers equal-area conic projection, accurate calculations of distance or

This product is generated from the of the version date(s) listed below.

Soil Survey Area: Norfolk and Suf
Survey Area Data: Version 17, Se

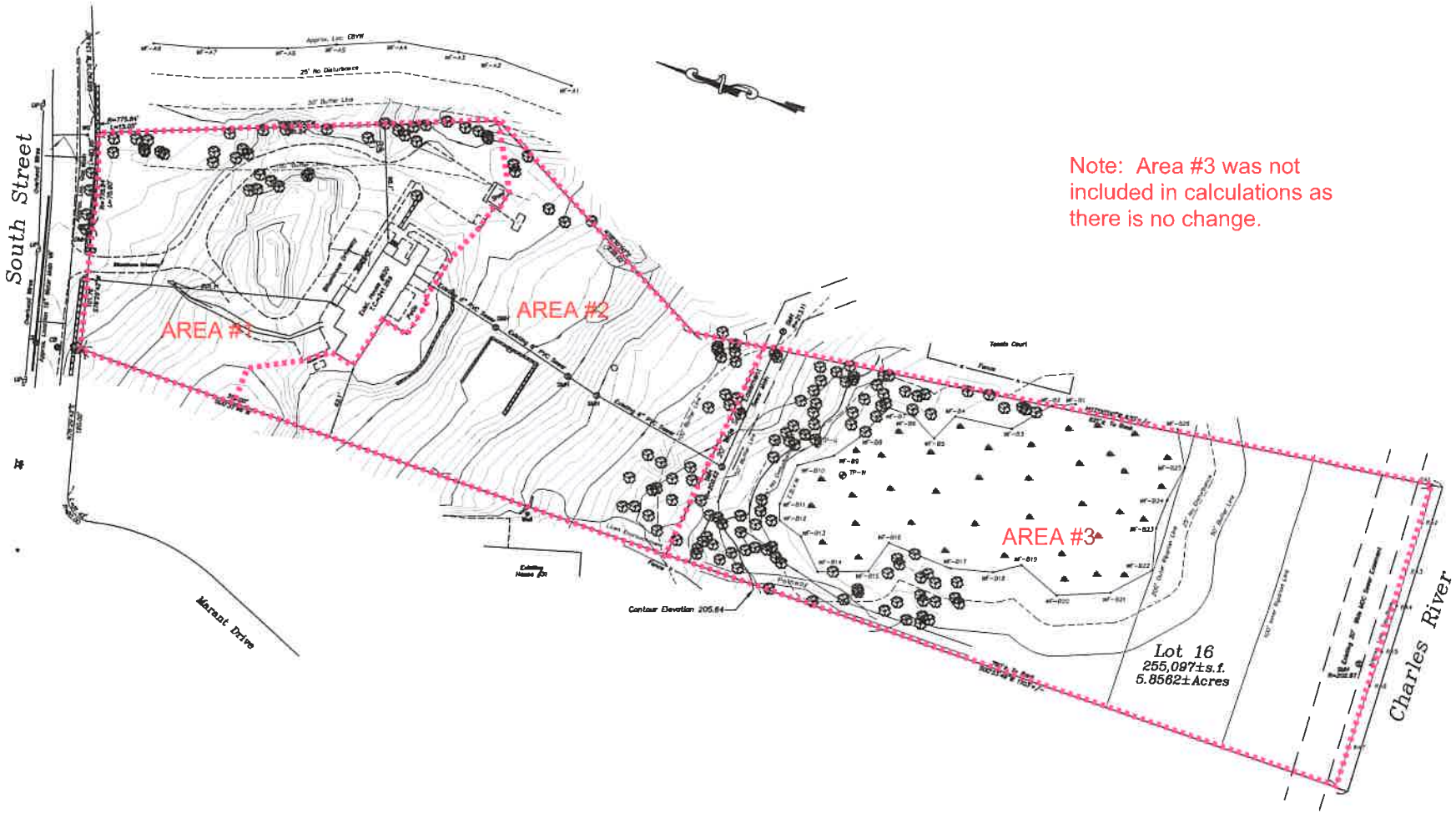
Soil map units are labeled (as spac 1:50,000 or larger.

Date(s) aerial images were photogr 5, 2022

The orthophoto or other base map compiled and digitized probably diff imagery displayed on these maps. shifting of map unit boundaries may

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	2.1	100.0%
Totals for Area of Interest		**2.1**	**100.0%**



~Pre Development Catchment Area Plan~

920 South Street

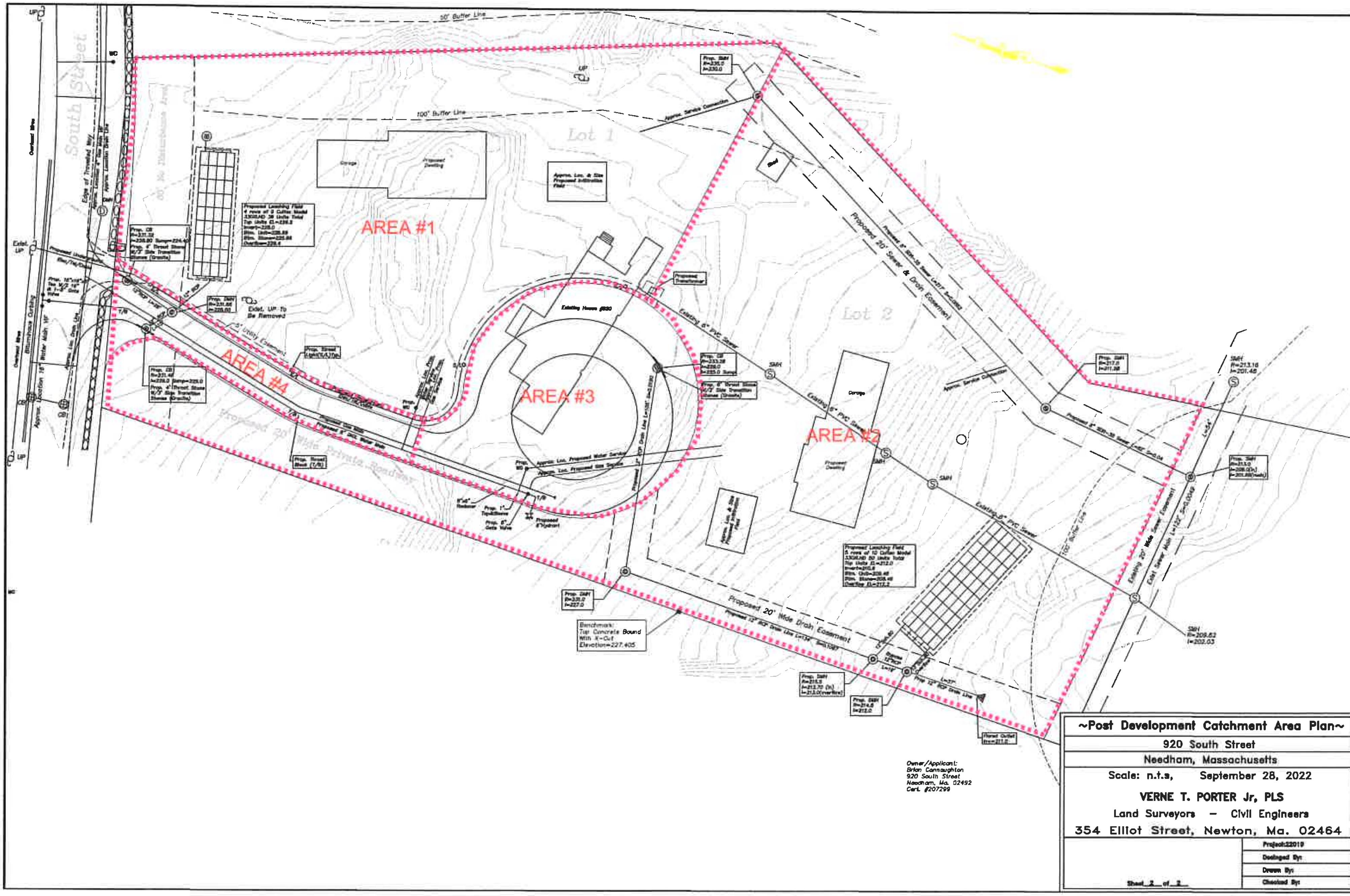
Needham, Massachusetts

Scale: n.t.s. September 28, 2022

VERNE T. PORTER Jr, PLS
Land Surveyors – Civil Engineers
354 Elliot Street, Newton, Ma. 02464

Project:22019
Designed By:
Drawn By:
Checked By:

Sheet 1 of 2



Owner/Applicant:
Brian Connaughton
920 South Street
Needham, Ma. 02492
Cert. #207299

~Post Development Catchment Area Plan~

920 South Street

Needham, Massachusetts

Scale: n.t.s, September 28, 2022

VERNE T. PORTER Jr, PLS

Land Surveyors – Civil Engineers

354 Elliot Street, Newton, Ma. 02464

Project:22019

Designed By:

Drawn By:

Checked By:

Sheet 2 of 2