

JC ENGINEERING, Inc.
Civil & Environmental Engineering

2854 Cranberry Highway
East Wareham, Massachusetts 02538
Ph. 508-273-0377 – Fax 508-273-0367

January 6, 2022

Town of Wareham
Planning Board
Memorial Town Hall
54 Marion Road
Wareham, MA 02571

RE: Consulting Engineer Review Comments for The Definitive Subdivision Plan for Tobia Way, Wareham, MA

Dear Board Members,

We have reviewed the letter entitled “Definitive Subdivision Plan Review, Tobia Way at 5 Crooked River Rd” prepared by Charles L. Rowley and dated January 1, 2022. Please see below for the comments listed on this letter followed by our responses and a description of plan changes shown in red.

General:

1. The deed attached to the application package references an existing subdivision that was done for Robert Brighetti in 1974. The plan of record was recorded in the Plymouth County Registry of Deeds in Plan Book 18, Page 135. The deed indicates that Lot 1022, as shown on the original plan is a right of way. The owner of the right of way and any others claiming rights to it should be identified for the record.

The current applicant is the sole owner of the right of way shown as lot 1022. Aside from the owner, no other property has deeded rights to this right of way. We have updated the “notes” shown on pages 2 & 3 to help clarify the ownership of the right of way.

2. The Planning Board should consider the rescission of the subdivision referenced above and should vote to rescind it to avoid one approved subdivision overtopping another. If notice has not been given to those having rights in the previous right of way, it should be done as part of the deliberations.

We agree that the previous subdivision plan should be rescinded. Proper notice has been given as no other property owner has rights to the previous right of way.

3. The new plan shows a proposed street layout to be known as Tobia Way and includes Lot 1021 and portions of Lot 1020 and 2022 as shown on the original subdivision. By virtue of this proposal no rights to use Tobia Way are automatically granted to the owner of Lot

1003D (N/F Carr). However, the applicant could grant rights of access for future development of land outside the limits of what is shown.

Therefore, the Board may wish to consider conditioning the project to only that which is shown with no access granted to other properties without returning to the Planning Board for approval.

The applicant's intention is to only give rights for the proposed right of way to the Proposed Lot 2 as shown on our plan.

Plan:

1. The proposed subdivision shows a paved driving surface 12 feet in width with a 1-foot Cape Cod Berm on one side. The grading of the road is such that runoff is collected along the berm. Evidence should be presented to the Board that the Wareham Fire Department considers the 12-foot width sufficient for their purposes.

The Wareham Fire Department has confirmed the roadway width is sufficient for the creation of 1 lot (see comment letter).

2. The two paved waterways shown should be re-oriented on an angle with the paved surface that will allow runoff into the paved waterway more directly. A detail of the proposed waterway and rip-rap stone should be shown. Can the waterway closest to Crooked River Road be brought any closer to reduce the runoff onto the public way? Some limited regrading may be necessary in this area.

The angle of the paved swales has been adjusted to allow runoff to flow more directly. A detail of the paved swale and riprap has been added to page 4. The swale closest to Crooked River Road has been relocated slightly south of its original location to help collect more runoff. The swale furthest from Crooked River Road has been relocated slightly north of its original position due to the change in size of the retention basin (see stormwater comments below). Grading has been slightly adjusted to accommodate these changes.

3. Show the pavement cross section with two layers of gravel and remove the captions "depth varies" and "ordinary borrow".

The roadway cross section on page 4 has been modified to show two layers of gravel and remove the captions "depth varies" and "ordinary borrow".

4. Although Section VI, Required Improvements, C,6 of the Rules and Regulations suggest that the gravel specification M1-3.0 Type (A) is allowed, it is not recommended because the maximum stone size is too large. It should be no greater than half the depth of the material (3" or 75mm maximum size in both layers). A confirmation that material used for the gravel base meets the minimum specification of M1.03.0, Type (B) or (C) should be presented at the time of construction.

The roadway cross section on page 4 has been modified to specify M1-3.0 Type (B) instead of M1-3.0 Type (A). Confirmation that the appropriate type of gravel to be used for the roadway will be presented at time of construction.

5. Loam and seed should be labeled with a 4-inch minimum depth.

The roadway cross section detail and the retention basin detail as shown on page 4 have been modified to specify that loam and seed will need to be a minimum of 4" in depth.

6. There appears to be some unnecessary regrading of the site between contours 27 and 28. These contours could be brought closer to the pavement which would lessen some of the disturbance.

The proposed 28-foot contour has been adjusted by bringing it closer to the pavement which helps to eliminate some unnecessary grading.

Requested Waivers

1. Waivers noted as 1 through 5 and waiver 7 need approval from the Board. Since there is no public sewer within 1500 feet of the subdivision no waiver (6) for a connection is necessary.

Waiver 6 has been removed from the waiver requests.

2. An additional waiver for the pavement width and modified turning area at the end of Tobia Way is required. See Section V, Design Standards, C,3,5 of the Rules and Regulations. It is recommended that the orientation of the turning area be discussed with the Fire Department but that the final orientation be related to Department requirements and the best location for a driveway to Lot 2.

A waiver request has been added to page 1 which requests a waiver from having a turn around with an outside dimension of 100'. Per the Wareham Fire Departments review, the turn around that is shown on plan is sufficient for their purpose (see comment letter). The turning radius of the road has been adjusted to 25 feet as requested by the Wareham Fire Department.

Stormwater Requirements

1. The stormwater requirements appear to have been met with the exception of confirming that abutting properties or ways will not be adversely impacted by the development or a 100-year storm event. See Section V, Design Standards, B,1 of the Rules and Regulations. Additional information is suggested.

The size of the retention basin has been slightly enlarged to ensure runoff from a 100-year storm event will not flow over the perimeter of the retention basin and therefore will not adversely impact any abutting properties of ways. The stormwater analysis has been updated to show the peak elevation of stormwater during a 100-year storm event.

Wareham Planning Board

Page 4

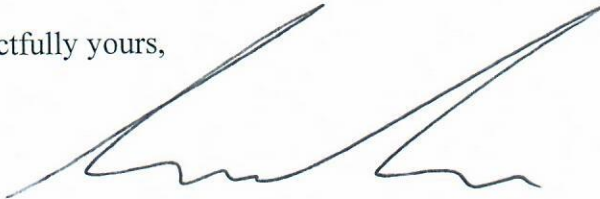
January 6, 2022

Conclusions:

As with all subdivision projects the approval must include a covenant to be recorded with the plan with a notation to that effect on the plan. The applicant has the option to post other security as noted in the Rules and Regulations but in either case, the plan should not be signed until the lapse of the 20-day appeal period has been certified by the Town Clerk and the form of security has been approved.

The applicant plans to sign a covenant and have it recorded along with the plan. A notation that a covenant will be recorded is displayed on the bottom right-hand corner of page 3 on the subdivision plans.

Respectfully yours,

A handwritten signature in black ink, appearing to read 'Samuel J. Iamele', written in a cursive style.

Samuel J. Iamele, EIT
Project Engineer

Cc: File; Client

Wareham Fire Department

273 Main Street
Wareham, MA 02571

Business Phone: (508) 295-2973 · Fax: (508) 295-1333

January 6, 2022

Town of Wareham Planning Board
C/O Kenneth Buckland
54 Marion Road
Wareham MA 02571

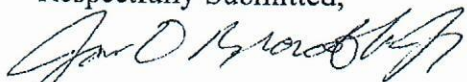
Dear Planning Board,

The Wareham Fire Department has reviewed the proposed Tobia Way Subdivision at 5 Crooked River Road and have the following comments.

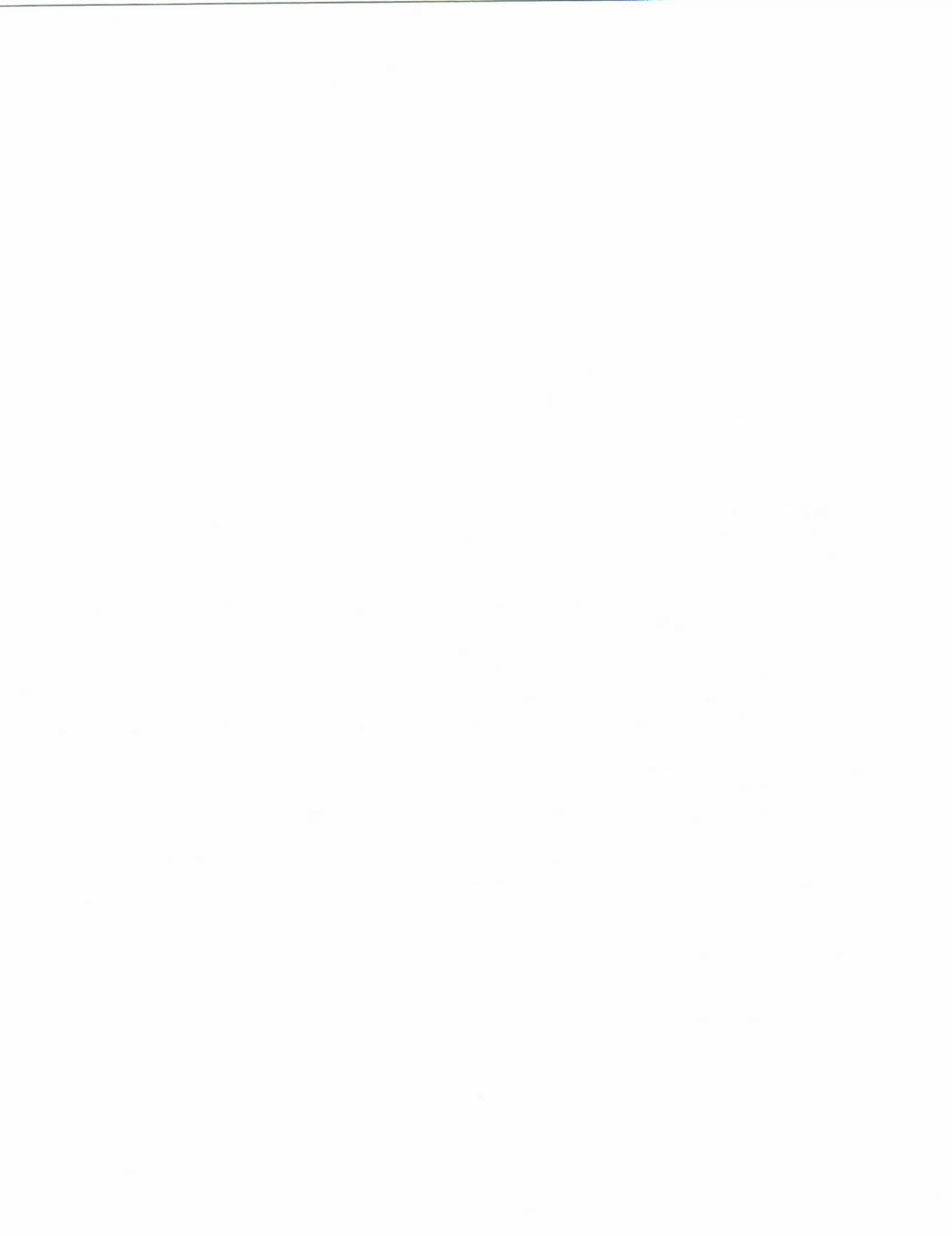
1. The proposed access road is acceptable only for (1) single family dwelling. The proposed road would not be acceptable for a multiple family dwelling or access to multiple lots.
2. The inside turning radius shall be 25 degrees.
3. The access road shall always be kept clear from trees and vegetation including overhead obstruction to allow for emergency vehicle access.
4. No vehicles or equipment shall be allowed to park or be stored on the provided "hammerhead" emergency vehicle turnaround.
5. This "hammerhead" emergency vehicle turnaround shall be kept clear of snow and other debris that would hinder use.
6. Finished access road subject to Wareham Fire Department inspection.

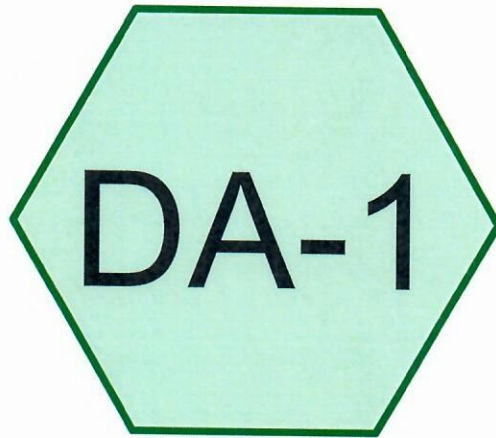
If you have any additional questions regarding this matter, please feel free to contact the Fire Prevention office of the Wareham Fire Department.

Respectfully Submitted,

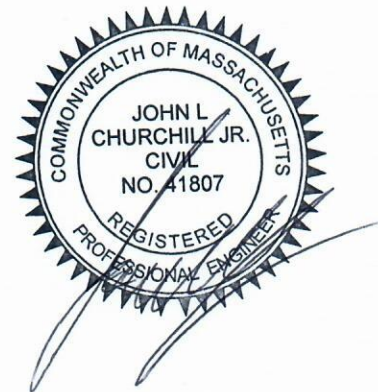


Captain James Brandolini Jr
Fire Prevention





On-Site Runoff



Existing Conditions

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Page 2

Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---------------------------------------|
| 0.028 | 76 | Gravel roads, HSG A (DA-1) |
| 0.039 | 98 | Unconnected roofs, HSG A (DA-1) |
| 2.013 | 43 | Woods/grass comb., Fair, HSG A (DA-1) |
| 2.081 | 44 | TOTAL AREA |

Existing Conditions

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Page 3

Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|-------------------------|
| 2.081 | HSG A | DA-1 |
| 0.000 | HSG B | |
| 0.000 | HSG C | |
| 0.000 | HSG D | |
| 0.000 | Other | |
| 2.081 | | TOTAL AREA |

Existing Conditions

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Page 4

Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|------------------|------------------|------------------|------------------|------------------|------------------|-------------------------|-------------------------|
| 0.028 | 0.000 | 0.000 | 0.000 | 0.000 | 0.028 | Gravel roads | DA-1 |
| 0.039 | 0.000 | 0.000 | 0.000 | 0.000 | 0.039 | Unconnected roofs | DA-1 |
| 2.013 | 0.000 | 0.000 | 0.000 | 0.000 | 2.013 | Woods/grass comb., Fair | DA-1 |
| 2.081 | 0.000 | 0.000 | 0.000 | 0.000 | 2.081 | TOTAL AREA | |

Existing Conditions

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Type III 24-hr 25 YR Rainfall=5.40"

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Page 5

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1: On-Site Runoff

Runoff Area=90,630 sf 1.86% Impervious Runoff Depth>0.52"
Flow Length=340' Tc=16.0 min CN=44 Runoff=0.47 cfs 0.090 af

Total Runoff Area = 2.081 ac Runoff Volume = 0.090 af Average Runoff Depth = 0.52"
98.14% Pervious = 2.042 ac 1.86% Impervious = 0.039 ac



Existing Conditions

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Type III 24-hr 25 YR Rainfall=5.40"

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Page 6

Summary for Subcatchment DA-1: On-Site Runoff

Runoff = 0.47 cfs @ 12.44 hrs, Volume= 0.090 af, Depth> 0.52"

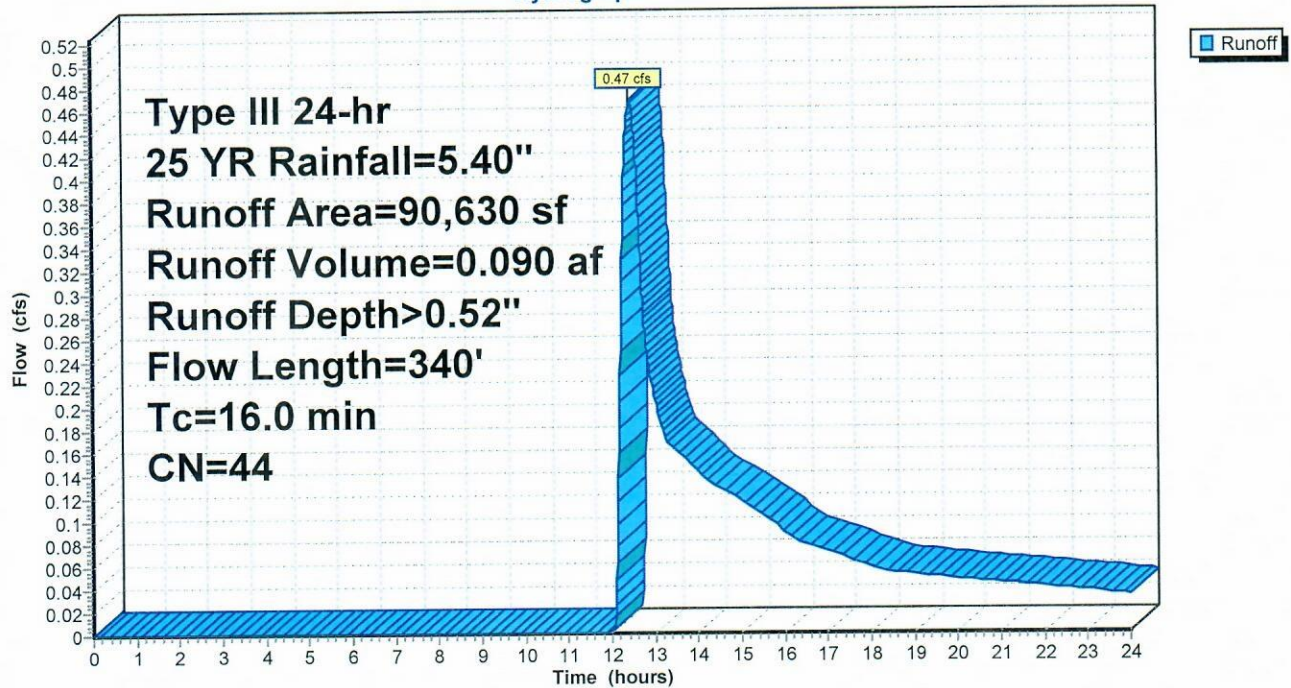
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 YR Rainfall=5.40"

| Area (sf) | CN | Description |
|-----------|----|--------------------------------|
| 1,690 | 98 | Unconnected roofs, HSG A |
| 1,232 | 76 | Gravel roads, HSG A |
| 87,708 | 43 | Woods/grass comb., Fair, HSG A |
| 90,630 | 44 | Weighted Average |
| 88,940 | | 98.14% Pervious Area |
| 1,690 | | 1.86% Impervious Area |
| 1,690 | | 100.00% Unconnected |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.2 | 50 | 0.0300 | 0.08 | | Sheet Flow, A - B Woods: Light underbrush n= 0.400 P2= 3.40" |
| 5.8 | 290 | 0.0275 | 0.83 | | Shallow Concentrated Flow, B - C Woodland Kv= 5.0 fps |
| 16.0 | 340 | Total | | | |

Subcatchment DA-1: On-Site Runoff

Hydrograph



Existing Conditions

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Type III 24-hr 100 YR Rainfall=7.00"

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Page 7

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1: On-Site Runoff

Runoff Area=90,630 sf 1.86% Impervious Runoff Depth>1.15"
Flow Length=340' Tc=16.0 min CN=44 Runoff=1.49 cfs 0.199 af

Total Runoff Area = 2.081 ac Runoff Volume = 0.199 af Average Runoff Depth = 1.15"
98.14% Pervious = 2.042 ac 1.86% Impervious = 0.039 ac



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Type III 24-hr 100 YR Rainfall=7.00"

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Page 8

Summary for Subcatchment DA-1: On-Site Runoff

Runoff = 1.49 cfs @ 12.28 hrs, Volume= 0.199 af, Depth> 1.15"

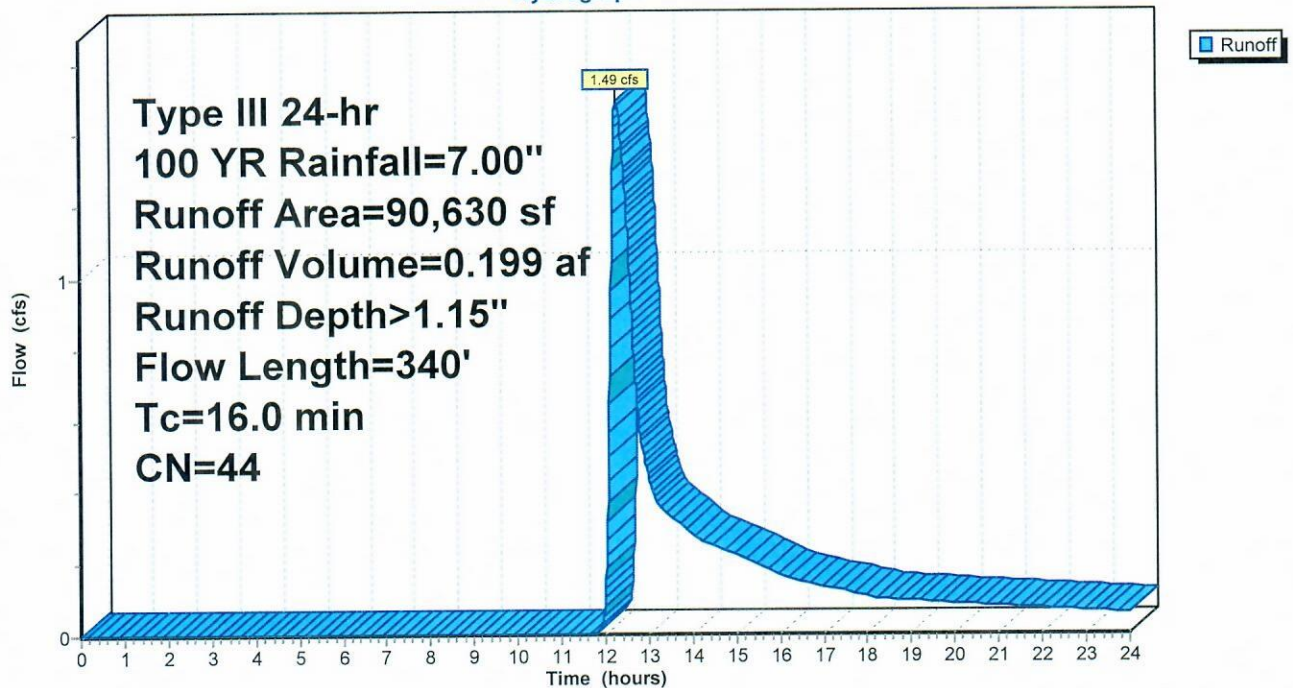
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 Type III 24-hr 100 YR Rainfall=7.00"

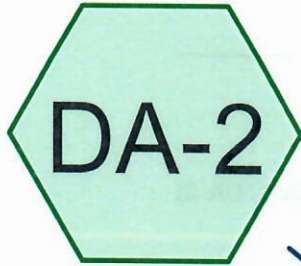
| Area (sf) | CN | Description |
|-----------|----|--------------------------------|
| 1,690 | 98 | Unconnected roofs, HSG A |
| 1,232 | 76 | Gravel roads, HSG A |
| 87,708 | 43 | Woods/grass comb., Fair, HSG A |
| 90,630 | 44 | Weighted Average |
| 88,940 | | 98.14% Pervious Area |
| 1,690 | | 1.86% Impervious Area |
| 1,690 | | 100.00% Unconnected |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.2 | 50 | 0.0300 | 0.08 | | Sheet Flow, A - B Woods: Light underbrush n= 0.400 P2= 3.40" |
| 5.8 | 290 | 0.0275 | 0.83 | | Shallow Concentrated Flow, B - C Woodland Kv= 5.0 fps |
| 16.0 | 340 | Total | | | |

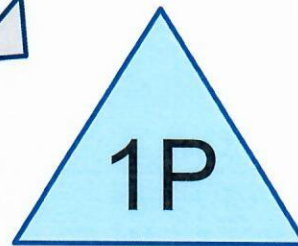
Subcatchment DA-1: On-Site Runoff

Hydrograph





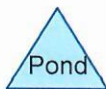
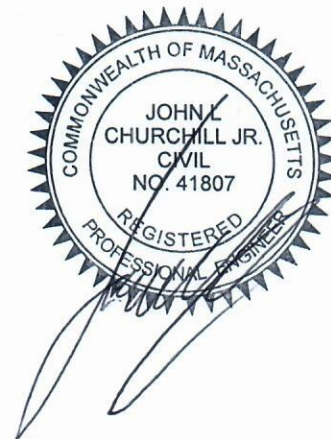
Road Runoff



Detention Basin



On-Site Runoff



Proposed Conditions

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Page 2

Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---|
| 0.028 | 76 | Gravel roads, HSG A (DA-1) |
| 0.098 | 98 | Paved parking, HSG A (DA-1, DA-2) |
| 0.039 | 98 | Roofs, HSG A (DA-1) |
| 1.916 | 43 | Woods/grass comb., Fair, HSG A (DA-1, DA-2) |
| 2.081 | 47 | TOTAL AREA |

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Page 3

Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|-------------------------|
| 2.081 | HSG A | DA-1, DA-2 |
| 0.000 | HSG B | |
| 0.000 | HSG C | |
| 0.000 | HSG D | |
| 0.000 | Other | |
| 2.081 | | TOTAL AREA |

Proposed Conditions

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Page 4

Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|------------------|------------------|------------------|------------------|------------------|------------------|-------------------------|-------------------------|
| 0.028 | 0.000 | 0.000 | 0.000 | 0.000 | 0.028 | Gravel roads | DA-1 |
| 0.098 | 0.000 | 0.000 | 0.000 | 0.000 | 0.098 | Paved parking | DA-1, DA-2 |
| 0.039 | 0.000 | 0.000 | 0.000 | 0.000 | 0.039 | Roofs | DA-1 |
| 1.916 | 0.000 | 0.000 | 0.000 | 0.000 | 1.916 | Woods/grass comb., Fair | DA-1, DA-2 |
| 2.081 | 0.000 | 0.000 | 0.000 | 0.000 | 2.081 | TOTAL AREA | |

Proposed Conditions

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Type III 24-hr 25-year Rainfall=5.40"

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Page 5

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA-1: On-Site Runoff

Runoff Area=73,807 sf 2.76% Impervious Runoff Depth>0.57"
Flow Length=340' Tc=16.0 min CN=45 Runoff=0.45 cfs 0.081 af

Subcatchment DA-2: Road Runoff

Runoff Area=16,823 sf 23.27% Impervious Runoff Depth>1.25"
Flow Length=300' Slope=0.0083 '/' Tc=3.3 min CN=56 Runoff=0.54 cfs 0.040 af

Pond 1P: Detention Basin

Peak Elev=25.28' Storage=916 cf Inflow=0.54 cfs 0.040 af
Outflow=0.03 cfs 0.026 af

Total Runoff Area = 2.081 ac Runoff Volume = 0.121 af Average Runoff Depth = 0.70"
93.43% Pervious = 1.944 ac 6.57% Impervious = 0.137 ac



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Type III 24-hr 25-year Rainfall=5.40"

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Page 6

Summary for Subcatchment DA-1: On-Site Runoff

Runoff = 0.45 cfs @ 12.42 hrs, Volume= 0.081 af, Depth> 0.57"

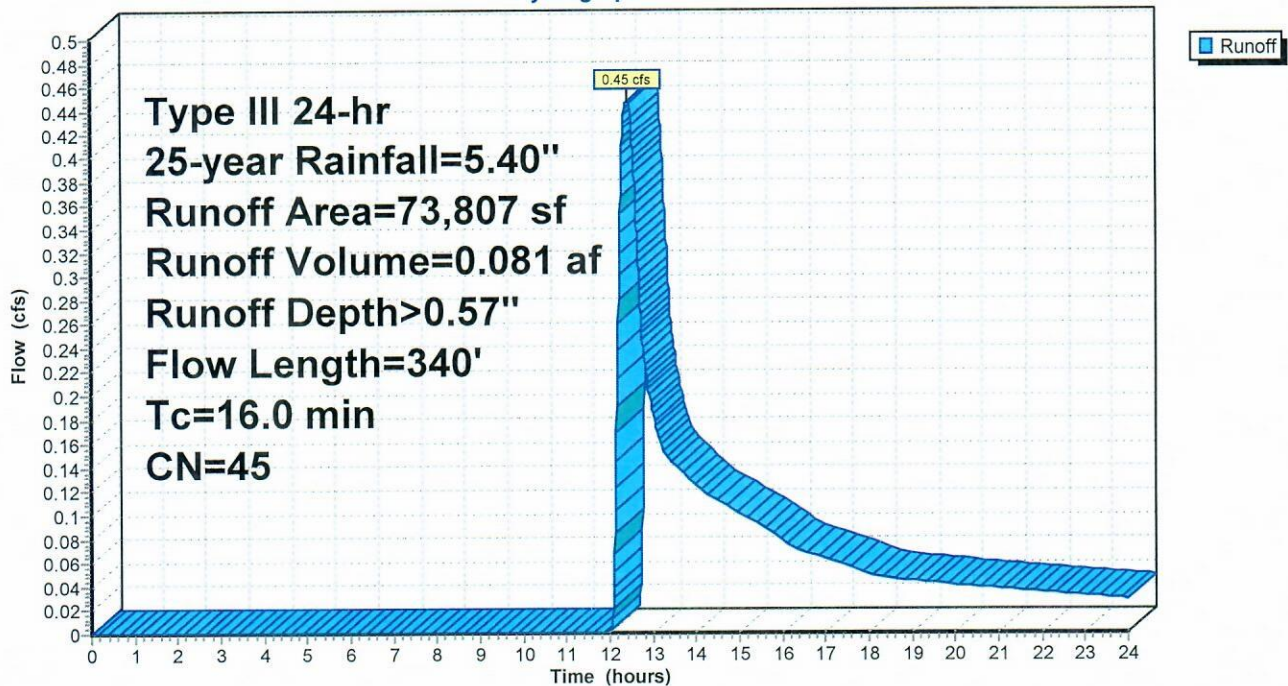
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

| Area (sf) | CN | Description |
|-----------|----|--------------------------------|
| 1,690 | 98 | Roofs, HSG A |
| 1,232 | 76 | Gravel roads, HSG A |
| 70,539 | 43 | Woods/grass comb., Fair, HSG A |
| 346 | 98 | Paved parking, HSG A |
| 73,807 | 45 | Weighted Average |
| 71,771 | | 97.24% Pervious Area |
| 2,036 | | 2.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.2 | 50 | 0.0300 | 0.08 | | Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.40" |
| 5.8 | 290 | 0.0275 | 0.83 | | Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps |
| 16.0 | 340 | Total | | | |

Subcatchment DA-1: On-Site Runoff

Hydrograph



Proposed Conditions

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Type III 24-hr 25-year Rainfall=5.40"

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Summary for Subcatchment DA-2: Road Runoff

Runoff = 0.54 cfs @ 12.06 hrs, Volume= 0.040 af, Depth> 1.25"

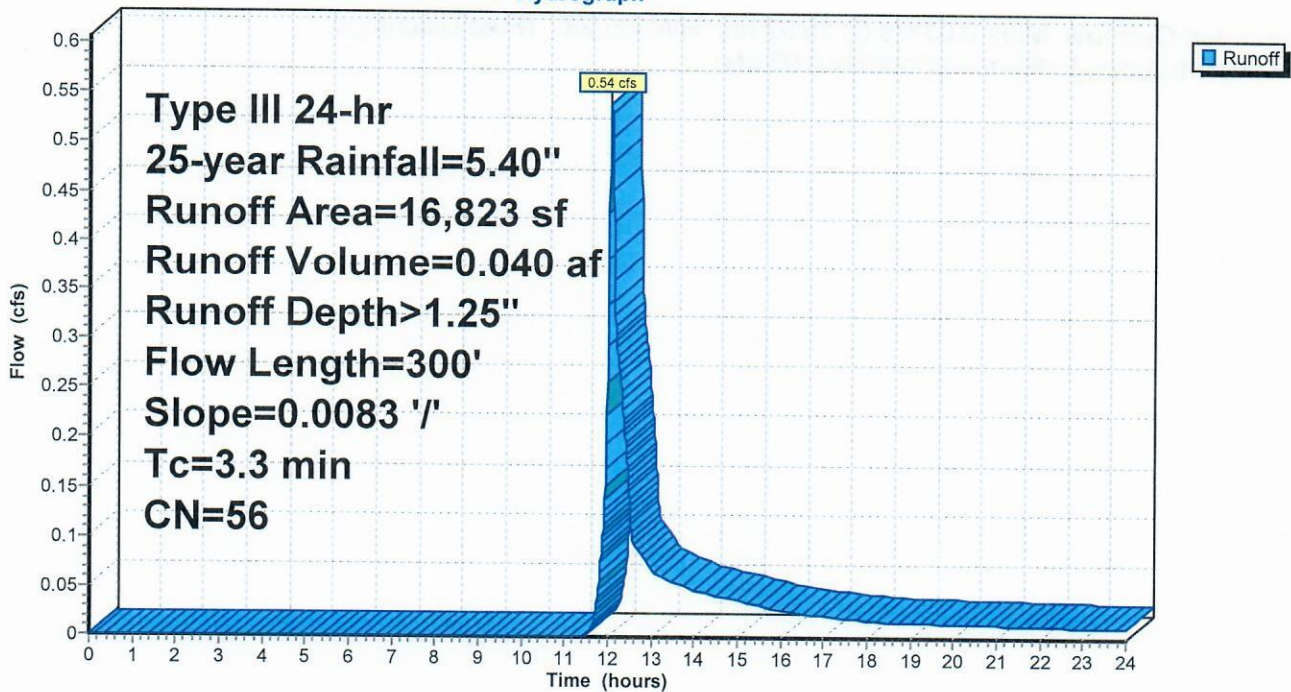
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.40"

| Area (sf) | CN | Description |
|-----------|----|--------------------------------|
| 3,914 | 98 | Paved parking, HSG A |
| 12,909 | 43 | Woods/grass comb., Fair, HSG A |
| 16,823 | 56 | Weighted Average |
| 12,909 | | 76.73% Pervious Area |
| 3,914 | | 23.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.0 | 50 | 0.0083 | 0.87 | | Sheet Flow, A-B |
| 2.3 | 250 | 0.0083 | 1.85 | | Smooth surfaces n= 0.011 P2= 3.40" |
| 3.3 | 300 | Total | | | Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps |

Subcatchment DA-2: Road Runoff

Hydrograph



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Type III 24-hr 25-year Rainfall=5.40"

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Summary for Pond 1P: Detention Basin

Inflow Area = 0.386 ac, 23.27% Impervious, Inflow Depth > 1.25" for 25-year event
Inflow = 0.54 cfs @ 12.06 hrs, Volume= 0.040 af
Outflow = 0.03 cfs @ 15.92 hrs, Volume= 0.026 af, Atten= 95%, Lag= 231.5 min
Discarded = 0.03 cfs @ 15.92 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 25.28' @ 15.92 hrs Surf.Area= 1,211 sf Storage= 916 cf

Plug-Flow detention time= 312.2 min calculated for 0.026 af (65% of inflow)
Center-of-Mass det. time= 194.5 min (1,073.7 - 879.2)

| Volume | Invert | Avail.Storage | Storage Description |
|---------------------|----------------------|---------------------------|--|
| #1 | 24.00' | 2,016 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 24.00 | 252 | 0 | 0 |
| 25.00 | 975 | 614 | 614 |
| 26.00 | 1,830 | 1,403 | 2,016 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|--------|---|
| #1 | Discarded | 24.00' | 1.020 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.03 cfs @ 15.92 hrs HW=25.28' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Proposed Conditions

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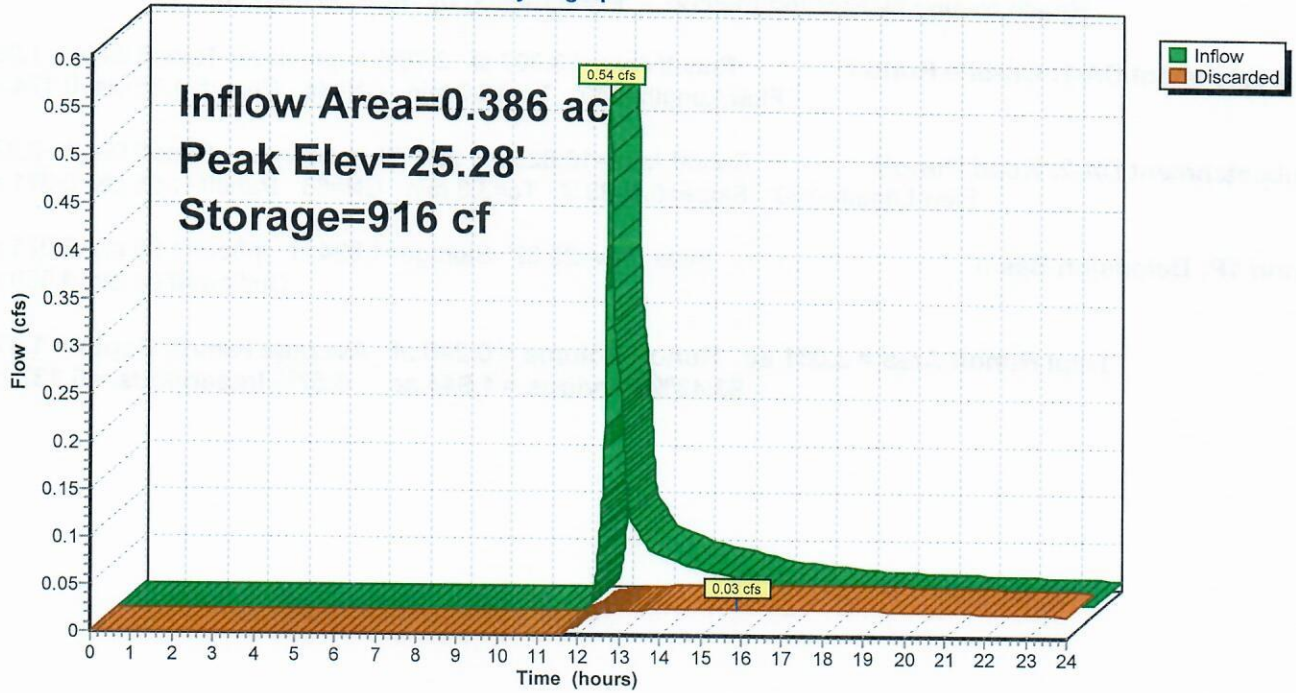
Type III 24-hr 25-year Rainfall=5.40"

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Pond 1P: Detention Basin

Hydrograph



Proposed Conditions

Type III 24-hr 100-year Rainfall=7.00"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment DA-1: On-Site Runoff Runoff Area=73,807 sf 2.76% Impervious Runoff Depth>1.23"
Flow Length=340' Tc=16.0 min CN=45 Runoff=1.35 cfs 0.174 af

Subcatchment DA-2: Road Runoff Runoff Area=16,823 sf 23.27% Impervious Runoff Depth>2.22"
Flow Length=300' Slope=0.0083 '/' Tc=3.3 min CN=56 Runoff=1.05 cfs 0.071 af

Pond 1P: Detension Basin Peak Elev=25.89' Storage=1,824 cf Inflow=1.05 cfs 0.071 af
Outflow=0.04 cfs 0.039 af

Total Runoff Area = 2.081 ac Runoff Volume = 0.245 af Average Runoff Depth = 1.41"
93.43% Pervious = 1.944 ac 6.57% Impervious = 0.137 ac

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Type III 24-hr 100-year Rainfall=7.00"

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Summary for Subcatchment DA-1: On-Site Runoff

Runoff = 1.35 cfs @ 12.28 hrs, Volume= 0.174 af, Depth> 1.23"

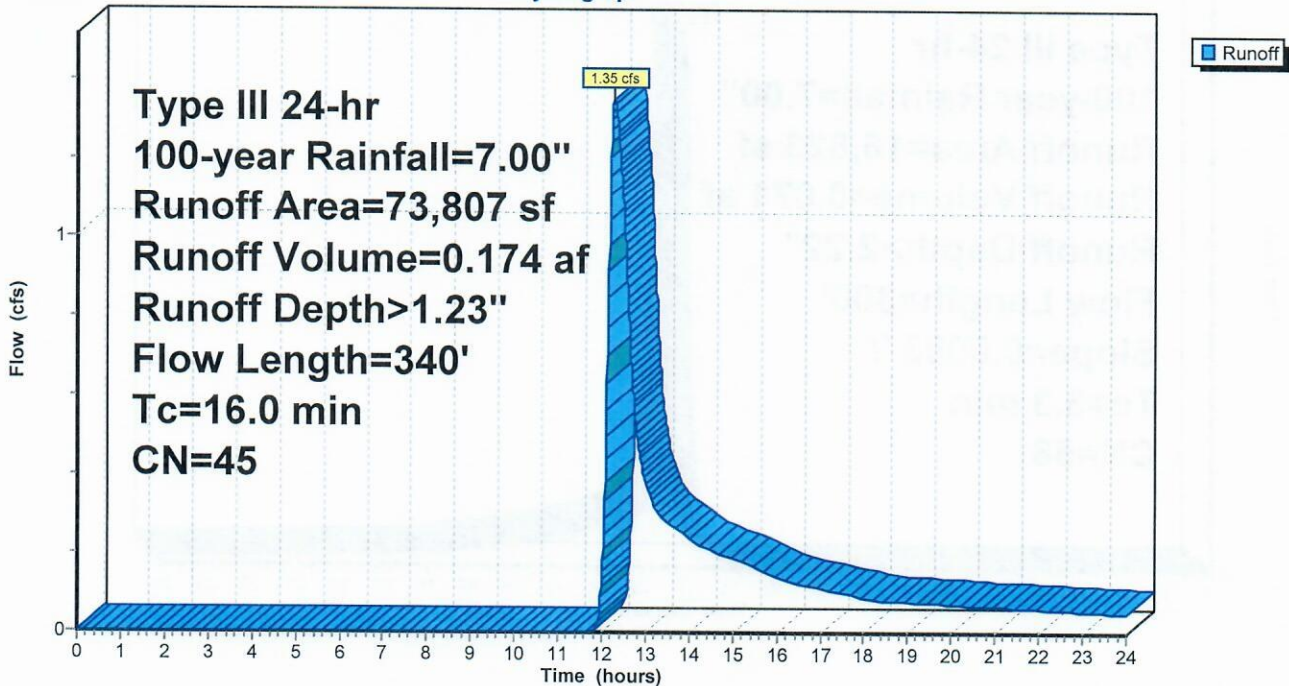
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.00"

| Area (sf) | CN | Description |
|-----------|----|--------------------------------|
| 1,690 | 98 | Roofs, HSG A |
| 1,232 | 76 | Gravel roads, HSG A |
| 70,539 | 43 | Woods/grass comb., Fair, HSG A |
| 346 | 98 | Paved parking, HSG A |
| 73,807 | 45 | Weighted Average |
| 71,771 | | 97.24% Pervious Area |
| 2,036 | | 2.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.2 | 50 | 0.0300 | 0.08 | | Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.40" |
| 5.8 | 290 | 0.0275 | 0.83 | | Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps |
| 16.0 | 340 | Total | | | |

Subcatchment DA-1: On-Site Runoff

Hydrograph



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Type III 24-hr 100-year Rainfall=7.00"

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Summary for Subcatchment DA-2: Road Runoff

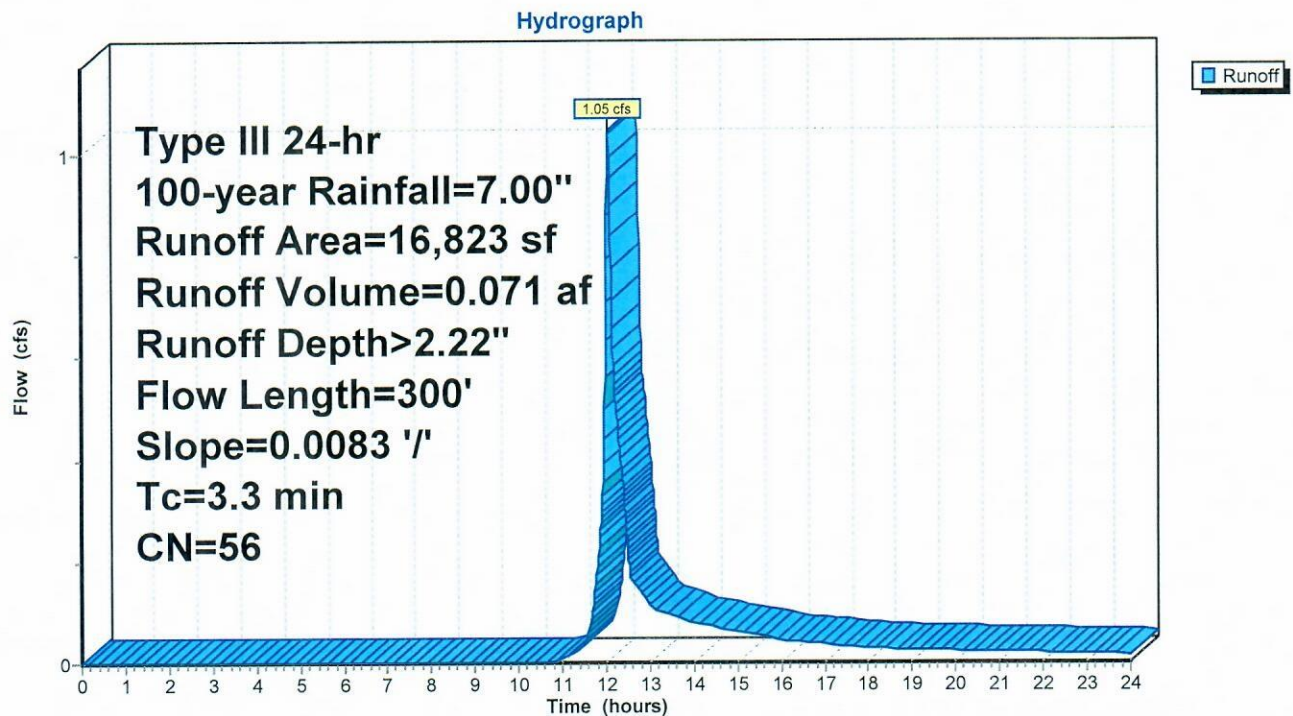
Runoff = 1.05 cfs @ 12.06 hrs, Volume= 0.071 af, Depth> 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.00"

| Area (sf) | CN | Description |
|-----------|----|--------------------------------|
| 3,914 | 98 | Paved parking, HSG A |
| 12,909 | 43 | Woods/grass comb., Fair, HSG A |
| 16,823 | 56 | Weighted Average |
| 12,909 | | 76.73% Pervious Area |
| 3,914 | | 23.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.0 | 50 | 0.0083 | 0.87 | | Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.40" |
| 2.3 | 250 | 0.0083 | 1.85 | | Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps |
| 3.3 | 300 | Total | | | |

Subcatchment DA-2: Road Runoff



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Type III 24-hr 100-year Rainfall=7.00"

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Summary for Pond 1P: Detention Basin

Inflow Area = 0.386 ac, 23.27% Impervious, Inflow Depth > 2.22" for 100-year event
Inflow = 1.05 cfs @ 12.06 hrs, Volume= 0.071 af
Outflow = 0.04 cfs @ 16.29 hrs, Volume= 0.039 af, Atten= 96%, Lag= 253.9 min
Discarded = 0.04 cfs @ 16.29 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 25.89' @ 16.29 hrs Surf.Area= 1,738 sf Storage= 1,824 cf

Plug-Flow detention time= 340.0 min calculated for 0.039 af (55% of inflow)
Center-of-Mass det. time= 213.2 min (1,073.7 - 860.5)

| Volume | Invert | Avail.Storage | Storage Description |
|---------------------|----------------------|---------------------------|--|
| #1 | 24.00' | 2,016 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 24.00 | 252 | 0 | 0 |
| 25.00 | 975 | 614 | 614 |
| 26.00 | 1,830 | 1,403 | 2,016 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|--------|---|
| #1 | Discarded | 24.00' | 1.020 in/hr Exfiltration over Surface area |

Discarded OutFlow Max=0.04 cfs @ 16.29 hrs HW=25.89' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

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Pond 1P: Detention Basin

Hydrograph

