

October 5, 2021

Kevin Ellis
Chairman
Hingham Planning Board
Planning@hingham-ma.gov

Emily Wentworth
Senior Planner
Hingham Zoning Board of Appeals

Hingham Town Hall
210 Central Street
Hingham, MA 02043

RE: **Request to Amend Special Permit A2**
Site Plan Review in Association with Special Permit A2
208 Downer Avenue - Hingham, MA 02043

Dear Mr. Ellis and Ms. Wentworth:

The purpose of this letter is to accompany revised materials associated with a Request for Site Plan Review in Association with a Special Permit A2; and to Amend an existing Special Permit A2 to remove an existing storage barn and construct a new two-story boat storage barn at 208 Downer Avenue.

We appreciate the feedback that we received at the recent Planning Board Meeting on September 13th and subsequently at a scheduled site visit on September 27th. At both meetings, we were requested to consider and provide supplemental materials to a variety of questions raised in connection with the application. The purpose of this letter is to address these questions.

- ***Location of Barn*** - *A question was raised as to the reason for relocating the barn in the proposed location.* The current barn is located in the Velocity Zone of a FEMA Flood Plain. Rebuilding the barn in the same location would require elevating the first floor on a pile-supported foundation to be flood compliant, rendering the barn unusable for its intended primary purpose of storing boats. The proposed new site was determined to be the optimal location because it is located both outside of the flood plain and the coastal bank, and within the allowable building setbacks. However, it was made clear at the hearing that the Club ought to consider moving the proposed structure away from the sloped land to reduce the amount of disturbance to the sloped land. To address this concern, we have relocated the proposed barn ten feet away from the slope to reduce the amount of cut, but still leaving sufficient area to maintain the five displaced parking spaces.
- ***Size of Barn*** - *A question was raised as to the reason for the new barn's proposed dimensions.* The dimensions of the proposed new barn were determined specifically to accommodate the Club's two launch boats on the ground floor, with a second floor to store the 420 boats on the upper level. The current barn houses the 420 boats, not the launches. The Club determined that in undertaking to rebuild the barn, it would be beneficial and cost-effective to create a structure that would also accommodate its two launch

boats. The Club believes that storing the launch boats inside the structure rather than in the parking lot will be more attractive for the neighborhood, as well as provide better protection for the boats.

- **Coastal Bank** - *A concern was raised that the new barn in its proposed location would cause harm to the coastal bank.* The site of the new barn was specifically selected to be outside of the coastal bank and flood plain. The Administrative Decision of the Conservation Commission of 8/30/2021 confirms that the proposed location is not within the coastal bank.
- **Removal & Replacement of Trees** - *A concern was raised that the removal of existing trees in the proposed site of the new barn would remove screening between the Club and its abutter at 5 Merrill St.* The Club engaged Southeast Arborist, LLC to examine the trees in the proposed construction area. A copy of their report is included with this submittal. The report identifies 6 trees of DBH 6” or greater and approximately 15-17 additional saplings of DBH under 6” that the arborist recommends should be removed prior to commencement of construction. According to the report, these trees are Norway Maples (considered an invasive species) and exhibit damage and decay. The Club anticipates that regardless of the proposed construction, it may need to remove these trees for safety reasons. As noted above, the construction area and these trees are not located within the coastal bank. The Club recognizes that its immediate neighbor enjoys some seasonal screening provided by these trees and also recognizes that certain other neighbors would benefit from the removal of these trees with expanded water views. The Club has also engaged Environmental Consulting & Restoration, LLC to assist in developing an appropriate landscape plan to restore the site with native trees, shrubs and plants to revegetate the area in a manner designed to control erosion and provide some screening between the two properties. A copy of ECR’s Proposed Landscape Plan is also included with this submittal. The Club seeks to implement a landscape plan that will provide its immediate neighbor with screening, while also benefitting other neighbors with expanded water views, and importantly will control erosion and enhance an area at the intersection of Downer and Marion that is currently overtaken by invasive Knotweed.
- **Erosion Control** – *A concern was raised as to whether construction and siting of the new barn in the slopeside would create erosion problems.* The Club has engaged McArdle Gannon Associates, Inc. to provide professional geotechnical engineering services for this project to ensure that it is designed in a way that protects the slopeside during and after construction. Additionally, as noted above, the Club plans to restore areas with native vegetation following construction.
- **Access to Barn from Marion Street** - *A question was raised as to the impact on traffic of access to the upper level of the new barn.* The proposed plan includes a crushed stone pathway from Marion Street to the upper level of the new barn. This path would be pedestrian only and not for motorized vehicle access. The primary use of this path would be for the Club to remove the 420 boats from storage in the spring and to return the boats into storage in the fall. The boats would be moved with hand-held dollies from the barn and rolled the short distance to the Club. The Club maintains a fleet of approximately sixteen 420 boats for its juniors program. The boats are approximately 13ft. 9in. in length. The process of moving all the 420 boats into or out of the barn would be approximately one hour. Club staff members would also occasionally access the upper level of the barn to remove or store other Club equipment and supplies. Accordingly, the anticipated impact on traffic would be minimal to none.
- **Additional Landscaping** – *A request was made that landscaping of the triangular area on the corner of Marion St. and Downer Ave. be landscaped.* As previously noted, the Club has incorporated this area into the overall Landscaping Plan as prepared by Environmental Consulting & Restoration, LLC and included with this submittal.

- **Construction Process** – *A question was raised as to the impact of construction vehicles and equipment on parking and nearby streets.* It is important to the Club that construction of the new barn take place during the off season so that its in-season activities are not disrupted and parking will not be impacted. Accordingly, the Club’s parking lot will be available for construction vehicles. **[Except as may be necessary for certain construction activity, it is expected that all construction vehicles and equipment can be parked on Club property rather than Town roads.]** *Additionally, the question was raised as to the daily clearing of dirt, debris and mud from the roads. [The contractors would be responsible for keeping the roads clear of construction matter in accordance with normal industry standards and practices.]*
- **Parking** - *A question was raised as to the impact of the new barn on parking and traffic.* The new barn will replace an old barn and continue to serve the same function of storing boats, equipment and other Club property and supplies. There will be no events or programming held inside the barn. Accordingly, the new barn will not generate any additional parking demand or reason for any change in traffic patterns. Additionally, there will be a net increase of (2) additional parking spots, with (2) spots being created by the demolition of the old barn and (5) spots being relocated by the construction of new barn. The total existing parking count across the gravel Hadlock Parcel is approximately (32) spaces based on current locations of curb stops. That space count will grow to (34) spaces with the relocation of the storage barn. Therefore, the Club will continue to exceed the minimum (17) parking spots required under its current Special Permit A2.

We hope that this letter provides helpful explanations and additional background on the items raised to date during both our public hearing and public site visit.

The following materials are being submitted to update both the Zoning Special Permit Amendment Request and associated Site Plan Review Applications:

- Existing Conditions Plan
- Site Plan
- Landscape Plan
- Arborist Report
- HydroCAD Report

Cavanaro Consulting, Inc.
Hingham Yacht Club
208 Downer Avenue – Hingham, MA 02043
Proposed Storage Barn Relocation
October 5, 2021
Page 2 of 2

We look forward to presenting these materials to you and both Boards at the next scheduled public hearing on 10/12/21 (Joint Meeting with Planning Board & ZBA). If any questions arise in the meantime, please do not hesitate to let us know.

Sincerely,

Cavanaro Consulting, Inc.

A handwritten signature in black ink, appearing to read "John Cavanaro". The signature is fluid and cursive, with a large initial "J" and "C".

John C. Cavanaro, P.E.
Managing Principal

Enclosures

cc: C. Burns, HYC Commodore
T. Connerly, HYC Secretary
J. Braley, HYC Manager
Jenn Gay-Smith, HYC
M. Whittmore, AIA
File 21034



SOUTHEAST ARBORIST, LLC

PO Box 553, Cohasset, MA 02025 | 508-369-5009 | southeastarborist@gmail.com

June 13, 2021

Hingham Yacht Club
Attn: Jacob Braley
211 Downer Avenue
Hingham, MA 02043

To Whom It May Concern;

It was a pleasure to meet with Mr. Braley and discuss your upcoming projects at your property. Please find included our recommendations regarding the trees in your construction area.

Construction Area: Wooded area between Marion Street and waterfront, adjacent to gravel parking area. Proposed new building marked with stakes and orange cones.

Environmental Conditions: All trees evaluated are located on a steep, vine-covered slope. Evidence of construction/excavation performed on western property bordering proposed construction area. Exposure to high winds likely. Soil evaluation not performed. Slope ends at gravel parking lot

Type of Construction: Storage facility without sewer or water. Overhead electrical service.

Trees Impacted:

1. Norway Maple tree (*Acer platanoides*)

Location: Southeast corner of wooded area.

DBH: over 6"

Remarks: Norway Maple trees are listed as Invasive by the Massachusetts Department of Agriculture Resources. Weak branch unions and brittle holding wood make these trees highly susceptible to damage during high-wind events and heavy snow/ice storms. This particular tree shows signs of significant previous storm damage, with extensive decay emanating from the point of breakage. Further decline is highly likely.
Recommendations: Remove prior to commencement of construction.

2. Norway Maple tree (*Acer platanoides*)

Location: Central eastern side of wooded area.

DBH: over 6"

Remarks: Norway Maple trees are listed as Invasive by the Massachusetts Department of Agriculture Resources. Weak branch unions and brittle holding wood make these trees highly susceptible to damage during high-wind events and heavy snow/ice storms. This particular tree shows signs of significant previous storm damage, with extensive decay emanating from the point of breakage. Further decline is highly likely.
Recommendations: Remove prior to commencement of construction.

3. Norway Maple tree (*Acer platanoides*)

Location: Northeastern corner of wooded area.

DBH: over 6"

Remarks: Norway Maple trees are listed as Invasive by the Massachusetts Department of Agriculture Resources. Weak branch unions and brittle holding wood make these trees highly susceptible to damage during high-wind events and heavy snow/ice storms. This particular tree shows signs of significant previous storm damage, with extensive decay emanating from the point of breakage. Also, extreme basal decay is present, further compromising structural integrity. Further decline is highly likely.
Recommendations: Remove prior to commencement of construction.

4. Norway Maple tree (*Acer platanoides*)

Location: Northwest corner of wooded area.

DBH: over 6"

Remarks: Norway Maple trees are listed as Invasive by the Massachusetts Department of Agriculture Resources. Weak branch unions and brittle holding wood make these trees highly susceptible to damage during high-wind events and heavy snow/ice storms. This particular tree shows a cavity at approximately 5' from the base exhibiting decay. Presence of significant leader originating from the base with a bark-included union contributes to a higher likelihood of failure.

Recommendations: Remove prior to commencement of construction.

5. Norway Maple tree (*Acer platanoides*)

Location: Northwest corner of wooded area.

DBH: over 6"

Remarks: Norway Maple trees are listed as Invasive by the Massachusetts Department of Agriculture Resources. Weak branch unions and brittle holding wood make these trees highly susceptible to damage during high-wind events and heavy snow/ice storms. This particular tree shows a cavity at approximately 20' from the base exhibiting decay. Moderate dieback at branch tips may indicate compromised growing conditions and further decline of the tree.

Recommendations: Remove prior to commencement of construction.

6. Norway Maple tree (*Acer platanoides*)

Location: Northwest corner of wooded area.

DBH: over 6"

Remarks: Norway Maple trees are listed as Invasive by the Massachusetts Department of Agriculture Resources. Weak branch unions and brittle holding wood make these trees highly susceptible to damage during high-wind events and heavy snow/ice storms.

Recommendations: Remove prior to commencement of construction.

Also present are 15-17 Norway Maple saplings under 6" DBH that we recommend being removed prior to construction commencement.

Sincerely,

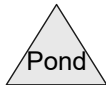
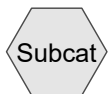
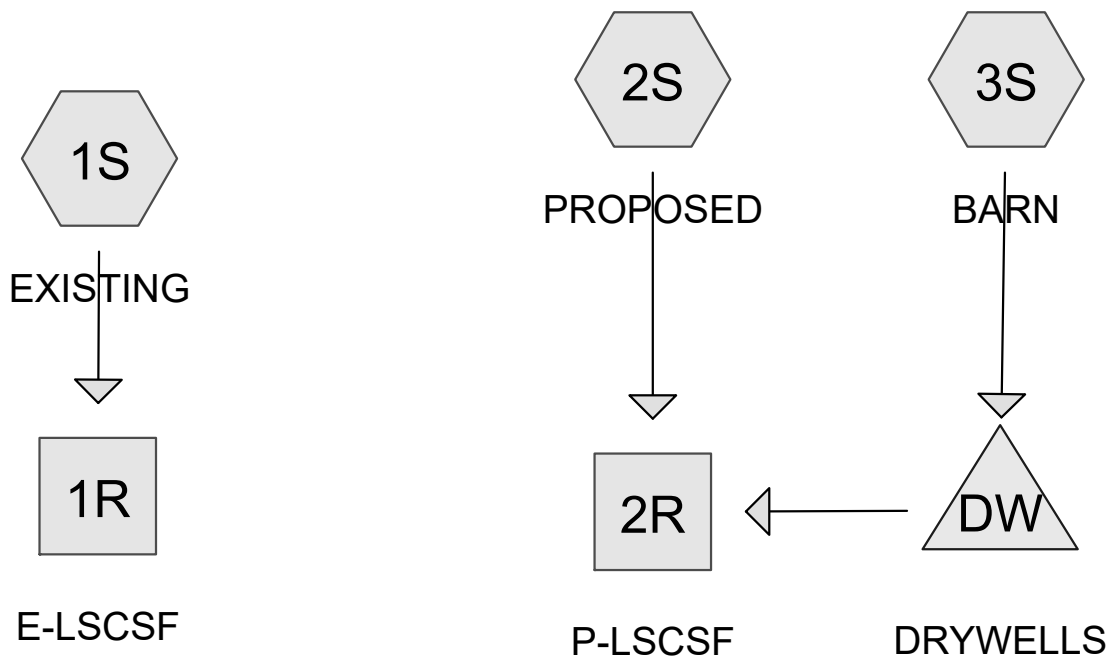
Michael J. Casey, Jr.

Michael J. Casey, Jr.

Owner, Southeast Arborist, LLC

ISA Certified Arborist FL-9268A

TCIA Certified Treecare Safety Professional #03636



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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 1S: EXISTING Runoff Area=21,220 sf 2.62% Impervious Runoff Depth=2.26"
Tc=5.0 min CN=91 Runoff=1.31 cfs 0.09 af

Subcatchment 2S: PROPOSED Runoff Area=20,140 sf 0.04% Impervious Runoff Depth=2.26"
Tc=5.0 min CN=91 Runoff=1.25 cfs 0.09 af

Subcatchment 3S: BARN Runoff Area=1,080 sf 100.00% Impervious Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=0.08 cfs 0.01 af

Reach 1R: E-LSCSF Inflow=1.31 cfs 0.09 af
Outflow=1.31 cfs 0.09 af

Reach 2R: P-LSCSF Inflow=1.33 cfs 0.09 af
Outflow=1.33 cfs 0.09 af

Pond DW: DRYWELLS Peak Elev=12.95' Storage=10 cf Inflow=0.08 cfs 0.01 af
Discarded=0.00 cfs 0.00 af Primary=0.08 cfs 0.01 af Outflow=0.08 cfs 0.01 af

Total Runoff Area = 0.974 ac Runoff Volume = 0.18 af Average Runoff Depth = 2.28"
96.13% Pervious = 0.937 ac 3.87% Impervious = 0.038 ac

Summary for Subcatchment 1S: EXISTING

Runoff = 1.31 cfs @ 12.07 hrs, Volume= 0.09 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

Area (sf)	CN	Description
16,243	96	Gravel surface, HSG C
4,421	74	>75% Grass cover, Good, HSG C
* 556	98	BUILDING
21,220	91	Weighted Average
20,664		97.38% Pervious Area
556		2.62% Impervious Area

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

Summary for Subcatchment 2S: PROPOSED

Runoff = 1.25 cfs @ 12.07 hrs, Volume= 0.09 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

Area (sf)	CN	Description
15,990	96	Gravel surface, HSG C
4,142	74	>75% Grass cover, Good, HSG C
* 8	98	WALLS
20,140	91	Weighted Average
20,132		99.96% Pervious Area
8		0.04% Impervious Area

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

Summary for Subcatchment 3S: BARN

Runoff = 0.08 cfs @ 12.07 hrs, Volume= 0.01 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

Area (sf)	CN	Description
* 1,080	98	BUILDING
1,080		100.00% Impervious Area

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

Summary for Reach 1R: E-LSCSF

Inflow Area = 0.487 ac, 2.62% Impervious, Inflow Depth = 2.26" for 2 Year Event event
 Inflow = 1.31 cfs @ 12.07 hrs, Volume= 0.09 af
 Outflow = 1.31 cfs @ 12.07 hrs, Volume= 0.09 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: P-LSCSF

Inflow Area = 0.487 ac, 5.13% Impervious, Inflow Depth = 2.28" for 2 Year Event event
 Inflow = 1.33 cfs @ 12.07 hrs, Volume= 0.09 af
 Outflow = 1.33 cfs @ 12.07 hrs, Volume= 0.09 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond DW: DRYWELLS

Inflow Area = 0.025 ac, 100.00% Impervious, Inflow Depth = 2.97" for 2 Year Event event
 Inflow = 0.08 cfs @ 12.07 hrs, Volume= 0.01 af
 Outflow = 0.08 cfs @ 12.07 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 12.07 hrs, Volume= 0.00 af
 Primary = 0.08 cfs @ 12.07 hrs, Volume= 0.01 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 12.95' @ 12.07 hrs Surf.Area= 10 sf Storage= 10 cf

Plug-Flow detention time= 57.1 min calculated for 0.01 af (100% of inflow)
 Center-of-Mass det. time= 57.3 min (812.8 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	10.50'	10 cf	Custom Stage Data (Irregular) Listed below (Recalc) 25 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
10.50	10	12.6	0	0	10
13.00	10	12.6	25	25	42

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.50'	0.270 in/hr Exfiltration over Wetted area
#2	Primary	12.90'	4.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.07 hrs HW=12.95' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.08 cfs @ 12.07 hrs HW=12.95' (Free Discharge)

↳ **2=Orifice/Grate** (Weir Controls 0.08 cfs @ 0.74 fps)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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 1S: EXISTING Runoff Area=21,220 sf 2.62% Impervious Runoff Depth=3.64"
Tc=5.0 min CN=91 Runoff=2.07 cfs 0.15 af

Subcatchment 2S: PROPOSED Runoff Area=20,140 sf 0.04% Impervious Runoff Depth=3.64"
Tc=5.0 min CN=91 Runoff=1.97 cfs 0.14 af

Subcatchment 3S: BARN Runoff Area=1,080 sf 100.00% Impervious Runoff Depth=4.41"
Tc=5.0 min CN=98 Runoff=0.12 cfs 0.01 af

Reach 1R: E-LSCSF Inflow=2.07 cfs 0.15 af
Outflow=2.07 cfs 0.15 af

Reach 2R: P-LSCSF Inflow=2.08 cfs 0.15 af
Outflow=2.08 cfs 0.15 af

Pond DW: DRYWELLS Peak Elev=12.97' Storage=10 cf Inflow=0.12 cfs 0.01 af
Discarded=0.00 cfs 0.00 af Primary=0.12 cfs 0.01 af Outflow=0.12 cfs 0.01 af

Total Runoff Area = 0.974 ac Runoff Volume = 0.30 af Average Runoff Depth = 3.66"
96.13% Pervious = 0.937 ac 3.87% Impervious = 0.038 ac

Summary for Subcatchment 1S: EXISTING

Runoff = 2.07 cfs @ 12.07 hrs, Volume= 0.15 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.65"

Area (sf)	CN	Description
16,243	96	Gravel surface, HSG C
4,421	74	>75% Grass cover, Good, HSG C
* 556	98	BUILDING
21,220	91	Weighted Average
20,664		97.38% Pervious Area
556		2.62% Impervious Area

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

Summary for Subcatchment 2S: PROPOSED

Runoff = 1.97 cfs @ 12.07 hrs, Volume= 0.14 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.65"

Area (sf)	CN	Description
15,990	96	Gravel surface, HSG C
4,142	74	>75% Grass cover, Good, HSG C
* 8	98	WALLS
20,140	91	Weighted Average
20,132		99.96% Pervious Area
8		0.04% Impervious Area

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

Summary for Subcatchment 3S: BARN

Runoff = 0.12 cfs @ 12.07 hrs, Volume= 0.01 af, Depth= 4.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.65"

Area (sf)	CN	Description
* 1,080	98	BUILDING
1,080		100.00% Impervious Area

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

Summary for Reach 1R: E-LSCSF

Inflow Area = 0.487 ac, 2.62% Impervious, Inflow Depth = 3.64" for 10 Year Event event
 Inflow = 2.07 cfs @ 12.07 hrs, Volume= 0.15 af
 Outflow = 2.07 cfs @ 12.07 hrs, Volume= 0.15 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: P-LSCSF

Inflow Area = 0.487 ac, 5.13% Impervious, Inflow Depth = 3.67" for 10 Year Event event
 Inflow = 2.08 cfs @ 12.07 hrs, Volume= 0.15 af
 Outflow = 2.08 cfs @ 12.07 hrs, Volume= 0.15 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond DW: DRYWELLS

Inflow Area = 0.025 ac, 100.00% Impervious, Inflow Depth = 4.41" for 10 Year Event event
 Inflow = 0.12 cfs @ 12.07 hrs, Volume= 0.01 af
 Outflow = 0.12 cfs @ 12.07 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 12.07 hrs, Volume= 0.00 af
 Primary = 0.12 cfs @ 12.07 hrs, Volume= 0.01 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 12.97' @ 12.07 hrs Surf.Area= 10 sf Storage= 10 cf

Plug-Flow detention time= 40.4 min calculated for 0.01 af (100% of inflow)
 Center-of-Mass det. time= 40.6 min (788.9 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1	10.50'	10 cf	Custom Stage Data (Irregular) Listed below (Recalc) 25 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
10.50	10	12.6	0	0	10
13.00	10	12.6	25	25	42

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.50'	0.270 in/hr Exfiltration over Wetted area
#2	Primary	12.90'	4.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.07 hrs HW=12.97' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.11 cfs @ 12.07 hrs HW=12.97' (Free Discharge)

↳ **2=Orifice/Grate** (Weir Controls 0.11 cfs @ 0.84 fps)

Summary for Subcatchment 1S: EXISTING

Runoff = 3.19 cfs @ 12.07 hrs, Volume= 0.23 af, Depth= 5.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=6.80"

Area (sf)	CN	Description
16,243	96	Gravel surface, HSG C
4,421	74	>75% Grass cover, Good, HSG C
* 556	98	BUILDING
21,220	91	Weighted Average
20,664		97.38% Pervious Area
556		2.62% Impervious Area

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

Summary for Subcatchment 2S: PROPOSED

Runoff = 3.02 cfs @ 12.07 hrs, Volume= 0.22 af, Depth= 5.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=6.80"

Area (sf)	CN	Description
15,990	96	Gravel surface, HSG C
4,142	74	>75% Grass cover, Good, HSG C
* 8	98	WALLS
20,140	91	Weighted Average
20,132		99.96% Pervious Area
8		0.04% Impervious Area

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

Summary for Subcatchment 3S: BARN

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.01 af, Depth= 6.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=6.80"

Area (sf)	CN	Description
* 1,080	98	BUILDING
1,080		100.00% Impervious Area

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

Summary for Reach 1R: E-LSCSF

Inflow Area = 0.487 ac, 2.62% Impervious, Inflow Depth = 5.74" for 100 Year Event event
 Inflow = 3.19 cfs @ 12.07 hrs, Volume= 0.23 af
 Outflow = 3.19 cfs @ 12.07 hrs, Volume= 0.23 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: P-LSCSF

Inflow Area = 0.487 ac, 5.13% Impervious, Inflow Depth = 5.77" for 100 Year Event event
 Inflow = 3.20 cfs @ 12.07 hrs, Volume= 0.23 af
 Outflow = 3.20 cfs @ 12.07 hrs, Volume= 0.23 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond DW: DRYWELLS

Inflow Area = 0.025 ac, 100.00% Impervious, Inflow Depth = 6.56" for 100 Year Event event
 Inflow = 0.17 cfs @ 12.07 hrs, Volume= 0.01 af
 Outflow = 0.17 cfs @ 12.07 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 12.07 hrs, Volume= 0.00 af
 Primary = 0.17 cfs @ 12.07 hrs, Volume= 0.01 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 12.99' @ 12.07 hrs Surf.Area= 10 sf Storage= 10 cf

Plug-Flow detention time= 28.2 min calculated for 0.01 af (100% of inflow)
 Center-of-Mass det. time= 28.4 min (770.8 - 742.4)

Volume	Invert	Avail.Storage	Storage Description
#1	10.50'	10 cf	Custom Stage Data (Irregular) Listed below (Recalc) 25 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
10.50	10	12.6	0	0	10
13.00	10	12.6	25	25	42

Device	Routing	Invert	Outlet Devices
#1	Discarded	10.50'	0.270 in/hr Exfiltration over Wetted area
#2	Primary	12.90'	4.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.07 hrs HW=12.98' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.17 cfs @ 12.07 hrs HW=12.98' (Free Discharge)

↳ **2=Orifice/Grate** (Weir Controls 0.17 cfs @ 0.95 fps)