**FINAL SITE PLAN**  
**SPECIAL PERMIT PLPZ 202100531**

**Sites residence**  
**12 Meadow Dr.**

Construct pool, pool terrace and cabana, house additions including covered porch and garage with breezeway, renovations to existing cottage, new gazebo, water features, pergola, walkways, play area, new driveway, storm water measures, associated grading and landscaping, resulting in on site building volume in excess of 150,000 cubic feet.

<table>
<thead>
<tr>
<th>LOCATION:</th>
<th>12 Meadow Dr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZONE:</td>
<td>RA-2</td>
</tr>
<tr>
<td>PARCEL SIZE:</td>
<td>2.62 acres</td>
</tr>
<tr>
<td>Tax ID:</td>
<td>10-1105/S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXISTING</th>
<th>PROPOSED</th>
<th>PERMITTED/REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROSS SQ FT:</td>
<td>9711 SF</td>
<td>10,269 SF</td>
</tr>
<tr>
<td>FAR:</td>
<td>0.085</td>
<td>0.0899</td>
</tr>
<tr>
<td>VOLUME:</td>
<td>147,196 CU FT</td>
<td>179,198 CU FT</td>
</tr>
<tr>
<td>GREEN AREA:</td>
<td>&gt;78 %</td>
<td>80.6 %</td>
</tr>
<tr>
<td>FRONT SETBACK</td>
<td>80.3’</td>
<td>75’</td>
</tr>
<tr>
<td>REAR SETBACK</td>
<td>155.2’</td>
<td>No change</td>
</tr>
<tr>
<td>SIDEYARD SETBACKS</td>
<td>95.4’</td>
<td>89.7’</td>
</tr>
<tr>
<td>SETBACKS for accessory structures in rear yards</td>
<td>37.5’ / 107.5’</td>
<td>25’ (SIDE) / 25’ (REAR)</td>
</tr>
<tr>
<td>HEIGHT</td>
<td>3 sty</td>
<td>24.96’ (garage)</td>
</tr>
<tr>
<td></td>
<td>34’ – 8 3/16”</td>
<td>25’ (cabana)</td>
</tr>
</tbody>
</table>
UPDATE
The Commission reviewed this application at the last meeting (2-15-22). The outstanding items have been addressed as noted below:

Zoning comments have been addressed as follows:
- Neither a variance nor a special exception is required for the project, pursuant to Sections 6-141(b)(2)(B) and 6-95(a)(2)(A), respectively. (see comments dated 2-23-22)
- Conforming 60’ road width was confirmed by survey submitted by applicant (see survey dated 4-5-06)
- Carport section plans have been submitted by applicant (see section plans dated 11-21-2021)

Sewer comments have been addressed:
- Both the agent, Redniss and Mead, and the owners of the property, The Sites, have submitted written acknowledgement of the Sewer comments and those have been forwarded to Rich Feminella for his records.
- The Sewer comments do not include any other requirements prior to PZ decision.

Volume:
- Volume plans have been submitted indicating increase of on-site volume from 147,196 to 179,198 cu. ft. (see volume plans dated 11-17-21)

Landscaping:
- The Bill Kenny landscape plan (updated 2-17-22) has been updated with a note that indicates 30% of the 15 new trees will be native to the northeast, that the rain garden will be planted with native shrubs and groundcover, and that the final plan during the zoning/building permit phase will note the proposed species.

APPLICATION SUMMARY:
The applicant is requesting final site plan and special permit approval, pursuant to Sections 6-5, 6-13 to 6-17, 6-93, 6-95(a), 6-101, 6-141 and 6-205 of the Building Zone Regulations to construct pool, pool terrace and cabana, house additions including covered porch and garage with breezeway, renovations to existing cottage, new gazebo, water features, pergola, walkways, play area, new driveway, storm water measures, associated grading and landscaping, resulting in gross floor area of 10,269 sq. ft. and volume in excess of 150,000 cu. ft., on a 2.6-acre property located at 12 Meadow Drive in the RA-2 zone.

ISSUES/COMMENTS:
1. The accessory cottage has a kitchen. The tax card shows this cottage in existence since 1911, which complies with Section 6-95(a)(5).
2. Zoning – updated Zoning comments dated 2/23/22 indicate that the renovations to the cottage meet Section 6-141(b)(2)(B).
3. DPW Engineering – DPW comments dated 2/8/22 indicate conceptual acceptance of the drainage plan and report. The applicant must resubmit prior to Zoning permit sign off.
4. **Sewer** – Comments dated 2-11-22 requiring written acknowledgment have been addressed by agent and owner.

5. **Inland Wetlands** – A permit questionnaire was endorsed by staff on 11/19/21 indicating no inland wetlands permit is required for the project.

6. **Conservation** – Awaiting updated comments on the landscaping plan. Comments dated 2/8/22 positively note the preservation of existing structures and the additional plantings proposed via the landscaping plan. The comments make note of flooding conditions in the neighborhood, The comments note acceptance of landscaping plan concept noting that final species must be called out on final plan.

**DEPARTMENT COMMENTS**

- **Zoning Enforcement**– Attached
- **Sewer** – Attached
- **Conservation**- awaiting updated comments, 2-8-22 comments attached
- **DPW** - Attached

**EXISTING CONDITIONS**

The subject property is located in the neighborhood that is north of Downtown Greenwich, west of Greenwich Hospital. Note that there is another 12 Meadow Drive located in Cos Cob which is not part of this application.

The 2.62-acre lot has frontage on both Meadow Drive to the north and Glenville Road to the south. Based on Zoning statistics provided, the front yard, in regards to setbacks, is the one facing Glenville Road. The entrance drive to the property is located off of Meadow Drive. The site is currently improved with a single family house, an accessory cottage, and a driveway. The site has areas of rock ledge outcroppings and is well vegetated including various sized trees.

There are no inland wetlands on site. The property is serviced by public water and sewer.

No subdivisions or site plans were found on file with Planning and Zoning for the property. Staff was further unable to locate any Zoning Enforcement files for the property.

**PROPOSAL**

The proposal includes construction of additions to the existing house including a new garage to the east of the house, with a new breezeway “attaching” the two structures. A new pool with terracing and cabana is proposed to the west of the house. A new gazebo in this general area is proposed. An existing cottage located in the southeast corner of the site, close to the southern boundary with Glenville Road, will be renovated. Renovations include interior renovations, addition of a new bay window and a new terrace added to the east elevation.

Other improvements include water features, a pergola, walkways, play area, new driveway, storm water measures, associated grading and landscaping. Cut and fill volumes have been provided on the plans: 371 cy cut and 794 cy of fill.
The gross floor area on site will increase from 9711 sq. ft. to 10,269 sq. ft. FAR plans were submitted showing the increase in gross floor area. Volume will be in excess of 150,000 cu. ft. Volume plans have been submitted indicating increase of on-site volume from 147,196 to 179,198 cu. ft.

The existing cottage to be renovated is greater than 1200 sq. ft. Section 6-95(a)(2)(A) calls for either a special exception review by ZBA for accessory structures greater than 1200 sq. ft. (in the RA-2 zone), OR, if volume will be greater than 150,000 cu. ft., a special permit review by P+Z. The intent is to require only one process, not both a special exception and a special permit, for one project. Further, the renovations to the cottage meet Section 6-141(b)(2)(B) and do not require a variance per Zoning comments dated 2-23-22.

The cottage already has a kitchen facility and will continue to have a kitchen post-renovation. The architectural plans call the cottage an accessory dwelling unit. The tax card shows the cottage was built in 1911. Section 6-95(a)(5) permits the accessory use of dwelling units in accessory buildings, provided the same dwelling units were in lawful existence prior to September 30, 1947.

**Storm water management**

Impervious area on site will increase by 5198 sq. ft. The stormwater plan includes a rain garden, underground infiltration systems and overland flow to manage and treat storm water. The drainage report indicates that the runoff reduction volume and ground water recharge for the property are addressed via the rain garden and infiltrators. DPW has accepted the concept of the drainage plan and report and has required resubmittal prior to Zoning permit sign off.

Conservation comments dated 2-8-22 provide photos of flooding of the neighborhood and recommend that additional mitigation measures be taken by the applicant to address the issue.

**Landscaping**

An overall master plan for landscaping has been prepared by William Kenny Associates. The plan has been updated to include a note that indicates 30% of the 15 new trees will be native to the northeast, that the rain garden will be planted with native shrubs and groundcover, and that the final plan during the zoning/building permit phase will note the proposed species. In the 2-8-22 comments, Conservation found the master plan acceptable and noted that species must be called out on the final plans.

**Sedimentation and Erosion Control plan**

Silt fence will be installed around the area of disturbance. Beyond the areas of silt fencing, the plans note disturbance should not take place. A large portion of a significant ledge outcropping to the east of the house, and the trees nearby, are areas that are not to be disturbed per the plan. The area of the proposed rain garden is shown to be protected with silt fencing in order to avoid compaction of the soils. Construction entrance / anti tracking is shown on the Meadow Drive driveway. Two stock pile areas are called out. Tree protection is shown for ten trees close to construction areas. Three trees are marked for removal.
SPECIAL PERMIT CONSIDERATIONS:
This proposal is subject to site plan and special permit review because the total proposed building volume exceeds 150,000 cubic feet per Section 6-101(a) and Section 6-95(a)(2)(A). Under Section 6-17, the Commission has to decide, among other things, if the proposal is in scale with and compatible with surrounding uses.

APPLICABLE REGULATIONS:
BZR Sections: 6-5, 6-13 to 6-17, 6-93, 6-95(a)(2)(A) and 6-95(a)(5), 6-101, 6-141(b)(2)(B) and 6-205
DEPARTMENT COMMENTS
ZONING ENFORCEMENT

Project No.    PLPZ202100531           Preliminary           Final  X

Reviewed for Planning and Zoning Commission.

TITLE OF PLAN REVIEWED: Sites

LOCATION: 12 Meadow Dr.

PLAN DATE:

ZONE: RA-2

☐ Ok for Zoning Permit Sign-off with the following revisions:

☐ Resubmit the following prior to Site Plan/ Subdivision approval:

☒ The subject site plan/subdivision meets the requirements of the Building Zone Regulations, excluding sections 6-15 and 6-17, and is Ok for Zoning Permit Sign-off. The proposed addition to the cottage complies with section 6-141(b)(2)(B) i&ii.

Reviewed by: Jodi Couture  Date: 2/22/2022

Note: These comments do not represent Building Inspection Division approval. Plans subject to review by ZEO at time of building permit application.
MEMORANDUM

TO: Patrick LaRow, Deputy Director, P & Z / Assistant Town Planner

FROM: Aleksandra Moch, Environmental Analyst

DATE: February 8, 2022

RE: John and Cindy Sites, 12 Meadow Drive, PLPZ 2021 00531
    Site plan by Redniss & Mead, dated November 19, 2021 and landscape master plan by William Kenny & Associates, dated November 19, 2021

I have reviewed the above-referenced plan and visited the site. The following comments are offered for your consideration:

1. Kudos for preserving the residence and the garage, and proposing large areas of lawn being replaced with new planting. Fifteen new trees are proposed to mitigate for the tree loss. The plan should indicate that at least 30% of these trees are native species. In addition, the proposed rain garden should be planted with native shrubs and ground cover. The final master plan submitted prior to the construction activities should specify the species.

2. The proposed storm water management plan uses hard-surface disconnection methods to allow the water from the driveway to sheet flow over the lawn and infiltrate. Natural infiltration is generally preferred over the engineered system, but in this case a more careful approach should be taken. Soil testing done for the drainage design shows shallow ground water table and ledge within the eastern section of the property. The neighboring property to the east (6 Meadow Drive) suffers from chronic flooding. The plan shows several driveway leak offs directing water towards the east. Due to the enlarged area of the driveway the runoff amount will increase, potentially worsening the flooding problem. The plan should be revised to either provide adequate storm water detention at the site and/or the driveway should be made permeable, and/or use the existing access with no increase in impermeable surface.

During the site investigation both the adjacent property to the east and the area across the street were severely flooded. No pictures were taken however; the pictures below are from Google maps taken in December of 2015.
6 Meadow Drive to the east from 12 Meadow Drive suffering from chronic flooding.

Chronically flooded area across the street.

cc: Conservation Commission
Date: February 11, 2022

To: Katie Deluca, Director, Planning & Zoning

From: Richard C. Feminella, Wastewater Division Manager

Copy: Chris Mandras, Maintenance Manager - Sewer Division
     Al Romano, Environmental Asset Engineer – Sewer Division

Re: PLPZ202100531: 12 Meadow Drive, John & Cindy Sites

We have prepared the following comments and questions regarding the proposed application.

Project Summary:
- Construction of a detached garage, several small additions, a pool and cabana, renovations to the cottage and revised driveways and patios causing an over volume situation.

Sewer Division Comments:

Comments to be addressed during P&Z phase:
- Prior to obtaining P&Z approval, the applicant/owner is required to submit a signed letter acknowledging receipt of these P&Z comments and that the applicant/owner has read all the comments and agrees to adhere to the comments. A copy of this document is required to be provided to the Sewer Division. It is important for the applicant/owner to understand that failure to comply with these comments may result in delays in both Sewer and Building Permitting. The applicant/owner assumes any risk or impacts to their project schedule as a result of not complying with these requirements.

Comments to be addressed during Sewer and Building Permit phase:
- The applicant/owner will be required to obtain all necessary Sewer Permits, please coordinate directly with the Sewer Division during the Sewer and Building Permit phase.

- The applicant/owner has already obtained a Sewer CCTV Inspection Permit on January 19, 2022 (PRSD2022200018). Please remind the applicant/owner they are required to follow the conditions of that permit and have ALL sanitary sewer laterals that serve any building on this site (main house, separate garage/cottage, and any other buildings that currently have sewer on them from the building all the way to their connection point on the Town sewer main. This needs to be performed in the presence of the Sewer Division Environmental Asset Engineer/ Sewer Inspector as outlined in the Sewer Permit they already have. All conditions of permit must be satisfied.

- The proposed plans do not show sanitary sewer or proposed drainage improvements. Any plans submitted for Sewer Permitting need to show both the sanitary sewer laterals (existing and proposed), site storm drainage (existing and proposed) and any other utilities or site work.

- Please indicate if the proposed detached garage will have any plumbing fixtures or not. If so, please include on the plans how they propose to connect to sanitary sewer.
• If there are currently any accessory buildings that are connected to sanitary sewer that do not have proper Sewer Permitting in place already, they will be required to obtain and complete the necessary Sewer Permit accordingly.

• The owner may be required to complete documentation regarding the shared sewer laterals between separate buildings on this property. Please coordinate with Sewer Division during Sewer Permitting.

• Any of the proposed future pool, cabana, etc. will require review and approval by the Sewer Division PRIOR to obtaining Building Permits. Please coordinate directly with Sewer when that design has been finalized for further direction and requirements.

• Please confirm in writing if there are any outdoor plumbing fixtures connected to sanitary sewer (either existing or proposed). This includes, but is not limited to outdoor sinks for grills, outdoor showers, etc.

• Please note, sanitary sewers are designed for first floor elevations. Therefore, any plumbing fixtures in lower levels (basements) could be subject to sanitary sewer backups/overflows. The property owner is strongly recommended to consider and review this and plan accordingly to protect themselves in those situations. The Town is not responsible for damages as a result of these connections/installations. Please consider this and revise accordingly.

• Please note, in accordance with Town regulations and standard practice, all clear water sources cannot discharge to sanitary sewer. This includes air conditioning and high efficiency heating system condensate lines. Please confirm that the new development will not discharge any clear water sources to sanitary sewer.

Please NOTE: These comments are intended for P&Z review only. These comments do not take the place of Sewer Permit(s). Any Sewer Permit Applications receive thorough reviews and may result in additional comments/requirements at that time. In addition, please be reminded that in order to receive Building Permits, the applicant must have secured all other necessary permits, including, but not limited to, Sewer Permits PRIOR to obtaining their Building Permits.

Also, please note, the applicant should NOT submit for Sewer Permits until the project has received approval from P&Z.
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION
SITE DEVELOPMENT REVIEW

Engineering Project No. 21-5(73)  Department Project No. PLPZ202100531  Submittal Received Date: 12/1/2021

Submittal Reviewed For: Planning and Zoning  Traffic Review Requested: No  Review Type: Final Site Plan

PLN AN SET INFORMATION

Plan Title: Site Plan (Pool/Patio/Driveway/Addtions)  Project Address: 12 Meadow Drive

Engineering Firm: Redniss and Mead, Inc.  Original Plan Date: 11/19/2021  Latest Plan Revision Date: ____

DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm: Redniss and Mead, Inc.  Original Report Date: 11/19/2021  Latest Report Revision Date: ____

Reviews provided by the Engineering Division are for compliance with the Town’s “Roadway Design Manual and Standard Construction Details” and “Drainage Manual” as amended. Reviews are based upon the information and plans provided. Comments pertaining to the Town’s manuals are not all encompassing. Other reviewing entities may provide additional comments regarding consistency with these manuals in accordance with their jurisdictions. Review of sanitary sewer and septic systems are not reviewed by the Engineering Division.

All New Submittals for Commission Meetings must be received by the Engineering Division four weeks before scheduled Commission Meeting.

All Revised Submittals for Commission Meetings must be received by the Engineering Division three weeks before scheduled Commission Meeting.

Reviewed and Approved by: ____________________________  Date: ______________

Scott Marucci - Senior Civil Engineer

COMMENTS AND CONDITIONS OF APPROVAL: Resubmit Prior to Zoning/Building Permit Approval

1. A revised Form SC-107 needs to be submitted.
2. The Drainage Summary Report is acceptable in concept. The following revisions and additional information need to be submitted:
   a. The WQV computation for the rain garden is using the wrong areas. Review and revise to match the HydroCad areas.
   b. The routing device for the overflow for Pond 5P: Infiltration needs to be discussed with the Engineering Division.
   c. The Custom Stage Data used for Pond 6P: Rain Garden #1 shows no information for the storage computations. Revise the HydroCad to show the computations or provide a computations sheet for the custom stage data.
   d. Based on the results from DT 9 the required 2-foot separation from mottling is being met but based on the results from DT 8 the required 2-foot separation from mottling is not being met. On the details sheet provide a section through the infiltration system showing the system to the bottom of stone and also provide the mottling elevation for each deep test hole and draw a line between them. Project the 2-foot separation line from the mottling line. Only use the bottom of stone area that meets the 2-foot separation to calculate the drawdown.
e. Each of the disconnections for the proposed driveway going to Meadow Drive must show all standards for the simple disconnect can be met. Include the following on the LID Sheet or on a separate plan within the report:
   i. The plan must clearly show how each area meets the required disconnection standard.
   ii. Once an area is used another impervious area cannot get credit for the same or overlapping area.
   iii. The impervious area being discharged must be shown and include a callout with the total area.
   iv. The pervious receiving area must be shown and include a callout with the total area (must be twice the size of the impervious area directed to it).
   v. The slope across the pervious area must be shown (maximum slope is 5%).
   vi. The travel length across the pervious area must be shown (minimum length is 40-feet but should meet the longest travel length if greater than 40-feet).
   vii. A callout shall be included that states if the standard has been met or not met.
   viii. All areas that do not meet the standard must have an explanation included in the report as to why they should be accepted.
   ix. If the standard is not fully met the disconnection may be required to be replaced with another type of BMP that will meet the standard.

f. The disconnection for the proposed driveway near Glenville Road must show all standards for the simple disconnect can be met. Include the following on the LID Sheet or on a separate plan within the report:
   i. The plan must clearly show how each area meets the required disconnection standard.
   ii. Once an area is used another impervious area cannot get credit for the same or overlapping area.
   iii. The impervious area being discharged must be shown and include a callout with the total area.
   iv. The pervious receiving area must be shown and include a callout with the total area (must be twice the size of the impervious area directed to it).
   v. The slope across the pervious area must be shown (maximum slope is 5%).
   vi. The travel length across the pervious area must be shown (minimum length is 40-feet but should meet the longest travel length if greater than 40-feet).
   vii. A callout shall be included that states if the standard has been met or not met.
   viii. All areas that do not meet the standard must have an explanation included in the report as to why they should be accepted.
   ix. If the standard is not fully met the disconnection may be required to be replaced with another type of BMP that will meet the standard.

g. Since the simple disconnections for the driveways are using a level spreader, computations must be provided showing the velocity from the level spreader is equal to or less than 2.5 ft/sec.

h. The curb opening needs to be the same length as the level spreader length at a minimum.

i. The conveyance computations and outlet protection computations must be submitted prior to building permit.

j. Review and revise all other information and computations as needed.

3. The construction plan set needs to be revised as follows:
   a. Site Plan Sheets
      i. The driveways need to include all high points with a callout.
      ii. Show any new footing drain networks from the house/sump pump to the outfall.
      iii. Show top and bottom elevations for all retaining walls and stone fences.
      iv. Show all level spreaders/scour holes/riprap aprons with the following in the callout:
         1. Dimensions (length and width).
         2. Depth of stone.
         3. Pipe/stone elevation.
         4. Pipe size.
         5. Pipe material.
   b. Low Impact Development Plan Sheet:
      i. Delineate each area of impervious surfaces directed to a BMP with a callout specifying which BMP receives runoff.
      ii. Show areas of disconnected roofs.
   c. Driveway Profile & Sight Distance Sheet
      i. Show width of driveways at property line.
      ii. Show width of driveways at edge of road.
      iii. Show distance from edge of road to driveway gates (required minimum distance is 25 feet).
iv. The profile shall include spot elevations.

d. Construction Details Sheets
   i. The rip-rap splash pad needs to include a table for dimensions for each splash pad.
   ii. A detail needs to be added for each of the dropped curbs and the stone diaphragms.
   iii. A detail of the concrete spillway for the rain garden needs to be added.
   iv. A note shall be added to each BMP detail stating that the soils beneath the BMP shall be scarified or tilled to improve infiltration.

4. The draft Operations and Maintenance Plan Report needs include the following:
   a. Exhibit A needs to have a maintenance item added for the driveway disconnections.
   b. Exhibit A needs to have a maintenance item added for the grass pavers.

Standard Conditions for Each Submittal

1. The Engineering Division will no longer keep any records for the submittals. All records for the submittal shall be obtained from the Town of Greenwich Department/Division that has taken in applications and/or submittals. These documents are maintained within each office (e.g., P&Z, IWWA, and DPW Building and Highway Divisions).

2. All revisions to the reports and plans must follow the requirements in the Town of Greenwich Drainage Manual February 2014 as amended.

3. All revisions must be accompanied by a point-by-point written response to the Engineering Division’s comments.

Standard Conditions of Approval

1. The Operations and Maintenance Plan Report must include the following for the Certificate of Occupancy:
   b. The final completed Exhibit A, and B
   c. The Maintenance Declaration needs to be filed on the Town of Greenwich Land Records prior to a Certificate of Occupancy. A review of the documents above must be completed before filing on the Town of Greenwich Land Records.

2. The Town of Greenwich – Standard Construction Notes for Site and Subdivision Plans are conditions that must be met.

3. All requests for a Temporary Certificate of Occupancy (T.C.O.) or a Certificate of Occupancy (C.O.) shall be submitted one month before the T.C.O. or C.O. is required.

4. The submittal for a Temporary or Final Certificate of Occupancy must include the following:
   c. Field Inspection Record (All required photos) – Form SC-106 – Sealed and Signed by a Connecticut Licensed Professional Engineer.
   d. Bioretention Soil Testing Certification Sign-Off (as applicable with the bioretention soil gradation test and the phosphorous test for the mixed soil) – Form SC-104 – Sealed and Signed by a Connecticut Licensed Professional Engineer.
   h. A Letter discussing all the work that remains to be completed (Only for a Temporary Certificate of Occupancy Submittal).
PERTINENT DOCUMENTATION SUBMITTED AFTER INITIAL STAFF REPORT:

- SURVEY SHOWING ROAD WIDTH
- CARPORT SECTION PLAN
- VOLUME CALCULATIONS PLAN
- UPDATED LANDSCAPE PLAN
- SEWER ACKNOWLEDGEMENT LETTERS FROM AGENT AND OWNER
SURVEY OF PROPERTY FOR
ERNST LOWE
AND
JOAN MARY LOWE, TRUSTEES
12 MEADOW DRIVE
GREENWICH, CONN.

NOTE: UNLESS OTHERWISE NOTED PROPERTY LINES ARE UNEVENED.

ALL CERTIFICATIONS REFERRING TO THIS SURVEY SHALL BE MADE TO THE TITLE COMPANY OR LOAN COMPANY HOLDING THE DEED OR TiTLE TO THE PROPERTY.

RECEIVED FROM THE RECORDED OF GREENWICH COUNTY DEMONSTRATED
APRIL 11, 2006
3:26 P.M.

RECEIVED FROM THE RECORDED OF GREENWICH COUNTY DEMONSTRATED
APRIL 11, 2006
3:26 P.M.

4:11-06
MASTER PLAN
12 MEADOW DRIVE
GREENWICH, CT

GENERAL NOTES
1. UNLESS NOTED OTHERWISE, EXISTING CONDITIONS INFORMATION TAKEN FROM A DRAWING PREPARED BY REDNISS & MEAD.

PLANTING NOTES
1. 15 NEW TREES ARE PROPOSED; 30% OF THESE TREES WILL BE NATIVE TO THE NORTHEAST.
THE RAIN GARDEN WILL BE SPECIFIED AND PLANTED WITH NATIVE SHRUBS AND GROUNDCOVERS.
THE MASTER PLAN WILL BE REVISED TO INCLUDE THE SPECIES OF PLANTINGS NOTED ABOVE, ISSUES WERE INTRODUCED AND SUBMITTED TO PLANNING AND ZONING STAFF PRIOR TO CONSTRUCTION.

1
February 14, 2022

Richard Feminella – Wastewater Division Manager
Sewer Division - DPW
Town of Greenwich
101 Field Point Road
Greenwich, CT 06830

RE: PLPZ202100531: 12 Meadow Drive, Greenwich, CT
P&Z comments

Dear Mr. Feminella,

We are in receipt of your letter dated February 11, 2022. We have read through all the comments and agree to adhere to the comments. We offer the following in response to the comments:

- We shall obtain all necessary sewer permits and coordinate directly with the Sewer Division.
- We shall have all sanitary laterals TV inspected, including the separate garage/cottage and it shall be performed in the presence of the Sewer Division.
- It is proposed to reuse the existing sanitary lateral, if deemed in satisfactory condition. The existing and proposed site utilities are found on sheet SE-3 dated 11-19-2021.
- The detached garage will not have any plumbing fixtures so a connection to the sanitary sewer is not required.
- We shall review the permit files for the existing accessory building and obtain a new sewer permit if necessary. It is intended to reuse the existing sanitary lateral for the cottage.
- We shall complete any necessary documentation regarding any shared sewer laterals.
- The pool and cabana are planned for a future phase and are not designed at this time. If/when they are to proceed with those elements, we shall coordinate with the sewer division prior to seeking permits for them.
- We shall take an inventory of any outdoor plumbing fixtures and report to the sewer division prior to building permit.
- It is understood that the sanitary sewers are designed for first floor elevations. The owners shall take the necessary precautions to prevent backups/overflows.
- No clear water is proposed to connect to the sanitary sewer.

We respectfully request this matter be placed on the earliest available Commission agenda. Thank you and don’t hesitate to call or email me to discuss.

Sincerely,

[Signature]

Bret D. Holzwarth, P.E.

Cc: Marisa Anastasio – P&Z
Dear Marisa and Richard,

Cindy and I have reviewed your comments and have discussed the issues with Bret and his team. We are in accord and agree to take the actions indicated with Bret as our guide. Thank you for your consideration.

Regards,
Cindy & John Sites
12 Meadow Drive
Greenwich, CT 06831

CAUTION: This email originated from outside the Town email system. Do not click links or open attachments unless you have verified the sender and know the content is safe.
INITIAL APPLICATION
Site Plan Application

Property Address: 12 Meadow Drive, Greenwich, CT 06831

Property Owner: John & Cindy Sites

Applicant: (Same as owner)

Authorized Agent: Redniss & Mead, Inc c/o Bret Holzwarth

Select One: □ Pre-Application ☑ Final

Zone(s): RA-2
Lot Area: 2.62 acres

Please select all relevant items below:

☑ Special Permit – Complete special permit application form
☐ Coastal Overlay Zone
☐ Property is within 500 feet of a Municipal Boundary of __________________ (for notification)
☐ Amendment to Building Zone Regulations – Section(s) ______________________________
☐ Amendment to Building Zone Map – Zone(s) affected ______________________________
☐ Health Department review needed
☑ Sewer Department review needed
☐ Architectural Review Committee Application attached or Review needed
☑ Planning & Zoning Board of Appeals review needed
☐ Inland Wetlands and Watercourses Agency Review / Approval Required
☐ Scenic Road Designation

To be completed by P&Z staff only:
Check # _________________ Check Amount: $_____________

Application # ____________________________ pzSitePlanApp 2020
<table>
<thead>
<tr>
<th></th>
<th>EXISTING</th>
<th>PROPOSED</th>
<th>PERMITTED/ REQUIRED</th>
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</thead>
<tbody>
<tr>
<td><strong>COMMERCIAL/OFFICE</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Gross Floor Area</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Usable Floor Area</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Parking Spaces</td>
<td></td>
<td></td>
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<tr>
<td><strong>COMMERCIAL/RETAIL</strong></td>
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<tr>
<td>Usable Floor Area</td>
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<td></td>
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<tr>
<td>Parking Spaces</td>
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<tr>
<td><strong>OTHER USES</strong></td>
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<td>Gross Floor Area</td>
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<tr>
<td>Parking Spaces</td>
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</tr>
<tr>
<td><strong>RESIDENTIAL</strong></td>
<td></td>
<td></td>
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<tr>
<td>Number of Units</td>
<td>2 (1 main, 1 cottage)</td>
<td>2 (1 main, 1 cottage)</td>
<td>N/A</td>
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<tr>
<td>Number of Bedrooms</td>
<td>8 (6 main, 2 cottage)</td>
<td>9 (6 main, 3 cottage)</td>
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<tr>
<td>Gross Floor Area</td>
<td>9,711sf</td>
<td>10,269sf</td>
<td>10,290sf</td>
</tr>
<tr>
<td>Parking Spaces</td>
<td>2 (Cottage)</td>
<td>3 (Garage)</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>TOTAL SQUARE FOOTAGE</strong></td>
<td>9,711sf</td>
<td>10,269sf</td>
<td>10,290sf</td>
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<tr>
<td><strong>BUILDING HEIGHT</strong></td>
<td>34'-8 3/16&quot;</td>
<td>34'-8 3/16&quot;</td>
<td>47.5'</td>
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<tr>
<td><strong>FLOOR AREA RATIO</strong></td>
<td>0.0849</td>
<td>0.0898</td>
<td>0.09</td>
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<tr>
<td><strong>BUILDING COVERAGE</strong></td>
<td>N/A</td>
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<td>N/A</td>
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<td><strong>LOT COVERAGE</strong></td>
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<td>N/A</td>
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<td><strong>TOTAL PARKING SPACES</strong></td>
<td>2 (Cottage garage)</td>
<td>3 (New Garage)</td>
<td>N/A</td>
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<td><strong>GREEN AREA</strong></td>
<td>&gt;78%</td>
<td>92,131 sf (80.6%)</td>
<td>89,185sf (78%)</td>
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<td><strong>AGE OF STRUCTURE</strong></td>
<td>110</td>
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<td><strong>THIS SITE PLAN INVOLVES:</strong></td>
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<tr>
<td>☑ Additions</td>
<td>☑ Alterations</td>
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<tr>
<td>□ Demolition</td>
<td>□ Re-Construction</td>
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</table>
Special Permit Application

Property Address: 12 Meadow Drive, Greenwich, CT 06831
Property Owner: John & Cindy Sites
Applicant: (Same as owner)
Authorized Agent: Redniss & Mead c/o Bret Holzwarth

Address: 12 Meadow Drive
Cell Phone: 
Other Phone: 
Address: 
Cell Phone: 
Other Phone: 
Address: 
Cell Phone: 
Other Phone: 

Zone(s): RA-2
Lot Area: 2.62 acres

PLEASE SELECT ALL RELEVANT ITEMS BELOW:

- Section 6-17 — Special Permit standards and procedure
- Section 6-30 — Conservation Zone special provisions
- Section 6-94(b) — Non-residential Uses and Group Living Facilities permitted in Residential Zones including Resident Medical Professional Office
- Section 6-98 — RMF Zone
- Section 6-100 — Use Groups for Business Zones
- Section 6-101, 107 — Buildings over 40,000 c.f. in Central Greenwich Impact Overlay Zone, Post Road Impact Overlay Zone, WB, LB or LBR Zones; and over 150,000 c.f. in all other zones
- Section 6-103.1 — Parking deficient uses in CGBR
- Section 6-104 — Parking Structures incl. underground in LB Zone and Height exceptions
- Section 6-105, 106 — Front Yard Parking in GB or GBO Zone
- Section 6-109 — HO & HRO Zones
- Section 6-110 — Dwellings under special requirements for Business Zones
- Section 6-112 — IND-RE Zone applications
- Section 6-113 — In Hospital Zones: certain accessory uses, expansions exceeding 4,000 s.f. or interior alterations or changes of use exceeding 20,000 s.f. (cumulative within 2 years)
- Section 6-114 — CCRC (Continuing Care Retirement Community)
- Section 6-118.1 — Uses within railroad rights of way
- Section 6-123 — Setbacks from Connecticut Turnpike in Business Zones
- Section 6-140.1 — Satellite Earth Stations that emit microwaves
- Section 6-141 — Changes in non-conforming uses, buildings
- Section 6-205 — Historic structures in CBG Zone exceeding FAR And Notes 7, 8 & 9

To be completed by P&Z staff only:
Check # _________________ Check Amount: $__________
Application # ____________________________

pzSpecial Permit App 2020
TOWN OF GREENWICH
Town Hall ~ 101 Field Point Road ~ Greenwich, CT 06830
Planning & Zoning Department ~ 203-622-7894 ~ Fax: 203-622-3765

Application Signature Page

Property Address: 12 Meadow Drive, Greenwich, CT 06831
Tax ID: 10-1105/S

Property Owner 1: John Sites
Address: 12 Meadow Drive
Email: sitesjohn099@gmail.com
Signature: [Signature]
Cell Phone: Other Phone:
Date:

Property Owner 2: Cindy Sites
Address: 12 Meadow Drive
Email: cindylynnsites@gmail.com
Signature: [Signature]
Cell Phone: Other Phone:
Date:

Property Owner 3: 
Address: 
Email: 
Signature: 
Cell Phone: Other Phone:
Date:

Property Owner 4: 
Address: 
Email: 
Signature: 
Cell Phone: Other Phone:
Date:

Applicant: (Same as owners) 
Address: 
Email: 
Signature: 
Cell Phone: Other Phone:
Date:

Authorized Agent: Redniss & Mead c/o Bret Holzwarth
Address: 22 First Street Stamford CT 06905
Email: b.holzwarth@rednissmead.com
Signature: [Signature]
Cell Phone: Other Phone: (203) 327-0500
Date: 11/19/2021

pzSignaturePage 2020
Site Plan Review Checklist

Property Address: 12 Meadow Drive
Tax ID: 10-1105/S

Anticipated Type of Application: Special Permit for volume

All applications for preliminary and final site plan approval shall be made on the appropriate forms as provided by the Planning Staff. The following items must also be provided with the application. If any of the following items are not filed at the time of application, the application may be returned to the applicant in order that it may be filed in the entirety at an appropriate future date. Required Items: (Sec. 6-14)

Please check the items submitted below:

1. Fifteen copies of a survey, folded to 9" x 12", showing existing conditions, including:
   - a. Locations and dimensions of all existing buildings, structures, fences, retaining walls, utility facilities, trees of six (6) inches or more in diameter at breast height, and other similar features.
   - b. Existing contours at no more than a two-foot vertical interval, unless waived by the commission Staff in circumstances where such contours may not be necessarily pertinent. The survey shall indicate topographic conditions of property immediately adjoining the subject parcel.
   - c. The location of all existing watercourses, intermittent streams wetlands as required by IWWA, Flood Hazard Lines as determined by FEMA, springs and rock outcrops or a note indicating that none exist, with the sources of information listed.
   - d. The zone in which the land to be developed falls and the location of any town and zone boundary lines within or adjoining the tract, and yard dimensions to existing buildings. Lot area, by zone, shall be indicated.
   - e. The title of the development, date, revision date if any and nature of revision, north arrow, scale, and the name and address of owner and names of owners of adjacent land.
   - f. Street and property lines, curbs, edges of pavement, sidewalks, easements, right-of-way, covenants, and deed restrictions.
   - g. Traffic lights and controls, public trees, catch basins, hydrants, and power and telephone lines in adjacent streets.
   - h. Certification with the signature and seal or registration number of a registered land surveyor licensed in the State of Connecticut that the drawing is substantially correct to A-2 Standards, and that the property is in a designated zone under the zoning regulations.

2. Fifteen sets of a detailed Site development plan, at a readable scale, folded to 9" x 12", prepared in accordance with all applicable Town standards including the Roadway Design and Drainage Design Manuals, and signed by a professional architect, land surveyor, or engineer licensed in the State of Connecticut, showing:
   - a. Location, dimension, and elevation of all proposed buildings, structures, walls, fences.
   - b. Location dimensions and surface treatment of all existing and proposed parking and loading spaces, traffic access and circulation drives, and pedestrian walks. Sidewalks are to be provided as required by the Building Zone Regulations.
   - c. Approximate location of proposed utility lines, including water, gas, electricity, sewer and the location of any transformers.
   - d. Note specifying source of water supply and method of sewage disposal.
   - e. Existing and proposed contours at units of no more than a two-foot interval unless waived by the Commission’s staff. Cuts and fills and estimates of blasting to be submitted at time of final site plan.
   - f. Location, size and type of proposed landscaping and buffer planting and the designation of those areas of natural vegetation not to be disturbed.
   - g. Any other similar information determined by the Commission staff to provide for the proper enforcement of the Building Zone Regulations.
   - h. Zoning statistics including: Gross Floor Area, Floor Area Ratio, Usable Floor Area, Required Parking, Actual Parking
Provided, Building Height, Building Footprint, and Area Devoted to Surface parking, Building and Drives.

☐ i. Provisions for compliance with Americans with Disabilities Act (Handicap Access) and State Building Code).

☐ j. Coastal Area Management Application for projects within the Coastal Overlay Zone.

☒ 3. Eight sets of architectural plans, signed and sealed by an architect registered in the State of Connecticut, of all floors, all exterior elevations showing existing and proposed grade conditions. Elevations are to detail architectural elements by labeling materials, color and dimensions. Each architectural elevation shall show the absolute building height as well as building height for zoning purposes. All HVAC facilities are to be shown on architectural elevations.

☒ 4. Three copies of Floor Plan Work Sheets with the dimensions and calculated floor areas for each floor prepared in accordance with Sec. 6-5(22). Consult Commission Staff for required format.

☒ 5. Three copies of “building coverage” computation sheets.

☐ 6. Three copies of “area devoted to surface parking, building, and drives” worksheets.

☒ 7. Five copies of sight distance certification reports when required by a preliminary site plan review or when advised by the commission staff pursuant to item 2(g) of this checklist.

☒ 8. Three copies of Volume calculations per 6-101.

☒ 9. Completed Traffic Impact Evaluation Form if applicable. Submission requirements are defined on the form, available at the Commission office. A traffic report may be required.

☒ 10. Ten copies of completed application form signed by applicant or authorized agent, owners and contract purchasers, as applicable.

☒ 11. Ten copies of completed Special Permit form, if required by Building Zone Regulations.

☒ 12. Fifteen copies of detailed, inclusive narrative description of the proposed project. For those projects involving amendments to the Building Zone Regulations and/or amendments to the Building Zone Regulation Map, the narrative description must provide the section number and text for the proposed amendments(s) to the BZR and an explanation providing justification for the proposal. For map changes, a scaled drawing at 1” to 400’ needs to be provided for affected areas(s).

☒ 13. Eight copies of reductions in, 11 x 17 size, or other appropriate size, providing a readable, clear plan of proposed site development and architectural plans.

☒ 14. A showing that an adequate source of potable water is available to satisfy the needs of the proposed development as per Sec. 6-15(a) (5), signed by C.A.W.C.

☒ 15. An affidavit certifying that all abutting property owners have been notified, as evidenced by the submission of a certificate of mailing or certified or registered mail receipts about said application. A schedule of names, addresses, shown on a GIS map with lot lines indicating the location of the notified property owners. Owners of lots, or portions of lots, which are across a public or private street shall be deemed to be abutting property owners. For projects which require the preliminary review by the Conservation Commission, the notice shall be sent by the applicant to abutting owners two weeks prior to any scheduled hearing date of the Conservation Commission.

☒ 16. Authorization for the agent and contract purchasers to act on behalf of the certified property owner(s).

☒ 17. A separate schematic plan at a scale no larger than 1”-100” indicating buildings, parking and drives on the site and all adjoining properties, including those across the street, and the nearest cross street.

☒ 18. Five copies of a Drainage Summary Report as per Department of Public Works and the Town Drainage Design Manual. The summary report must be prepared in accordance with the following formats: PRELIMINARY: Existing and proposed storm water distribution, existing and proposed runoff rates, capability of off-site drainage facilities to accommodate proposed runoff, capability of off-site soils to accommodate percolation or detention if proposed, and identification of proposed drainage structures. FINAL: Final structure design details, prior approval from IWWA, Engineering Division and Conservation Commission as appropriate, and all information required by the preliminary report or two copies of drainage exemption forms.

☒ 19. In accordance with Sec. 6-183.1 to 6-183.10 of the Building Zone regulations, tree protection and sedimentation and erosion control plans shall be submitted with all site plan applications.

☒ 20. All applications for final site plans shall be in the form of a survey prepared by a registered Connecticut land surveyor having metes and bounds, dimensions of all buildings, parking and drives, setbacks of all structures from property lines, setbacks between buildings, and certification that building dimensions shown thereon are the same as the approved architectural plans Architectural and drainage plans are to be references by title, date(s) and sheet numbers.

☒ 21. Required fee submitted at time of application (see fee schedule).

☐ 22. “It is the belief of the PZC staff that this application is incomplete because of the failure of the applicant to provide the materials
referred to above. This application will be reviewed by the PZC and a decision made as to whether it is complete or incomplete at its public meeting to be held in the PZC office."

All applicants must make an appointment to submit this application with the Applications Coordinator, Peter Mangs, who can be reached by (email) Peter.Mangs@greenwichct.org or (phone) 203-622-7894.

NOTE: Any new documentation presented at Planning and Zoning Meetings shall be submitted to staff so that they can be made part of the record. Please ensure all documents can easily be removed from presentation boards.
November 19, 2021

Katie DeLuca, Director
Planning & Zoning Department
Town of Greenwich
101 Field Point Road
Greenwich, CT 06830

RE: Planning and Zoning Special Permit Application
12 Meadow Drive, Greenwich, CT

Dear Ms. DeLuca,

On behalf of our client, John & Cindy Sites, we are pleased to submit the enclosed Application for a Planning & Zoning Site Plan – Special Permit pertaining to their 2.62-acre property at 12 Meadow Drive. The property is located in the RA-2 zone on the south side of Meadow Drive within the Rock Ridge Association. This application is being submitted for a dwelling that exceeds 150,000 cubic feet in volume. Per Section 6-101 of the Greenwich Zoning Regulations, this requires a Special Permit.

The property is currently developed with a large single-family dwelling, separate cottage accessory building, driveway, patios and landscaping. There are no wetland soils on the property. The proposed modification includes a detached garage connected to the house via open breezeway, several small additions to the house, a pool and cabana, renovations to the cottage and revised driveway and patios. The existing cottage exceeds the maximum floor area for an accessory structure and requires a variance from ZBA in order to be renovated. That ZBA application is being submitted simultaneously with this one. The proposal will be compliant with all other zoning criteria including height, setbacks, green area, and floor area ratio.

Stormwater Mitigation Executive Summary: The property is split between 3 drainage basins; North, East and Southwest. The proposed improvements increase impervious coverage by 5,198sf. To mitigate this increase, it is proposed to construct a rain garden in the southwest corner of the site and an infiltration system along the western edge near the proposed pool. The infiltration system consists of 24 two-foot-tall concrete galleries. High groundwater and ledge prevent infiltration in the north and east basins. So, the design was to re-route coverage toward the southwest basin, which decreases the coverage in the North and East. Water quality in those basins is achieved through simple disconnects of the driveway, directing runoff to sheet flow across flat lawns allowing it to absorb into the soil. Groundwater recharge and runoff reduction is achieved in the rain garden and infiltration system. The design treats 69% of the disturbed impervious coverage via LID techniques, which exceeds the 60% Town requirement. In total, 93% of the site impervious coverage is being treated for stormwater. It is my professional opinion that this project is in conformance with all applicable standards set forth in the Greenwich LID Drainage Manual. If built and constructed according to the design plans this project will have no significant impact to the adjacent neighboring properties, or adverse impact to onsite or downstream hydrology.
Submitted Plans and Support Documentation: In support of the request for permit, we include one copy of the following materials:

- Application fee, $2,350 check payable to the Town of Greenwich
- Site Plan Application Form signed November 19, 2021
- Special Permit Form dated November 19, 2021
- Property and Topographic Survey (PTS) dated June 28, 2021
- Zoning Location Survey (ZLS) dated November 19, 2021
- Site Plans (CV-1, SE-1 through SE-9) dated November 19, 2021
- Master Plan by William Kenny Associates dated November 19, 2021
- Main House Architectural Plans, Elevations & FAR worksheets (A-200 through WS8) dated November 19, 2021
- Cottage Architectural Plans, Elevations & FAR worksheets (A-200 through WS2) dated November 19, 2021
- Cubic Volume Worksheet (CB1) dated November 19, 2021
- Proposed Greenspace Exhibits dated November 19, 2021
- Proposed Grade Plane Exhibits and worksheets dated November 19, 2021
- Project Narrative – which is this document
- List of names and mailing addresses of all abutting property owners
- Affidavit of Notification of Application dated November 19, 2021
- Agent Authorization Letter dated November 19, 2021
- Drainage Summary Report dated November 19, 2021
- CD containing application in pdf form

We respectfully request this matter be placed on the earliest available Commission agenda. Thank you and don’t hesitate to call or email me to discuss.

Sincerely,

Bret D. Holzwarth, P.E.
November 19, 2021

Mr. Bret D. Holzwarth  
Redniss & Mead, Inc.  
22 First Street  
Stamford, CT 06905

Re: 12 Meadow Drive - Greenwich, CT

Dear Mr. Holzwarth,

This letter serves to authorize Redniss & Mead to act as our agent in securing any and all approvals required for the property referenced above.

Sincerely,

[Signature]

Owners  Date  
11/19/21
TOWN OF GREENWICH  
Town Hall ~ 101 Field Point Road ~ Greenwich, CT  06830  
Inland Wetlands & Watercourse Agency ~ 203-622-7736 ~ Fax:203-622-7764

PERMIT-NEED QUESTIONNAIRE

This form is NOT an IWWA Application

Project Address: 12 Meadow Drive

Property Owner: John & Cindy Sites

Address: 12 Meadow Drive, Greenwich, CT

Contact information – Email or Cell Phone: sitesjohn099@gmail.com

Authorized Agent: Redniss & Mead c/o Bret Holzwarth

Address: 22 First Street, Stamford, CT

Contact information – Email or Cell Phone: b.holzwarth@rednissmead.com (203) 327-0500

Has there ever been an IWWA application for this site? YES NO

Appl. # ____________________________

ACTIVITY: (Circle) Addition Demolition Deck Garage Interior renovations New residence Generator

Tennis Court Pool Site Work/Landscaping Septic Other (specify) ____________________________

Will this activity require an addition to the septic system or a B100a? YES NO

FEE: $65 for reviews requiring a site visit

A PLOT PLAN IS REQUIRED SHOWING THE PROPOSED ACTIVITY.

IWWA staff will review the project proposal to determine if regulated activities are associated with the proposal and whether an IWWA permit is required. If an IWWA permit is required, the appropriate permit application packet will be provided.

Do not apply for a Building Permit until this review is complete.

No work may begin until an IWWA permit is issued and/or the "Building Permit Application Sign-Off Sheet" has been signed.

The issuance of a building permit alone does not constitute an authorization to proceed.

As the property owner [ ] or, authorized agent [ ] I believe the information I have submitted is correct.

Signature ____________________________ Date 11/19/2021

STAFF NOTES

Office Rev Date 11/19/2021 Field Inv Date ______/____/____

WET/WC? YES NO TIDAL

Action Required? YES NO If yes, DR AA AR SIA Staff

Soils Report Date ______/____/____ Author ____________________________ Soils

Comments: ____________________________

IWWA Questionnaire Revised 3/4/2020
SUBMITTED FOR:
ZONING BOARD OF APPEALS
PLANNING AND ZONING SPECIAL PERMIT

DRAWING TITLE          NUMBER  ORIG. DATE
COVER PAGE             CV-1     11/10/2021
PROPERTY & TOPOGRAPHIC SURVEY   PS-1     11/12/2021
ZONING LOCATION SURVEY          ZL-1     11/10/2021
SITE DEVELOPMENT PLAN          SD-1     11/10/2021
SITE GRADING PLAN              SG-1     11/10/2021
SITE UTILITY PLAN              SU-1     11/10/2021
SUSTAINABILITY &晋级 Passage Control AND LID PLAN  SC-1  11/10/2021
NOTES                      NS-1     11/10/2021
SIDEWALK CROSS SECTION & RIGHT DISTANCE SC-2     11/10/2021
BUILDING ELEVATIONS           BE-1     11/10/2021
SITE DATA & DETAILS          SD-5     11/10/2021
DETAILS                    DE-2     11/10/2021

COVER PAGE: DESCRIPTION
I2 MEADOW DRIVE
GREENWICH, CT
PREPARED FOR
JOHN AND CINDY SITES

Scale: 1" = 200'

CONTRACT NO. 8956

Redden & Mead
Civil Engineers
108 N. Main Street South
Charlestown, Tennessee 37031
(931) 436-4004

DRAWN BY
S. E. Pennington

Concord, TN
November 14, 2021

CV-1
NOTES:

1. This survey was prepared in accordance with Section 20-3010 of the Department of Environmental Quality's and the Department of Labor and Work in the State of Connecticut as required by the Commonwealth of Massachusetts, for use in the State of Massachusetts. It was not prepared in accordance with the Connecticut Topographic Survey and may contain some areas of which are not suitable for further development. Therefore, any foundation or construction work in these areas is prohibited.

2. All of the Surveyed Parcel(s) are within.


4. Reference is made to Map 1025 and to Maps 1031, 1072 and 1035 C.L.R.

5. Sectional Plan is to Section 1.3B as outlined in Sec. 1.3B & Sec. 1.12 of the Town of Darien Zoning Zone Map.

6. Additional details are included in the Property Survey.

7. Reference is made to Map 1025 and to Maps 1031, 1072 and 1035 C.L.R.

8. Reference is made to the Greenwich Land Records (ULR) for all of the Surveyed Parcel(s) as noted above.

9. Reference is made to the Greenwich Land Records (ULR) for all of the Surveyed Parcel(s) as noted above.

10. Reference is made to the Greenwich Land Records (ULR) for all of the Surveyed Parcel(s) as noted above.

JOINING DATA TABLE

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<thead>
<tr>
<th>Requirement</th>
<th>Address Required</th>
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<tbody>
<tr>
<td>Square</td>
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<tr>
<td>Street</td>
<td>12 MEADOW DRIVE</td>
</tr>
<tr>
<td>Lot</td>
<td>100</td>
</tr>
<tr>
<td>Rear</td>
<td>12.00 acres</td>
</tr>
<tr>
<td>Foundation</td>
<td>Width: 20' x 10'</td>
</tr>
<tr>
<td>Size (Estimate)</td>
<td>250 sq. ft.</td>
</tr>
</tbody>
</table>

* See Table 1.
These drawings are intended only to depict the design of site grading, drainage, sanitary, utilities, sediment control, and erosion control.

**RETAINING WALLS:**
31. Refer to plans prepared by the structural engineer for information regarding the design any retaining walls.
35. All sanitary sewer pipe shall be Poly Vinyl Chloride Pipe (PVCP) and shall be Schedule 40 with solvent weld joints.

**UTILITIES:**
56. Utilities shown on these plans are "not guaranteed" to be complete or correct. Prior to any site activities, the Contractor shall provide protection and support of these facilities and repair any damage caused by the work in a timely manner.
57. Maintenance of all onsite drainage facilities shall be the responsibility of the property owner.
60. Where necessary, existing utilities shall be reinstalled to meet all minimum coverage requirements.

**EROSION AND SEDIMENT CONTROL:**
72. Contractor is responsible to place the hot-mix asphalt mix as required in the drawings, details and the applicable Section of the CT DOT FORM 818 (latest edition).
74. Finished paving shall be free of "bird baths" and be smooth at the slopes specified on the plans.
75. Thicknesses of all layers shown are after compaction. Compact all layers to 95% per ASTM D 1557 (Modified Proctor Method).

**DRAINAGE:**
94. Dust control to be achieved with watering down disturbed areas as required.
95. Temporary silt fences must be maintained and no silt or sediment shall be allowed to enter the storm water drainage system.

**SHEET Metal:**
101. Excavated material from temporary silt traps must be stockpiled on uphill side of silt fence.

**NOTES:**
103. Temporary barriers shall be installed to prevent debris from entering the storm water drainage system.
PROPOSED ELEVATIONS
EXISTING ELEVATIONS
EXISTING RESTRICTIVE LAYER

ELEVATION VIEW FROM FRONT ELEVATION.
REFER TO PLANS BY LOUIS CAMPANA
ARCHITECT, FOR DESIGN INFORMATION AS IT RELATES TO SPECIFIC BUILDING DETAILS.

RESTRICTIVE LAYER AT 106.00 PER TEST PIT #3
GRADE=108.83 AND 34" TO LEDGE

BUILDING ELEVATIONS
DEPICTING
12 MEADOW DRIVE
GREENWICH, CT
PREPARED FOR
JOHN AND CINDY SITES

Permission to reproduce this document in whole or in part is hereby granted.
WILLIAM KENNY ASSOCIATES

NOVEMBER 19, 2021

SCALE: 0' 20' 10'

12 MEADOW DRIVE
GREENWICH, CT

MASTER PLAN

EXISTING RESIDENCE
PROPOSED GARAGE
PROPOSED PLAYSCAPE
PROPOSED COURTYARD
EXISTING COTTAGE
PROPOSED 20'X40' POOL
PROPOSED POOL TERRACE
PROPOSED DRIVEWAY ENTRANCE AND STONE WALLS
PROPOSED HEDGE
PROPOSED PLANTING BED
PROPOSED DRIVEWAY
PROPOSED WALKWAY
PROPOSED STONE SLAB STEPS
EXISTING LEDGE
EXISTING TREE (TYP.)
75' SETBACK
35' SETBACK
PROPOSED GARDEN WITH PLANT BEDS, WATER FEATURE, AND GRAVEL WALKWAYS
PROPOSED RAIN GARDEN
PROPOSED HEDGE
PROPOSED PATIO
PROPOSED WATER FEATURE
PROPOSED STEPPING STONES (TYP.)
PROPOSED BBQ
EXISTING VEGETATION BUFFER; SUPPLEMENT WITH NEW PLANTINGS
TRANSPLANTED AND/OR PROPOSED PLANTING
EXISTING, TRANSPLANTED, AND PROPOSED PLANTING
PROPOSED FLOWERING TREE (TYP.)

GENERAL NOTES:
1. UNLESS NOTED OTHERWISE, EXISTING CONDITIONS INFORMATION TAKEN FROM A DRAWING PREPARED BY REDNISS & MEAD.
EXISTING GROSS FLOOR AREA WORKSHEET

Project Name: SITES RESIDENCE
Project No.: 202102
Drawing No.: 8 Pasadena Road - Bronxville - NY - 10708
louiscampanaarchitect@outlook.com
914.573.6804
Date: LC
Drawing Title: 12 MEADOW DRIVE
GREENWICH, CT 06831
Scale: 3/16" = 1'-0"
Orientation: E

Ownership & Conditions of Use:

Drawings and Specifications, as instruments of professional service are and shall remain the property of Louis Campana Architect. Documents are not to be used in whole or in part, for other projects or purposes or by any other parties than those authorized by contract without the specific written authorization of Louis Campana Architect.

Copyright 2021 Louis Campana Architect

As Noted
02.23.21
Issue Date Description: LC
11.19.21 ZBA application Submission
LEGEND

- S' OFFSET LINE
- SECTION DELINEATOR
- SECTION LETTER
- LOWEST GRADE WITHIN S'
- LOWEST GRADE @ FOUNDATION
- EXISTING CONTOUR

NOTES:
1. REFER TO GRADE PLANE WORKSHEET (ATTACHED) FOR GRADE PLANE CALCULATION.

PROPOSED MAIN DWELLING GRADE PLANE EXHIBIT
12 MEADOW DRIVE
GREENWICH, CT
<table>
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<tr>
<th>Side (A)</th>
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<th>Length along 6’ Offset Line (C)</th>
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Total: 408.6 | 45,170.6 | 104.9

Grade Plane = 110.6 Column D/Column C
Weighted First Floor Elev = 112.87
Lower Level Elev = 104.87
First Floor Elev - Grade Plane = 2.27
Grade Plane - Lower Level Elev = 5.7

Distance between Lowest Elevation along Foundation and FFE = 8.0
Is the Basement Considered a Story = NO §6-5 (45.1)
Percent of Basement Floor Area Counting towards FAR = 0% §6-5 (22.1)(B)

Note 1: Linear slope within segment allows for lowest grade utilized in calculation above to be an average of the highest and lowest grades within the segment. (OK’d by Chief ZEO via e-mail on 10-19-18)

On November 19, 2021

Bret D. Holzwarth  CT P.E. 27812

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~PROPOSED DWELLING~

Existing FFE Weighted Average
(Refer to EXHIBIT)

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<td><strong>FFE Weighted Avg.</strong></td>
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<td><strong>112.87</strong></td>
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</table>

On __November 19, 2021__

Bret D. Holzwarth  CT P.E. 27812

This document and copies thereof are valid only if they bear the signature and embossed seal of the designated licensed professional. Unauthorized alterations render any declaration hereon null and void.
Client Name: John and Cindy Sites  
Job: 10373  
Site Location: 12 Meadow Drive, Greenwich, CT  
Calculated by: DML  
Date: 11/19/2021

### ~ PROPOSED GARAGE ~

#### Grade Plane Calculations

REFER TO ATTACHED EXHIBIT

<table>
<thead>
<tr>
<th>Side (A)</th>
<th>Lowest Elevation within 6' Envelope (B)</th>
<th>Length along 6' Offset Line (C)</th>
<th>Product (D) = (B x C)</th>
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| Total    | 156.9                                  | 17,389.4                        | 110.5                 |                                      |       |

- **Grade Plane** = 110.8 Column D/Column C
- **First Floor Elev** = 111.80
- **Lower Level Elev** = 0.00
- **First Floor Elev - Grade Plane** = 1.00
- **Grade Plane - Lower Level Elev** = 110.8

Distance between Lowest Elevation along Foundation and FFE = 1.3

Is the Basement Considered a Story = NO §6-5 (45.1)

Percent of Basement Floor Area Counting towards FAR = N/A §6-5 (22.1)(B)

---

On November 19, 2021  
By Bret D. Holzwarth  
CT P.E. 27812

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### Grade Plane Calculations

#### REFER TO ATTACHED EXHIBIT

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<th>Side (A)</th>
<th>Lowest Elevation within 6' Envelope (B)</th>
<th>Length along 6' Offset Line (C)</th>
<th>Product (D) = (B x C)</th>
<th>Lowest Elevation along Foundation (E)</th>
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**Total**

|               | 233.2 | 25,642.4 | 109.7 |

**Grade Plane** = 110.0 Column D/Column C  
**First Floor Elev** = 110.70  
**Lower Level Elev** = 0.00  
**First Floor Elev - Grade Plane** = 0.70  
**Grade Plane - Lower Level Elev** = 110.0

**Distance between Lowest Elevation along Foundation and FFE** = 1.0  
**Is the Basement Considered a Story** = NO §6-5 (45.1)  
**Percent of Basement Floor Area Counting towards FAR** = N/A §6-5 (22.1)(B)

---

On November 19, 2021  
Bret D. Holzwarth CT P.E. 27812  

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PROPOSED CABANA GRADE PLANE EXHIBIT
12 MEADOW DRIVE
GREENWICH, CT
~ PROPOSED CABANA ~

**Grade Plane Calculations**

REFER TO ATTACHED EXHIBIT

<table>
<thead>
<tr>
<th>Side (A)</th>
<th>Lowest Elevation within 6' Envelope (B)</th>
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**Total**

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<td>Grade Plane - Lower Level Elev =</td>
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Distance between Lowest Elevation along Foundation and FFE = 1.0

Is the Basement Considered a Story

Percent of Basement Floor Area Counting towards FAR = N/A §6-5 (22.1)(B)

On November 19, 2021

Bret D. Holzwarth  CT P.E. 27812

This document and copies thereof are valid only if they bear the signature and embossed seal of the designated licensed professional. Unauthorized alterations render any declaration hereon null and void.
November 19, 2021

Via Certificate of Mail

Re: John & Cindy Sites
12 Meadow Drive, Greenwich, CT
Planning & Zoning Site Plan and Special Permit Approval

Dear Neighbor,

Notice is hereby given that an application has been filed with the Greenwich Planning & Zoning Commission (PZC) on behalf of John and Cindy Sites, owners of 12 Meadow Drive. The applicant is seeking Site Plan/Special Permit Approval for additions to the existing residence, modifications to the existing cottage, a 3-car garage with connecting breezeway, new driveway, patio areas, pool, cabana, drainage improvements and other associated site improvements.

Further information on this application may be obtained by contacting the Greenwich PZC, Town Hall, 101 Field Point Road, Greenwich, CT 06830 at (203) 622-7984 or the undersigned at (203) 327-0500.

Very truly yours,

Bret Holzwarth, P.E.

cc: Planning & Zoning
John and Cindy Sites
TOWN OF GREENWICH

AFFIDAVIT OF NOTIFICATION OF APPLICATION TO
PLANNING & ZONING DEPARTMENT

STATE OF CONNECTICUT )
COUNTY OF FAIRFIELD ) November 19, 2021

I, Jeanien Sheridan, being first duly sworn, do hereby certify that on November 19, 2021, I caused to be mailed, postage prepaid, to those persons whose names are set forth on the Certificate of Mail attached hereto, a copy of the notice attached hereto. Said persons were the record owners, as of November 19, 2021, as shown on the Town Tax Assessor's Office records of property abutting (as said term is defined in Sec. 6-14(a) (3) of the Greenwich Building Zone Regulations) the property belonging to Ashton Hudson Tr having an address of 12 Meadow Drive, Greenwich, Connecticut 06830, for which an application for permit has been filed with the Planning & Zoning Department.

Subscribed and sworn to before me this 19th day of November 2021

Mary Kilbane
Notary Public
TOWN OF GREENWICH PLANNING & ZONING APPLICATION
12 MEADOW DRIVE, GREENWICH, CT
ABUTTING PROPERTY OWNERS
CERTIFICATE OF MAIL

BELL JAMES F IV REVOCABLE TRUST &
BELL ANGELIQUE FEBLES REV TRUST
5 MEADOW DRIVE
GREENWICH CT 06831

SHENKMAN GREGORY ALEXANDER &
REBECCA
18 GLENVILLE ROAD
GREENWICH CT 06830

CONNER TIMOTHY V & ELAINE A
6 MEADOW DRIVE
GREENWICH CT 06831

FAGAN MARCIA &
MURPHY EDWARD ELLISON
11 MEADOW DRIVE
GREENWICH CT 06831

FIRESTONE ANN M
14 MEADOW DRIVE
GREENWICH CT 06830

GLENVILLE ROAD LLC
ONE ROCK RIDGE AVENUE
GREENWICH CT 06831

HUDSON ASHTON TR
12 MEADOW DRIVE
GREENWICH CT 06830

KRUMEICH MARIE C & CHRISTOPHER TR
12 GLENVILLE RD
GREENWICH CT 06831

SHAFFER CHARLES M III & KAREN
5 HILLSIDE DRIVE
GREENWICH CT 06831
RESIDENTIAL

VALUATION RECORD

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LAND DATA AND CALCULATIONS

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AKA: R02 11 Glenville Road
BP18: 18-2416, new roof for carriage house 100% Complete
BP21: 21-6264 Interior renovations & new elevator 20% complete
CMKP: 139, 809
GEN: Situs revised from Glenville Road (3069N0004). RCS - 6/1/06.
LAND: A-TRAFFIC
KV21: Revised sketch & details per listing
UC: 2021
USP: Reno

Supplemental Cards
TRUE TAX VALUE 1970000

Supplemental Cards
TOTAL LAND VALUE 1970000
**PHYSICAL CHARACTERISTICS**

*Style:* Tudor  
*Occupancy:* Single family  
*Story Height:* 2.75  
*Finished Area:* 9823  
*Attic:* None  
*Basement:* 3/4

**ROOFING**

*Material:* Asphalt shingles  
*Type:* Gable  
*Framing:* Std for Class  
*Pitch:* Not available

**FLOORING**

*Slab:* B  
*Sub and joists:* 1.0, 2.0, 2.5, 2.75  
*Base Allowance:* B, 1.0, 2.0, 2.5, 2.75

**EXTERIOR COVER**

*Stucco*

**INTERIOR FINISH**

*Normal for Class*

**ACCOMMODATIONS**

*Finished Rooms:* 17  
*Bedrooms:* 0  
*Family Rooms:* 1  
*Formal Dining Rooms:* 1  
*Fireplaces:* 5

**HEATING AND AIR CONDITIONING**

*Primary Heat:* Hot water - gas  
*Lower /Basmt:* 1  
*Upper Full Part:* Upper Upper  
*Air Cond:* 0  
*Use Hgt Type Grade Const Year Cond:* 13930 4918710

**PLUMBING**

*4 Fixt. Baths:* 1  
*3 Fixt. Baths:* 7  
*2 Fixt. Baths:* 2  
*Kit Sink:* 1  
*Extra Fixt:* 2  
*TOTAL:* 32

**REMODELING AND MODERNIZATION**

*Amount Date*

**IMPROVEMENT DATA**

| Description Value | ID Use Str Yr Eff Base Rate Adj Size Computed PhysObso Market Value |
|-------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| D :BASIC 6400     | D DWELL 0.00     | 84 1911 2016 EX | 0.00 Y 0.00     | 13930 4918710   | 0 0 100 90 4426800 |

**SPECIAL FEATURES**

**SUMMARY OF IMPROVEMENTS**

Data Collector/Date: AK 09/24/2021  
Appraiser/Date: TOG 10/01/2015  
Neighborhood: Neigh 162100 AV  
Supplemental Cards: TOTAL IMPROVEMENT VALUE 4426800

(LCM: 100.00)
### VALUATION RECORD

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### VALUATION

**Site Description**

### LAND DATA AND CALCULATIONS

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</table>

Supplemental Cards

TOTAL LAND VALUE
### PHYSICAL CHARACTERISTICS
- **Style:** Apt Over garage
- **Occupancy:** Single family
- **Story Height:** 1.75
- **Finished Area:** 1362
- **Attic:** None
- **Basement:** Full

### ROOFING
- **Material:** Asphalt shingles
- **Type:** Gable
- **Pitch:** Not available

### FLOORING
- **Slab:** B
- **Sub and joists:** 1.0, 1.5, 1.75
- **Base Allowance:** B, 1.0, 1.5, 1.75

### EXTERIOR COVER
- **Stucco:** 1.0, 1.5, 1.75

### INTERIOR FINISH
- **Normal for Class:** B, 1.0, 1.5, 1.75

### ACCOMMODATIONS
- **Finished Rooms:** 3
- **Bedrooms:** 1
- **Fireplaces:** 1

### HEATING AND AIR CONDITIONING
- **Primary Heat:** Hot water - gas
- **Lower Full Part**
- **/Bsem/ 1 Upper Upper**

### PLUMBING
- **3 Fixt. Baths:** 1 3
- **Kit Sink:** 1 1
- **TOTAL:** 4

### REMODELING AND MODERNIZATION

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<th>Date</th>
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### SPECIAL FEATURES

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### SUMMARY OF IMPROVEMENTS

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<td>2000</td>
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</table>

### IMPROVEMENT DATA

- **Util Shed:** 100 10

- **TOTAL IMPROVEMENT VALUE:** 544500

### Data Collector/Date
- **AK 09/24/2021**

### Appraiser/Date
- **TOG 10/01/2015**

### Neighborhood
- **Neigh 162100 AV**

### Supplemental Cards

| TOTAL IMPROVEMENT VALUE | 544500 |
December 21, 2021

Katie DeLuca, Director
Planning & Zoning
Town of Greenwich
Town Hall, 101 Field Point Rd
Greenwich, CT 06830

Re:  PLPZ202100531 – 12 Meadow Drive (FSP-C/SP)
   Time Extension Waiver

Dear Mrs. DeLuca,

   On behalf of the applicants, we hereby grant a 35-day extension to allow the Commission to hear the above application.

   Should you have any questions regarding the request, please contact us. Thank you for your consideration.

   Sincerely,

   Bret Holzwarth, P.E.
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Orientation
Narrative

General Project Description

The owners of the property located at 12 Meadow Drive (Tax ID 10-1105/S) in Greenwich, are proposing to develop the site with additions to the existing residence, modifications to the existing cottage, a 3-car garage with connecting breezeway, new driveway, patio areas, a pool, cabana, drainage improvements and other associated site improvements. This property is a part of the Rock Ridge Association. Reference is made to the Site Plan Set prepared by Redniss & Mead, Inc., dated 11/19/2021.

Site

The property is 2.62 acres situated on the south side of Meadow within the RA-2 zone. It also has frontage on Glenville Road to the south. The property is bounded by residentially zoned properties to the east and west. The property is to be served by public water and public sewers. The site is not located within the drinking water supply watershed. A review of the National Cooperative Soil Survey (NCSS) indicates the majority of the site has Charlton-Chatfield Complex soils, with a hydrologic soil group rating of B, while a small piece in the northeast corner has Sutton Fine Sandy Loam with a rating of B/D. To be conservative, we modeled that corner with D type soils.

Existing Conditions

Stormwater runoff from the site generally flows in three directions: north toward Meadow Drive, east toward the neighboring property and to the southwest corner of Glenville Road and the adjacent western property. No offsite area was taken into account. The entire site is ultimately tributary to the Horseneck Brook watershed.

All three drainage basins were evaluated separately in this study. The existing onsite impervious area is 19,587 square feet. The remaining site area is manicured lawn with a CN value of 61. Small area drains were observed in Meadow Drive near the property that collects road runoff and pipes it to the east. No onsite drainage infrastructure exists.

Proposed Conditions

The proposed improvements mentioned above disturb select portions of the previously developed site but keep much of the lawn areas throughout the property remain undisturbed. In all, impervious coverage on the property will increase by 5,198 square feet (0.12± acres). The storm water management measures incorporated into the site design are intended to promote Low Impact Development principles described in Section 4.4 of the Greenwich LID Manual.

As these proposed improvements are classified as a redevelopment, the Runoff Reduction Volume (RRV), Groundwater Recharge Volume (GRV) and Water Quality Volume (WQV) were calculated and are included in Appendix 2. To mitigate the increase in volume and peak rates of runoff, as well as provide water quality treatment and groundwater recharge, several mitigation systems are proposed.
A series of test pits were dug around the site to determine if infiltration practices were feasible, given the observation of ledge outcroppings and wet conditions on the neighboring property. A total of twelve (12) test pits were dug and all yielded varying depths to restrictive layer, with mottling ranging from 11” to 63” and ledge as shallow as 34”. Given the proposed grades within the site remain similar to existing, it is not practical to provide all the stormwater treatment through infiltration techniques in all areas of the site. With this in mind, infiltration practices are proposed in areas where distance above restrictive layers can be achieved, within the southwest basin. In the other basins, redirecting and reducing coverage are proposed to mitigate the peak rates of runoff. To provide water quality treatment in the north and east basins, the driveways will leak off to lawn areas via simple disconnects.

In the southwest corner of the site, a rain garden is proposed to receive stormwater runoff via overland flow from the rear yard, and piped flow from catch basins in the patio and driveway. This rain garden has a total storage capacity of 1,615cf below the outlet. The rain garden is sized to handle the tributary area and outlet the flow in a controlled fashion while also infiltrating into the underlying soils. The onsite flow will be treated through the rain garden prior to discharging offsite. The rain garden storage below the outlet exceeds the water quality volume of the drainage basin. The outlet is a five-foot concrete weir and rip rap energy dissipater.

The proposed pool, cabana and west portion of the main dwelling roof is proposed to be treated by an infiltration system consisting of 24 units of two-foot-tall concrete galleries with crushed stone below the system and around the outer perimeter. This infiltration system, sized to provide 1,208cf cubic feet of storage provides additional water quality treatment, groundwater recharge, and peak attenuation and is not included within the 60% calculation for LID techniques. The outlet a yard drain near the corner of the pool, set a few inches below the other yard drains. The outlet flows along the western property line heading south to the corner.

In the north and east drainage basins, tributary area and impervious coverage were reduced, so in both basins, peak flows are also reduced, and no storage was required. To address water quality, the new impervious coverage in the driveway flow to three separate leak offs. At the low points in the driveway flush curbs allow runoff to flow past a stone splash pad onto lawn areas. Per the simple disconnect requirements, the flow paths don’t exceed 75’ and the tributary area of each leak off doesn’t exceed 1,000sf of impervious area. The lawn areas do not exceed slopes greater than 5% for a minimum of 40’ past the leak offs.

Since the existing house and cottage are remaining, that portion of the total impervious coverage is not being disturbed. Based upon the disturbed impervious area of the site (17,346 square feet), the minimum required area of treatment using LID techniques is 60% (10,408 square feet). The disturbed impervious area treated using LID techniques is 11,915 square feet (69% of total disturbed impervious area), which occurs in the Rain Garden and simple disconnects. With the additional treatment by the infiltration system, the total treated area is 23,119 square feet (93% of the total impervious coverage).

The following table illustrates the required and provided Water Quality Volume and Runoff Reduction Volume in these systems:
Table 1

<table>
<thead>
<tr>
<th>POI</th>
<th>Water Quality Volume</th>
<th>Provided (sf)</th>
<th>Required (sf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WQV</td>
<td>RRV</td>
<td>GRV</td>
</tr>
<tr>
<td>West</td>
<td>1,580</td>
<td>152</td>
<td>N/A</td>
</tr>
<tr>
<td>East</td>
<td>1,434</td>
<td>152</td>
<td>N/A</td>
</tr>
<tr>
<td>Southwest</td>
<td>1,017</td>
<td>1,067</td>
<td>2,823</td>
</tr>
</tbody>
</table>

Note: WQV, RRV and GRV includes all storage within the rain garden and the infiltration system below the outlet.

To compare existing and proposed peak rates of runoff & volume, a storm water routing model was prepared utilizing the HydroCAD software. The following tables depict the results of the HydroCAD model for the Point of Interest (can also be found in Appendix #3). The following table depicts existing and proposed peak flows leaving the site:

Table 2: North Basin Peaks

<table>
<thead>
<tr>
<th>Return Period (years)</th>
<th>Existing Peak Flow Rate (cfs)</th>
<th>Proposed Peak Flow Rate (cfs)</th>
<th>Change (cfs)</th>
<th>Percent Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.38</td>
<td>0.35</td>
<td>-0.03</td>
<td>-7.9</td>
</tr>
<tr>
<td>2</td>
<td>0.57</td>
<td>0.55</td>
<td>-0.02</td>
<td>-3.5</td>
</tr>
<tr>
<td>5</td>
<td>0.98</td>
<td>0.95</td>
<td>-0.03</td>
<td>-3.1</td>
</tr>
<tr>
<td>10</td>
<td>1.37</td>
<td>1.34</td>
<td>-0.03</td>
<td>-2.2</td>
</tr>
<tr>
<td>25</td>
<td>2.04</td>
<td>2.03</td>
<td>-0.01</td>
<td>-0.5</td>
</tr>
<tr>
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<td>2.70</td>
<td>2.70</td>
<td>0.00</td>
<td>0.0</td>
</tr>
<tr>
<td>100</td>
<td>3.54</td>
<td>3.56</td>
<td>0.02</td>
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</table>

Table 3: East Basin Peaks

<table>
<thead>
<tr>
<th>Return Period (years)</th>
<th>Existing Peak Flow Rate (cfs)</th>
<th>Proposed Peak Flow Rate (cfs)</th>
<th>Change (cfs)</th>
<th>Percent Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.38</td>
<td>0.36</td>
<td>-0.02</td>
<td>-5.3</td>
</tr>
<tr>
<td>2</td>
<td>0.62</td>
<td>0.58</td>
<td>-0.04</td>
<td>-6.5</td>
</tr>
<tr>
<td>5</td>
<td>1.12</td>
<td>1.02</td>
<td>-0.10</td>
<td>-8.9</td>
</tr>
<tr>
<td>10</td>
<td>1.61</td>
<td>1.45</td>
<td>-0.16</td>
<td>-9.9</td>
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<tr>
<td>25</td>
<td>2.49</td>
<td>2.21</td>
<td>-0.28</td>
<td>-11.2</td>
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<tr>
<td>50</td>
<td>3.35</td>
<td>2.94</td>
<td>-0.41</td>
<td>-12.2</td>
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<tr>
<td>100</td>
<td>4.46</td>
<td>3.90</td>
<td>-0.56</td>
<td>-12.6</td>
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</table>
### Table 4: Southwest Basin Peaks

<table>
<thead>
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<th>Return Period (years)</th>
<th>Existing Peak Flow Rate (cfs)</th>
<th>Proposed Peak Flow Rate (cfs)</th>
<th>Change (cfs)</th>
<th>Percent Change (%)</th>
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<td>1</td>
<td>0.51</td>
<td>0.17</td>
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<tr>
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<td>10</td>
<td>2.34</td>
<td>1.42</td>
<td>-0.92</td>
<td>-39.3</td>
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<tr>
<td>25</td>
<td>3.66</td>
<td>3.52</td>
<td>-0.14</td>
<td>-3.8</td>
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<tr>
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<td>5.89</td>
<td>0.94</td>
<td>19.0</td>
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<tr>
<td>100</td>
<td>6.63</td>
<td>7.74</td>
<td>1.11</td>
<td>16.7</td>
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</tbody>
</table>

The following table depicts existing and proposed runoff volumes of the site:

### Table 5: North Basin Runoff

<table>
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<th>Return Period (years)</th>
<th>Existing Peak Flow Rate (cfs)</th>
<th>Proposed Peak Flow Rate (cfs)</th>
<th>Change (cfs)</th>
<th>Percent Change (%)</th>
</tr>
</thead>
<tbody>
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<tr>
<td>2</td>
<td>2,257</td>
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<tr>
<td>5</td>
<td>3,635</td>
<td>3,359</td>
<td>-276</td>
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<tr>
<td>10</td>
<td>4,987</td>
<td>4,644</td>
<td>-343</td>
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<tr>
<td>25</td>
<td>7,358</td>
<td>6,911</td>
<td>-447</td>
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</tr>
<tr>
<td>50</td>
<td>9,682</td>
<td>9,142</td>
<td>-540</td>
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</tr>
<tr>
<td>100</td>
<td>12,710</td>
<td>12,059</td>
<td>-651</td>
<td>-5.1%</td>
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</tbody>
</table>

### Table 6: East Basin Runoff

<table>
<thead>
<tr>
<th>Return Period (years)</th>
<th>Existing Peak Flow Rate (cfs)</th>
<th>Proposed Peak Flow Rate (cfs)</th>
<th>Change (cfs)</th>
<th>Percent Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,434</td>
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</tr>
<tr>
<td>2</td>
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<td>1,932</td>
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</tr>
<tr>
<td>5</td>
<td>3,542</td>
<td>3,183</td>
<td>-359</td>
<td>-10.1%</td>
</tr>
<tr>
<td>10</td>
<td>4,965</td>
<td>4,424</td>
<td>-541</td>
<td>-10.9%</td>
</tr>
<tr>
<td>25</td>
<td>7,500</td>
<td>6,621</td>
<td>-879</td>
<td>-11.7%</td>
</tr>
<tr>
<td>50</td>
<td>10,015</td>
<td>5,791</td>
<td>-4,224</td>
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</tr>
<tr>
<td>100</td>
<td>13,322</td>
<td>11,633</td>
<td>-1,689</td>
<td>-12.7%</td>
</tr>
</tbody>
</table>
Table 7: Southwest Basin Runoff

<table>
<thead>
<tr>
<th>Return Period (years)</th>
<th>Existing Peak Flow Rate (cfs)</th>
<th>Proposed Peak Flow Rate (cfs)</th>
<th>Change (cfs)</th>
<th>Percent Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2,370</td>
<td>1,101</td>
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<td>-53.5%</td>
</tr>
<tr>
<td>2</td>
<td>3,534</td>
<td>2,316</td>
<td>-1,218</td>
<td>-34.5%</td>
</tr>
<tr>
<td>5</td>
<td>5,972</td>
<td>4,961</td>
<td>-1,011</td>
<td>-16.9%</td>
</tr>
<tr>
<td>10</td>
<td>8,419</td>
<td>7,829</td>
<td>-590</td>
<td>-7.0%</td>
</tr>
<tr>
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<td>12,879</td>
<td>82</td>
<td>0.6%</td>
</tr>
<tr>
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<td>17,154</td>
<td>17,845</td>
<td>691</td>
<td>4.0%</td>
</tr>
<tr>
<td>100</td>
<td>22,898</td>
<td>24,336</td>
<td>1,438</td>
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</table>

Compliance with Stormwater Management Standards

**Standard 1. Low Impact Development**

Low impact development and site planning techniques were used to the maximum extent practicable given the soil conditions. LID techniques are used in limiting the amount of disturbance around the proposed improvements.

As infiltration possibilities are limited, where it is feasible, infiltration is maximized to the greatest extent possible and provides the water quality volume for the area tributary to it as well as the runoff reduction volume for the property as a whole.

**Standard 2. Protection of Natural Hydrology**

A. Overall site disturbance for this project is approximately 1.94± acres. Temporary site disturbance will be kept to a minimum for this project by the phasing of construction and staging construction in areas that are going to be permanently disturbed. Surrounding vegetation and mature trees will be protected throughout the construction process and remain in place after it is completed. The limit of disturbance is noted on the site plans and will be delineated in the field through the use of silt and/or construction fence. Areas in the northeast and northwest of the site will remain undisturbed.

B. Soil compaction and disturbance will be minimized by using the smallest equipment necessary to complete the development. Upon completion, soil compaction will be mitigated by deep tilling.

C. Existing on site drainage patterns are retained as much as is practicable. The time of concentration under pre-development conditions is similar to that under post-development conditions. This is achieved by leaving large portions of existing drainage patterns intact.

D. The natural topography of the land is retained in some areas even within the limit of disturbance.

E. Tilling will be recommended in the disturbed areas that will be heavily trafficked during construction.

F. At the completion of the project, no soil shall be left bare. All areas of exposed soil shall be sufficiently seeded, planted, or mulched so as to sufficiently stabilize it.
G. The existing drainage patterns are maintained as are some of the existing conveyance systems leaving the property. There are no wetlands or natural swales.

H. No roadways are proposed to cross any surface waters as a result of this project.

I. No roadways are proposed to cross any surface waters as a result of this project.

A. Stormwater management practices have been designed to integrate with the sites specific hydrologic and geologic conditions.
B. The proposed stormwater best management practices comply with peak flow, water quality and groundwater recharge requirements of the Greenwich LID Manual. A summary of existing and proposed condition peak flows is provided in Tables 2, 3 & 4 above and in Appendix 3. Runoff Reduction Volumes (RRV) are summarized in Tables 5, 6 & 7 above and in Appendix 2.
C. N/A
D. This project does not propose any stormwater to be pumped.
E. This project does not propose any groundwater to be pumped.

Standard 4. Runoff Volume Reduction and Groundwater Recharge
A. The Runoff Reduction Volume for the property in its entirety is provided within the rain garden and infiltration system. The outlet structures have been designed to provide the requisite volume below the lowest outlets in both systems. Refer to Table 1 for a summary of water quality volumes. Refer to Tables 5, 6 & 7 for a summary of runoff volumes.
B. Groundwater Recharge Volume requirements for this project are met through the installation of the rain garden, and infiltration system.
C. This item does not apply to this site as there are no tidal wetlands in the vicinity.

Standard 5. Peak Flow Control
A. N/A
B. All proposed stormwater management facilities are adequately sized to pass appropriate flows. Prior to building permit, outlet controls from all infiltration or filtering devices will be sized to pass the 100-year storm flow. The pipe networks downstream of these systems shall be sized to pass the 100-year storm flow. All other pipe networks shall be designed to pass the 25-year storm flow.
C. All peak flow rates are reduced from existing conditions up to and including the 25-year storm. Refer to Tables 2, 3 & 4 and Appendix 3 for further information.
D. The outlets from each of the storage devices on site shall be sized prior to building permit to safely pass the post development peak flows up to the 100-year storm.

Standard 6. Pollutant Reduction
A. Stormwater management systems meet the Greenwich LID Manual requirement to reduce 80% of the annual TSS by treating stormwater runoff from affected areas. Refer to Appendix 4 for further information on TSS removal. Refer to Appendix 2 for a summary of required water quality volumes and provided storage.
B. This project meets the required pollutant reduction standard by providing the required runoff reduction volume in the rain garden and infiltration system.
C. This project meets the required pollutant reduction for groundwater recharge volume by providing the required storage within the rain garden and infiltration system.

**Standard 7. High Load Areas**
A. This site does not and is not proposed to have any areas defined as "High Load Areas" defined in the Greenwich LID Manual.

**Standard 8. Critical Areas**
A. No stormwater discharge is proposed within or near any critical areas as defined by the Greenwich LID Manual.
B. Infiltration from “High Load Areas” are not proposed because there are no “High Load Areas” on site.

**Standard 9. Redevelopment**
A. The project is considered a redevelopment project as defined by the Greenwich LID Manual. The manual defines redevelopment as, “...construction, alteration, or improvement that disturbs the ground surface or increases the impervious area on previously developed sites.”
B. This project meets the standards to the maximum extent practicable given the existing soil conditions and the presence of ledge.
C. N/A
D. Refer to Item B above.
E. It is not proposed to place any stormwater infiltration practices within materials or soils that are deemed hazardous or contaminated.

**Standard 10. Construction Erosion and Sediment Control**
A. A plan to control construction related impacts has been created specifically for this site and project and is included in the drawing set.
B. Sediment and erosion controls such as silt fence, hay bales around area basins, and tree protection will be put in place at the beginning of the project. Controls related to improvements not yet constructed are proposed to be put in place as soon as construction allows. Additionally, the areas of the rain garden and the infiltration system will be inspected upon the completion of the entire project to ensure there is no accumulation of sediment. Any accumulated sediment will be removed from the system.

**Standard 11. Construction Inspections**
A. No surety is proposed.
B.- F. Refer to notes Greenwich LID Notes #1-5 on the proposed site drawings.

**Standard 12. Operation and Maintenance**
A. A long-term operation and maintenance plan, developed to ensure proper function of the stormwater management system is provided with this submission.
B. The operation and maintenance plan takes into consideration applicable items outlined in Sections 5 and 7 of the Greenwich LID Manual.

C.-F. These items will be addressed by way of the “Stormwater Management Practices Maintenance Declaration” (Appendix H of the Greenwich LID Manual) at the time a Certificate of Occupancy is requested.

This document shall serve as the “Stormwater Management Report”.

Standard 14. Illicit Discharges
There are no “illicit discharges” found onsite.

Conclusion

It is our opinion that this project is in conformance with all applicable standards set forth in the Greenwich LID Drainage Manual. If built and constructed according to the design plans this project will have no significant impact to the adjacent neighboring properties, or adverse impact to onsite or downstream hydrology.

Reference:
Appendix 1
Drainage Basin Maps
Appendix 2
Site Calculations
### Water Quality Volume Calculations

**Project:** 12 Meadow Drive  
**Project #:** 10373  
**Date:** 11/19/2021  
**Location:** Greenwich, CT  
**By:** VJH  
**Checked:** BDH  

#### Proposed Southwest Basin

<table>
<thead>
<tr>
<th>HSG</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin Area (A)=</td>
<td>0.485 acres</td>
</tr>
<tr>
<td>Impervious Area=</td>
<td>0.119 acresb</td>
</tr>
<tr>
<td>Lawn Area=</td>
<td>0.366 acres c</td>
</tr>
<tr>
<td>Open Space=</td>
<td>0.000 acresd</td>
</tr>
<tr>
<td>% Impervious (%I)</td>
<td>24.5%</td>
</tr>
<tr>
<td>% Lawn (%T)</td>
<td>75.5%</td>
</tr>
<tr>
<td>% Open Space (%F)</td>
<td>0.0%</td>
</tr>
<tr>
<td>I Runoff Coefficient (RvI)</td>
<td>0.95 e</td>
</tr>
<tr>
<td>T Runoff Coefficient (RvT)</td>
<td>0.20 e</td>
</tr>
<tr>
<td>F Runoff Coefficient (RvF)</td>
<td>0.03 e</td>
</tr>
<tr>
<td>R</td>
<td>0.384 f</td>
</tr>
<tr>
<td>WQV=</td>
<td>0.0155 ac. ft. g</td>
</tr>
</tbody>
</table>

| WQV= | 676.1 ft.³ |  

---

**NOTE:** Table 5-5 is from Section 5.6.3 of the February 2014 Town of Greenwich Drainage Manual

**NOTE:** The high overflow outlet from the Rain Garden system is set at elevation 105.10, which provides 1,615 ft³ of water quality treatment before flowing out of the system.
## Water Quality Volume Calculations

### Project Information
- **Location:** Greenwich, CT
- **Project #:** 10373
- **Date:** 11/19/2021
- **By:** VJH
- **Checked:** BDH

### Infiltration

<table>
<thead>
<tr>
<th>HSG</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin Area (A)=</td>
<td>0.145 acres</td>
</tr>
<tr>
<td>Impervious Area=</td>
<td>0.086 acres</td>
</tr>
<tr>
<td>Lawn Area=</td>
<td>0.059 acres</td>
</tr>
<tr>
<td>Open Space=</td>
<td>0.000 acres</td>
</tr>
<tr>
<td>% Impervious (%I)</td>
<td>59.5%</td>
</tr>
<tr>
<td>% Lawn (%T)</td>
<td>40.5%</td>
</tr>
<tr>
<td>% Open Space (%F)</td>
<td>0.0%</td>
</tr>
<tr>
<td>I Runoff Coefficient (RvI)</td>
<td>0.95</td>
</tr>
<tr>
<td>T Runoff Coefficient (RvT)</td>
<td>0.20</td>
</tr>
<tr>
<td>F Runoff Coefficient (RvF)</td>
<td>0.03</td>
</tr>
</tbody>
</table>

\[ R = \text{Site Cover Runoff Coefficient} = (RvI \times %I) + (RvT \times %T) + (RvF \times %F); \text{ Equation taken from February 2014 Town of Greenwich Drainage Manual section 5.6.3} \]

\[ WQV = \frac{1'' \times R \times A}{12}; \text{ Equation taken from February 2014 Town of Greenwich Drainage Manual section 5.6.3} \]

\[ WQV = 340.9 \text{ ft}^3 \]

---

**NOTE:** Table 5-5 is from Section 5.6.3 of the February 2014 Town of Greenwich Drainage Manual

**NOTE:** The lowest outlet from Infil#1 is set at elevation 107.40 which provides 1,208 ft³ of treatment before flowing out of the system.
# Runoff Reduction Volume Calculations

**Project:** 12 Meadow Drive  
**Project #:** 10373  
**Date:** 11/19/2021  
**Location:** Greenwich, CT  
**By:** VJH  
**Checked:** BDH

## North Basin

Runoff Volumes taken from Hydrocad Report.

<table>
<thead>
<tr>
<th>V&lt;sub&gt;pre&lt;/sub&gt;</th>
<th>Runoff volume_1-year_Pre Development&lt;sup&gt;1&lt;/sup&gt;</th>
<th>=</th>
<th>1,580 ft&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>V&lt;sub&gt;post&lt;/sub&gt;</td>
<td>Runoff volume_1-year_Post Development (No BMPs)&lt;sup&gt;2&lt;/sup&gt;</td>
<td>=</td>
<td>1,423 ft&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>RVR</td>
<td>Runoff volume Reduction (V&lt;sub&gt;post&lt;/sub&gt;-V&lt;sub&gt;pre&lt;/sub&gt;)</td>
<td>=</td>
<td>-157</td>
</tr>
<tr>
<td>RSV</td>
<td>Proposed Storage Volume&lt;sup&gt;3&lt;/sup&gt;</td>
<td>=</td>
<td>N/A</td>
</tr>
<tr>
<td>V&lt;sub&gt;post_BMP&lt;/sub&gt;</td>
<td>Runoff volume_1-year_Post Development with BMPs&lt;sup&gt;4&lt;/sup&gt;</td>
<td>=</td>
<td>N/A</td>
</tr>
</tbody>
</table>

V<sub>post_BMP</sub> < V<sub>pre</sub>  
Therefore the Runoff Volume Reduction Standard is met.

<sup>1</sup> Runoff volume taken from Subcatchment 2S.  
<sup>2</sup> Runoff volume taken from Subcatchment 7S.

## East Basin

Runoff Volumes taken from Hydrocad Report.

<table>
<thead>
<tr>
<th>V&lt;sub&gt;pre&lt;/sub&gt;</th>
<th>Runoff volume_1-year_Pre Development&lt;sup&gt;1&lt;/sup&gt;</th>
<th>=</th>
<th>1,434 ft&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>V&lt;sub&gt;post&lt;/sub&gt;</td>
<td>Runoff volume_1-year_Post Development (No BMPs)&lt;sup&gt;2&lt;/sup&gt;</td>
<td>=</td>
<td>1,326 ft&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>RVR</td>
<td>Runoff volume Reduction (V&lt;sub&gt;post&lt;/sub&gt;-V&lt;sub&gt;pre&lt;/sub&gt;)</td>
<td>=</td>
<td>-108</td>
</tr>
<tr>
<td>RSV</td>
<td>Proposed Storage Volume&lt;sup&gt;3&lt;/sup&gt;</td>
<td>=</td>
<td>N/A</td>
</tr>
<tr>
<td>V&lt;sub&gt;post_BMP&lt;/sub&gt;</td>
<td>Runoff volume_1-year_Post Development with BMPs&lt;sup&gt;4&lt;/sup&gt;</td>
<td>=</td>
<td>N/A</td>
</tr>
</tbody>
</table>

V<sub>post_BMP</sub> < V<sub>pre</sub>  
Therefore the Runoff Volume Reduction Standard is met.

<sup>1</sup> Runoff volume is sum of Subcatchment 3S.  
<sup>2</sup> Runoff volume is sum of Subcatchment 8S.
Runoff Reduction Volume Calculations

Project: 12 Meadow Drive  Project #: 10373  Date: 11/19/2021
Location: Greenwich, CT  By: VJH  Checked: BDH

Southwest Basin


\[ V_{\text{post}} - RSV \]
\[ V_{\text{post,BMP}} < V_{\text{pre}} \] Therefore the Runoff Volume Reduction Standard is met.

\[ V_{\text{pre}} = \text{Runoff volume}_1\text{-year}_1\text{Pre Development}^1 \]
\[ V_{\text{post}} = \text{Runoff volume}_1\text{-year}_1\text{Post Development (No BMPs)}^2 \]
\[ RVR = \text{Runoff volume Reduction (} V_{\text{post}} - V_{\text{pre}}) \]
\[ RSV = \text{Proposed Storage Volume}^3 \]
\[ V_{\text{post,BMP}} = \text{Runoff volume}_1\text{-year}_1\text{Post Development with BMPs}^4 \]
\[ V_{\text{post,BMP}} = V_{\text{post}} - RSV \]

ft^3

2,370
3,437
1,067
2,336
1,101

1 Runoff volume is sum of Subcatchment 1S.
2 Runoff volume is sum of Subcatchment 4S, 5S, and 6S.
3 Storage volume is sum of Ponds 5P and 6P, provided below outlets.
4 Runoff volume taken from Link SW-P.
Groundwater Recharge Volume Calculation

Project: 12 Meadow Drive  Project #: 10373  Date: 11/19/2021
Location: Greenwich, CT  By: VJH  Checked: BDH

**Proposed Conditions**

<table>
<thead>
<tr>
<th>Net Increase In Impervious Area (I)</th>
<th>0.119 acres*</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRCS Hydrologic Soil Group =</td>
<td>B^a</td>
</tr>
<tr>
<td>Design Rainfall =</td>
<td>1.0 inches</td>
</tr>
<tr>
<td>Groundwater Recharge Depth (F) =</td>
<td>0.35^b</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Groundwater Recharge Volume (GRV)= | 0.003 ac. ft. | 151.61 ft.³ |

^a From Natural Resources Conservation Service
^b Table 5-2 from the 2014 Town of Greenwich Drainage Manual Section 5.6.1
^c GRV = F x I from the 2014 Town of Greenwich Drainage Manual Section 5.6.1

* All increase of impervious area occurs where soils are classified as NRCS Hydrologic Soil Group B. No impervious coverage is changed within areas classified as B/D type soils.

NOTE: As the GRV is lower than the Water Quality Volumes and Runoff Volumes, any infiltration systems are designed to infiltrate the larger volume.
Appendix 3
HydroCAD Model
<table>
<thead>
<tr>
<th>Subcatchment</th>
<th>Area (sf)</th>
<th>Impervious (%)</th>
<th>Runoff (cfs)</th>
<th>Depth (&quot;')</th>
</tr>
</thead>
<tbody>
<tr>
<td>1S: Southwest Ex</td>
<td>55,117</td>
<td>14.81</td>
<td>0.51</td>
<td>0.52</td>
</tr>
<tr>
<td>2S: North Ex</td>
<td>27,793</td>
<td>24.99</td>
<td>0.38</td>
<td>0.68</td>
</tr>
<tr>
<td>3S: East Ex</td>
<td>31,431</td>
<td>14.25</td>
<td>0.38</td>
<td>0.55</td>
</tr>
<tr>
<td>4S: Southwest Pr</td>
<td>29,674</td>
<td>5.61</td>
<td>0.17</td>
<td>1.37</td>
</tr>
<tr>
<td>5S: Infiltration</td>
<td>6,333</td>
<td>59.45</td>
<td>0.24</td>
<td>0.85</td>
</tr>
<tr>
<td>6S: Rain Garden</td>
<td>24,641</td>
<td>35.26</td>
<td>0.50</td>
<td>1.42</td>
</tr>
<tr>
<td>7S: North Pr</td>
<td>27,110</td>
<td>21.71</td>
<td>0.35</td>
<td>0.60</td>
</tr>
<tr>
<td>8S: East Pr.</td>
<td>26,645</td>
<td>14.39</td>
<td>0.36</td>
<td>0.63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peak Elev</th>
<th>Storage</th>
<th>Inflow</th>
<th>Outflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>105.45'</td>
<td>721 cf</td>
<td>0.24 cfs 721 cf</td>
<td>0.00 cfs 0 cf</td>
</tr>
<tr>
<td>105.11'</td>
<td>1,630 cf</td>
<td>0.50 cfs 1,741 cf</td>
<td>0.01 cfs 125 cf</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link E-E: Basin E Ex.</th>
<th>Inflow</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.38 cfs 1,434 cf</td>
<td>0.38 cfs 1,434 cf</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link E-P: Basin E Pr.</th>
<th>Inflow</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.36 cfs 1,326 cf</td>
<td>0.36 cfs 1,326 cf</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link N-E: Basin N Ex.</th>
<th>Inflow</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.38 cfs 1,580 cf</td>
<td>0.38 cfs 1,580 cf</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link N-P: Basin N Pr.</th>
<th>Inflow</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.35 cfs 1,423 cf</td>
<td>0.35 cfs 1,423 cf</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link SW-E: Basin SW Ex.</th>
<th>Inflow</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.51 cfs 2,370 cf</td>
<td>0.51 cfs 2,370 cf</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link SW-P: Basin SW Pr.</th>
<th>Inflow</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.17 cfs 1,101 cf</td>
<td>0.17 cfs 1,101 cf</td>
<td></td>
</tr>
</tbody>
</table>
Subcatchment 1S: Southwest Ex
Runoff Area=55,117 sf  14.81% Impervious  Runoff Depth=0.77"
Flow Length=392’  Tc=9.2 min  CN=66  Runoff=0.87 cfs  3,534 cf

Subcatchment 2S: North Ex
Runoff Area=27,793 sf  24.99% Impervious  Runoff Depth=0.97"
Flow Length=218’  Tc=10.4 min  CN=71  Runoff=0.57 cfs  2,257 cf

Subcatchment 3S: East Ex
Runoff Area=31,431 sf  14.25% Impervious  Runoff Depth=0.81"
Tc=5.0 min  CN=67  Runoff=0.62 cfs  2,118 cf

Subcatchment 4S: Southwest Pr
Runoff Area=29,674 sf  5.61% Impervious  Runoff Depth=0.61"
Flow Length=394’  Tc=9.3 min  CN=63  Runoff=0.33 cfs  1,520 cf

Subcatchment 5S: Infiltration
Runoff Area=6,333 sf  59.45% Impervious  Runoff Depth=1.77"
Tc=5.0 min  CN=83  Runoff=0.31 cfs  937 cf

Subcatchment 6S: Rain Garden
Runoff Area=24,641 sf  35.26% Impervious  Runoff Depth=1.17"
Flow Length=134’  Tc=7.0 min  CN=74  Runoff=0.72 cfs  2,411 cf

Subcatchment 7S: North Pr
Runoff Area=27,110 sf  21.71% Impervious  Runoff Depth=0.91"
Flow Length=241’  Tc=8.6 min  CN=69  Runoff=0.55 cfs  2,058 cf

Subcatchment 8S: East Pr.
Runoff Area=26,645 sf  14.39% Impervious  Runoff Depth=0.87"
Tc=5.0 min  CN=69  Runoff=0.58 cfs  1,932 cf

Pond 5P: Infiltration
Peak Elev=105.76’  Storage=937 cf  Inflow=0.31 cfs  937 cf
Outflow=0.00 cfs  0 cf

Pond 6P: Rain Garden #1
Peak Elev=105.12’  Storage=1,655 cf  Inflow=0.72 cfs  2,411 cf
Outflow=0.05 cfs  796 cf

Link E-E: Basin E Ex.
Inflow=0.62 cfs  2,118 cf  Primary=0.62 cfs  2,118 cf

Link E-P: Basin E Pr.
Inflow=0.58 cfs  1,932 cf  Primary=0.58 cfs  1,932 cf

Link N-E: Basin N Ex.
Inflow=0.57 cfs  2,257 cf  Primary=0.57 cfs  2,257 cf

Link N-P: Basin N Pr.
Inflow=0.55 cfs  2,058 cf  Primary=0.55 cfs  2,058 cf

Link SW-E: Basin SW Ex.
Inflow=0.87 cfs  3,534 cf  Primary=0.87 cfs  3,534 cf

Link SW-P: Basin SW Pr.
Inflow=0.33 cfs  2,316 cf  Primary=0.33 cfs  2,316 cf
Type III 24-hr  5-Year Rainfall=4.30"  

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Southwest Ex
Runoff Area=55,117 sf  14.81% Impervious  Runoff Depth=1.30"
Flow Length=392’  Tc=9.2 min  CN=66  Runoff=1.61 cfs  5,972 cf

Subcatchment 2S: North Ex
Runoff Area=27,793 sf  24.99% Impervious  Runoff Depth=1.57"
Flow Length=218’  Tc=10.4 min  CN=71  Runoff=0.98 cfs  3,635 cf

Subcatchment 3S: East Ex
Runoff Area=31,431 sf  14.25% Impervious  Runoff Depth=1.35"
Tc=5.0 min  CN=67  Runoff=1.12 cfs  3,542 cf

Subcatchment 4S: Southwest Pr
Runoff Area=29,674 sf  5.61% Impervious  Runoff Depth=1.09"
Flow Length=394’  Tc=9.3 min  CN=63  Runoff=0.69 cfs  2,696 cf

Subcatchment 5S: Infiltration
Runoff Area=6,333 sf  59.45% Impervious  Runoff Depth=2.55"
Tc=5.0 min  CN=83  Runoff=0.45 cfs  1,345 cf

Subcatchment 6S: Rain Garden
Runoff Area=24,641 sf  35.26% Impervious  Runoff Depth=1.82"
Flow Length=134’  Tc=7.0 min  CN=74  Runoff=1.15 cfs  3,744 cf

Subcatchment 7S: North Pr
Runoff Area=27,110 sf  21.71% Impervious  Runoff Depth=1.49"
Flow Length=241’  Tc=8.6 min  CN=69  Runoff=0.95 cfs  3,359 cf

Subcatchment 8S: East Pr.
Runoff Area=26,645 sf  14.39% Impervious  Runoff Depth=1.43"
Tc=5.0 min  CN=69  Runoff=1.02 cfs  3,183 cf

Pond 5P: Infiltration
Peak Elev=107.41’  Storage=1,208 cf  Inflow=0.45 cfs  1,345 cf
Outflow=0.01 cfs  137 cf

Pond 6P: Rain Garden #1
Peak Elev=105.17’  Storage=1,741 cf  Inflow=1.15 cfs  3,744 cf
Outflow=0.26 cfs  2,128 cf

Link E-E: Basin E Ex.
Inflow=1.12 cfs  3,542 cf
Primary=1.12 cfs  3,542 cf

Link E-P: Basin E Pr.
Inflow=1.02 cfs  3,183 cf
Primary=1.02 cfs  3,183 cf

Link N-E: Basin N Ex.
Inflow=0.98 cfs  3,635 cf
Primary=0.98 cfs  3,635 cf

Link N-P: Basin N Pr.
Inflow=0.95 cfs  3,359 cf
Primary=0.95 cfs  3,359 cf

Link SW-E: Basin SW Ex.
Inflow=1.61 cfs  5,972 cf
Primary=1.61 cfs  5,972 cf

Link SW-P: Basin SW Pr.
Inflow=0.69 cfs  4,961 cf
Primary=0.69 cfs  4,961 cf
Type III 24-hr 10-Year Rainfall=5.10"

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Southwest Ex
Runoff Area=55,117 sf  14.81% Impervious  Runoff Depth=1.83"
Flow Length=392’  Tc=9.2 min  CN=66  Runoff=2.34 cfs  8,419 cf

Subcatchment 2S: North Ex
Runoff Area=27,793 sf  24.99% Impervious  Runoff Depth=2.15"
Flow Length=218’  Tc=10.4 min  CN=71  Runoff=1.37 cfs  4,987 cf

Subcatchment 3S: East Ex
Runoff Area=31,431 sf  14.25% Impervious  Runoff Depth=1.90"
Tc=5.0 min  CN=67  Runoff=1.61 cfs  4,965 cf

Subcatchment 4S: Southwest Pr
Runoff Area=29,674 sf  5.61% Impervious  Runoff Depth=1.58"
Flow Length=394’  Tc=9.3 min  CN=63  Runoff=1.05 cfs  3,903 cf

Subcatchment 5S: Infiltration
Runoff Area=6,333 sf  59.45% Impervious  Runoff Depth=3.26"
Tc=5.0 min  CN=83  Runoff=0.57 cfs  1,723 cf

Subcatchment 6S: Rain Garden
Runoff Area=24,641 sf  35.26% Impervious  Runoff Depth=2.45"
Flow Length=134’  Tc=7.0 min  CN=74  Runoff=1.56 cfs  5,027 cf

Subcatchment 7S: North Pr
Runoff Area=27,110 sf  21.71% Impervious  Runoff Depth=2.06"
Flow Length=241’  Tc=8.6 min  CN=69  Runoff=1.34 cfs  4,644 cf

Subcatchment 8S: East Pr.
Runoff Area=26,645 sf  14.39% Impervious  Runoff Depth=1.99"
Tc=5.0 min  CN=69  Runoff=1.45 cfs  4,424 cf

Pond 5P: Infiltration
Peak Elev=107.42’  Storage=1,210 cf  Inflow=0.57 cfs  1,723 cf
Outflow=0.04 cfs  515 cf

Pond 6P: Rain Garden #1
Peak Elev=105.24’  Storage=1,867 cf  Inflow=1.56 cfs  5,027 cf
Outflow=0.73 cfs  3,412 cf

Link E-E: Basin E Ex.
Inflow=1.61 cfs  4,965 cf  Primary=1.61 cfs  4,965 cf

Link E-P: Basin E Pr.
Inflow=1.45 cfs  4,424 cf  Primary=1.45 cfs  4,424 cf

Link N-E: Basin N Ex.
Inflow=1.37 cfs  4,987 cf  Primary=1.37 cfs  4,987 cf

Link N-P: Basin N Pr.
Inflow=1.34 cfs  4,644 cf  Primary=1.34 cfs  4,644 cf

Link SW-E: Basin SW Ex.
Inflow=2.34 cfs  8,419 cf  Primary=2.34 cfs  8,419 cf

Link SW-P: Basin SW Pr.
Inflow=1.42 cfs  7,829 cf  Primary=1.42 cfs  7,829 cf
Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Southwest Ex
- Runoff Area=55,117 sf  14.81% Impervious  Runoff Depth=2.79"  
  Flow Length=392'  Tc=9.2 min  CN=66  Runoff=3.66 cfs  12,797 cf

Subcatchment 2S: North Ex
- Runoff Area=27,793 sf  24.99% Impervious  Runoff Depth=3.18"  
  Flow Length=218'  Tc=10.4 min  CN=71  Runoff=2.04 cfs  7,358 cf

Subcatchment 3S: East Ex
- Runoff Area=31,431 sf  14.25% Impervious  Runoff Depth=2.86"  
  Tc=5.0 min  CN=67  Runoff=2.49 cfs  7,500 cf

Subcatchment 4S: Southwest Pr
- Runoff Area=29,674 sf  5.61% Impervious  Runoff Depth=2.47"  
  Flow Length=394'  Tc=9.3 min  CN=63  Runoff=1.71 cfs  6,101 cf

Subcatchment 5S: Infiltration
- Runoff Area=6,333 sf  59.45% Impervious  Runoff Depth=4.46"  
  Tc=5.0 min  CN=83  Runoff=0.78 cfs  2,356 cf

Subcatchment 6S: Rain Garden
- Runoff Area=24,641 sf  35.26% Impervious  Runoff Depth=3.53"  
  Flow Length=134'  Tc=7.0 min  CN=74  Runoff=2.26 cfs  7,246 cf

Subcatchment 7S: North Pr
- Runoff Area=27,110 sf  21.71% Impervious  Runoff Depth=3.06"  
  Flow Length=241'  Tc=8.6 min  CN=69  Runoff=2.03 cfs  6,911 cf

Subcatchment 8S: East Pr.
- Runoff Area=26,645 sf  14.39% Impervious  Runoff Depth=2.98"  
  Tc=5.0 min  CN=69  Runoff=2.21 cfs  6,621 cf

Pond 5P: Infiltration
- Peak Elev=107.48'  Storage=1,216 cf  Inflow=0.78 cfs  2,356 cf
  Outflow=0.30 cfs  1,148 cf

Pond 6P: Rain Garden #1
- Peak Elev=105.36'  Storage=2,076 cf  Inflow=2.26 cfs  7,246 cf
  Outflow=1.84 cfs  5,630 cf

Link E-E: Basin E Ex.
- Inflow=2.49 cfs  7,500 cf
  Primary=2.49 cfs  7,500 cf

Link E-P: Basin E Pr.
- Inflow=2.21 cfs  6,621 cf
  Primary=2.21 cfs  6,621 cf

Link N-E: Basin N Ex.
- Inflow=2.04 cfs  7,358 cf
  Primary=2.04 cfs  7,358 cf

Link N-P: Basin N Pr.
- Inflow=2.03 cfs  6,911 cf
  Primary=2.03 cfs  6,911 cf

Link SW-E: Basin SW Ex.
- Inflow=3.66 cfs  12,797 cf
  Primary=3.66 cfs  12,797 cf

Link SW-P: Basin SW Pr.
- Inflow=3.52 cfs  12,879 cf
  Primary=3.52 cfs  12,879 cf
Summary for Subcatchment 1S: Southwest Ex

Runoff = 3.66 cfs @ 12.13 hrs, Volume= 12,797 cf, Depth= 2.79"
Routed to Link SW-E : Basin SW Ex.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
<tr>
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<th>Description</th>
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<tbody>
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<td>98</td>
<td>Paved parking, HSG B</td>
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<tr>
<td>46,953</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>55,117</td>
<td>66</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>46,953</td>
<td>85</td>
<td>85.19% Pervious Area</td>
</tr>
<tr>
<td>8,164</td>
<td>14</td>
<td>14.81% Impervious Area</td>
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</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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<tr>
<td>3.2</td>
<td>66</td>
<td>0.1333</td>
<td>0.34</td>
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<td>Sheet Flow, Grass: Short  n= 0.150   P2= 3.40&quot;</td>
</tr>
<tr>
<td>0.5</td>
<td>46</td>
<td>0.0430</td>
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<td>Shallow Concentrated Flow, Short Grass Pasture</td>
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<tr>
<td>1.5</td>
<td>84</td>
<td>0.0190</td>
<td>0.96</td>
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<td>Shallow Concentrated Flow, Short Grass Pasture</td>
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<td>4.0</td>
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<td>0.0133</td>
<td>0.81</td>
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<td>Shallow Concentrated Flow, Short Grass Pasture</td>
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<td>9.2</td>
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Subcatchment 1S: Southwest Ex

Hydrograph

Type III 24-hr 25-Year Rainfall=6.40"
Runoff Area=55,117 sf
Runoff Volume=12,797 cf
Runoff Depth=2.79"
Flow Length=392'
Tc=9.2 min
CN=66
Summary for Subcatchment 2S: North Ex

Runoff = 2.04 cfs @ 12.15 hrs, Volume= 7,358 cf, Depth= 3.18"
Routed to Link N-E : Basin N Ex.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
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<td>Paved parking, HSG B</td>
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<tr>
<td>401</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>20,447</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>27,793</td>
<td>71</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>20,848</td>
<td>75</td>
<td>75.01% Pervious Area</td>
</tr>
<tr>
<td>6,945</td>
<td>24</td>
<td>24.99% Impervious Area</td>
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</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>8.7</td>
<td>100</td>
<td>0.0250</td>
<td>0.19</td>
<td></td>
<td>Sheet Flow, Sheet Flow</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grass: Short n= 0.150 P2= 3.40&quot;</td>
</tr>
<tr>
<td>1.7</td>
<td>118</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Short Grass Pasture Kv= 7.0 fps</td>
</tr>
</tbody>
</table>

10.4 218 Total

Subcatchment 2S: North Ex

Hydrograph

Type III 24-hr 25-Year Rainfall=6.40"
Runoff Area=27,793 sf
Runoff Volume=7,358 cf
Runoff Depth=3.18"
Flow Length=218'
Tc=10.4 min
CN=71
Summary for Subcatchment 3S: East Ex

Runoff = 2.49 cfs @ 12.08 hrs, Volume= 7,500 cf, Depth= 2.86"
Routed to Link E-E : Basin E Ex.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr  25-Year Rainfall=6.40"

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<th>Description</th>
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<td>Paved parking, HSG B</td>
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<tr>
<td>25,266</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>1,687</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>31,431</td>
<td>67</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>26,953</td>
<td>85</td>
<td>85.75% Pervious Area</td>
</tr>
<tr>
<td>4,478</td>
<td>14</td>
<td>14.25% Impervious Area</td>
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</tbody>
</table>

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

Direct Entry,

Subcatchment 3S: East Ex

Type III 24-hr 25-Year Rainfall=6.40"
Runoff Area=31,431 sf
Runoff Volume=7,500 cf
Runoff Depth=2.86"
Tc=5.0 min
CN=67
Summary for Subcatchment 4S: Southwest Pr

Runoff = 1.71 cfs @ 12.14 hrs, Volume = 6,101 cf, Depth = 2.47"
Routed to Link SW-P: Basin SW Pr.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt = 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
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<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
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<tbody>
<tr>
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<td>Paved parking, HSG B</td>
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<tr>
<td>28,008</td>
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<td>&gt;75% Grass cover, Good, HSG B</td>
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<tr>
<td>29,674</td>
<td>63</td>
<td>Weighted Average</td>
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<tr>
<td>28,008</td>
<td>94.39% Pervious Area</td>
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</tr>
<tr>
<td>1,666</td>
<td>5.61% Impervious Area</td>
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<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>3.2</td>
<td>66</td>
<td>0.1333</td>
<td>0.34</td>
<td></td>
<td>Sheet Flow, Sheet Flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grass: Short  n= 0.150  P2= 3.40&quot;</td>
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<tr>
<td>0.2</td>
<td>19</td>
<td>0.0430</td>
<td>1.45</td>
<td></td>
<td>Shallow Concentrated Flow, Shallow Concentrated</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Short Grass Pasture  Kv= 7.0 fps</td>
</tr>
<tr>
<td>1.1</td>
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<td>1.15</td>
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<td>Shallow Concentrated Flow, Concentrated Flow</td>
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<td></td>
<td>Short Grass Pasture  Kv= 7.0 fps</td>
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<tr>
<td>4.8</td>
<td>235</td>
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<td>Shallow Concentrated Flow</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Short Grass Pasture  Kv= 7.0 fps</td>
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<tr>
<td>9.3</td>
<td>394</td>
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<td>Total</td>
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Subcatchment 4S: Southwest Pr

Type III 24-hr 25-Year Rainfall=6.40"
Runoff Area=29,674 sf
Runoff Volume=6,101 cf
Runoff Depth=2.47"
Flow Length=394'
Tc=9.3 min
CN=63
Summary for Subcatchment 5S: Infiltration

Runoff = 0.78 cfs @ 12.07 hrs, Volume= 2,356 cf, Depth= 4.46"
Routed to Pond 5P: Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,765</td>
<td>98</td>
<td>Paved parking, HSG B</td>
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<tr>
<td>2,568</td>
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<tr>
<td>6,333</td>
<td>83</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>2,568</td>
<td>40.55% Pervious Area</td>
<td></td>
</tr>
<tr>
<td>3,765</td>
<td>59.45% Impervious Area</td>
<td></td>
</tr>
</tbody>
</table>

Tc=5.0 min

Subcatchment 5S: Infiltration

Type III 24-hr 25-Year Rainfall=6.40"
Runoff Area=6,333 sf
Runoff Volume=2,356 cf
Runoff Depth=4.46"
Tc=5.0 min
CN=83
Summary for Subcatchment 6S: Rain Garden

Runoff = 2.26 cfs @ 12.10 hrs, Volume = 7,246 cf, Depth = 3.53"
Routed to Pond 6P : Rain Garden #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
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<tbody>
<tr>
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<td>Paved parking, HSG B</td>
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<tr>
<td>15,953</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>24,641</td>
<td>74</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>15,953</td>
<td>64.74%</td>
<td>Pervious Area</td>
</tr>
<tr>
<td>8,688</td>
<td>35.26%</td>
<td>Impervious Area</td>
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</table>

Tc Length Slope Velocity Capacity Description
(min) (feet) (ft/ft) (ft/sec) (cfs)
6.5 100 0.0525 0.26 Sheet Flow, sheet
Grass: Short n= 0.150 P2= 3.40"
0.5 34 0.0260 1.13 Shallow Concentrated Flow, shallow
Short Grass Pasture Kv= 7.0 fps

Subcatchment 6S: Rain Garden

Type III 24-hr 25-Year Rainfall=6.40"
Runoff Area=24,641 sf
Runoff Volume=7,246 cf
Runoff Depth=3.53"
Flow Length=134'
Tc=7.0 min
CN=74
Summary for Subcatchment 7S: North Pr

Runoff = 2.03 cfs @ 12.12 hrs, Volume= 6,911 cf, Depth= 3.06"
Routed to Link N-P : Basin N Pr.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
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<th>Area (sf)</th>
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<tbody>
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<td>401</td>
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<tr>
<td>20,823</td>
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<td>&gt;75% Grass cover, Good, HSG B</td>
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<td>27,110</td>
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<td>Weighted Average</td>
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<td>21,224</td>
<td>78.29% Pervious Area</td>
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</tr>
<tr>
<td>5,886</td>
<td>21.71% Impervious Area</td>
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</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5</td>
<td>73</td>
<td>0.0280</td>
<td>0.19</td>
<td></td>
<td>Sheet Flow, Sheet Flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grass: Short n= 0.150 P2= 3.40&quot;</td>
</tr>
<tr>
<td>0.2</td>
<td>34</td>
<td>0.0150</td>
<td>2.49</td>
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<td>Shallow Concentrated Flow, Concentrated Flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
</tr>
<tr>
<td>1.9</td>
<td>134</td>
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<td>1.18</td>
<td></td>
<td>Shallow Concentrated Flow, Concentrated Flow</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Short Grass Pasture Kv= 7.0 fps</td>
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<tr>
<td>8.6</td>
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<td>Total</td>
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<td></td>
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Subcatchment 7S: North Pr

Hydrograph

Type III 24-hr 25-Year Rainfall=6.40"
Runoff Area=27,110 sf
Runoff Volume=6,911 cf
Runoff Depth=3.06"
Flow Length=241'
Tc=8.6 min
CN=69
Summary for Subcatchment 8S: East Pr.

Runoff = 2.21 cfs @ 12.08 hrs, Volume= 6,621 cf, Depth= 2.98"
Routed to Link E-P : Basin E Pr.

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
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<tbody>
<tr>
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<td>Paved parking, HSG B</td>
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<tr>
<td>20,178</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>1,687</td>
<td>80</td>
<td>&gt;75% Grass cover, Good, HSG D</td>
</tr>
<tr>
<td>*</td>
<td>89</td>
<td>Gravel/Playground</td>
</tr>
<tr>
<td>26,645</td>
<td>69</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>22,810</td>
<td>85.61% Pervious Area</td>
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</tr>
<tr>
<td>3,835</td>
<td>14.39% Impervious Area</td>
<td></td>
</tr>
</tbody>
</table>

Tc=5.0 min

Subcatchment 8S: East Pr.

Hydrograph

Type III 24-hr 25-Year Rainfall=6.40"
Runoff Area=26,645 sf
Runoff Volume=6,621 cf
Runoff Depth=2.98"
Tc=5.0 min
CN=69
Summary for Pond 5P: Infiltration

Inflow Area = 6,333 sf, 59.45% Impervious, Inflow Depth = 4.46" for 25-Year event
Inflow = 0.78 cfs @ 12.07 hrs, Volume= 2,356 cf
Outflow = 0.30 cfs @ 12.30 hrs, Volume= 1,148 cf, Atten= 61%, Lag= 13.7 min
Primary = 0.30 cfs @ 12.30 hrs, Volume= 1,148 cf

Routed to Link SW-P : Basin SW Pr.

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 107.48' @ 12.30 hrs  Surf.Area= 1,007 sf  Storage= 1,216 cf

Plug-Flow detention time= 231.5 min calculated for 1,147 cf (49% of inflow)
Center-of-Mass det. time= 118.0 min (920.9 - 802.9)

Volume Invert Avail.Storage Storage Description
#1A 104.40' 117 cf 18.50'W x 49.00'L x 2.00'H Field A
1,813 cf Overall - 1,521 cf Embedded = 292 cf x 40.0% Voids
#2A 104.40' 1,087 cf Concrete Galley 4x8x2 x 24 Inside #1
Inside= 42.0"W x 21.0"H => 6.04 sf x 7.50'L = 45.3 cf
Outside= 48.0"W x 24.0"H => 7.92 sf x 8.00'L = 63.4 cf
24 Chambers in 4 Rows
#3 106.40' 64 cf Custom Stage Data (Prismatic) Listed below (Recalc)
1,268 cf Total Available Storage

Storage Group A created with Chamber Wizard

Elevation Surf.Area Voids Inc.Store Cum.Store
(2000) (sq-ft) (%) (cubic-feet) (cubic-feet)
106.40 4 0.0 0 0
107.40 4 100.0 4 4
107.41 100 100.0 59 64
108.00 100 100.0 59 64

Device Routing Invert Outlet Devices
#1 Primary 107.40' 4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.30 cfs @ 12.30 hrs  HW=107.48' TW=0.00' (Dynamic Tailwater)
↑1= Sharp-Crested Rectangular Weir (Weir Controls 0.30 cfs @ 0.93 fps)
Pond 5P: Infiltration - Chamber Wizard Field A

Chamber Model = Concrete Galley  4x8x2 (Concrete Galley, UCPI 24" Low Profile Galley or equivalent)
Inside = 42.0"W x 21.0"H => 6.04 sf x 7.50'L = 45.3 cf
Outside = 48.0"W x 24.0"H => 7.92 sf x 8.00'L = 63.4 cf

48.0" Wide + 6.0" Spacing = 54.0" C-C Row Spacing

6 Chambers/Row x 8.00' Long = 48.00' Row Length + 6.0" End Stone x 2 = 49.00' Base Length
4 Rows x 48.0" Wide + 6.0" Spacing x 3 + 6.0" Side Stone x 2 = 18.50' Base Width
24.0" Chamber Height = 2.00' Field Height

24 Chambers x 45.3 cf = 1,087.2 cf Chamber Storage
24 Chambers x 63.4 cf = 1,520.6 cf Displacement

1,813.0 cf Field - 1,520.6 cf Chambers = 292.4 cf Stone x 40.0% Voids = 116.9 cf Stone Storage

Chamber Storage + Stone Storage = 1,204.1 cf = 0.028 af
Overall Storage Efficiency = 66.4%
Overall System Size = 49.00' x 18.50' x 2.00'

24 Chambers
67.1 cy Field
10.8 cy Stone
Pond 5P: Infiltration

Inflow Area=6,333 sf
Peak Elev=107.48'
Storage=1,216 cf

Time (hours)

Flow (cfs)
## Stage-Area-Storage for Pond 5P: Infiltration

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Summary for Pond 6P: Rain Garden #1

Inflow Area = 24,641 sf, 35.26% Impervious, Inflow Depth = 3.53” for 25-Year event

Inflow = 2.26 cfs @ 12.10 hrs, Volume= 7,246 cf
Outflow = 1.84 cfs @ 12.16 hrs, Volume= 5,630 cf, Attenu= 19%, Lag= 3.7 min
Primary = 1.84 cfs @ 12.16 hrs, Volume= 5,630 cf

Routed to Link SW-P : Basin SW Pr.

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 105.36’ @ 12.16 hrs Storage= 2,076 cf

Plug-Flow detention time= 132.0 min calculated for 5,630 cf (78% of inflow)
Center-of-Mass det. time= 49.3 min (876.0 - 826.7)

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Device Routing Invert Outlet Devices

#1 Primary 105.10’ 5.0’ long x 0.5’ breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.84 cfs @ 12.16 hrs HW=105.36’ TW=0.00’ (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 1.84 cfs @ 1.43 fps)
Pond 6P: Rain Garden #1

Inflow Area=24,641 sf
Peak Elev=105.36'
Storage=2,076 cf

Hydrograph

2.26 cfs
1.84 cfs
### Stage-Area-Storage for Pond 6P: Rain Garden #1

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Summary for Link E-E: Basin E Ex.

Inflow Area = 31,431 sf, 14.25% Impervious, Inflow Depth = 2.86" for 25-Year event
Inflow = 2.49 cfs @ 12.08 hrs, Volume = 7,500 cf
Primary = 2.49 cfs @ 12.08 hrs, Volume = 7,500 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

Link E-E: Basin E Ex.

Inflow Area=31,431 sf
Summary for Link E-P: Basin E Pr.

Inflow Area = 26,645 sf, 14.39% Impervious, Inflow Depth = 2.98" for 25-Year event

Inflow = 2.21 cfs @ 12.08 hrs, Volume= 6,621 cf
Primary = 2.21 cfs @ 12.08 hrs, Volume= 6,621 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Summary for Link N-E: Basin N Ex.

Inflow Area = 27,793 sf, 24.99% Impervious, Inflow Depth = 3.18" for 25-Year event
Inflow = 2.04 cfs @ 12.15 hrs, Volume = 7,358 cf
Primary = 2.04 cfs @ 12.15 hrs, Volume = 7,358 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

Inflow Area = 27,793 sf
Summary for Link N-P: Basin N Pr.

Inflow Area = 27,110 sf, 21.71% Impervious, Inflow Depth = 3.06" for 25-Year event
Inflow = 2.03 cfs @ 12.12 hrs, Volume= 6,911 cf
Primary = 2.03 cfs @ 12.12 hrs, Volume= 6,911 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

Link N-P: Basin N Pr.

Hydrograph
Summary for Link SW-E: Basin SW Ex.

Inflow Area = 55,117 sf, 14.81% Impervious, Inflow Depth = 2.79" for 25-Year event
Inflow = 3.66 cfs @ 12.13 hrs, Volume= 12,797 cf
Primary = 3.66 cfs @ 12.13 hrs, Volume= 12,797 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

Link SW-E: Basin SW Ex.

Hydrograph

Inflow Area=55,117 sf
Summary for Link SW-P: Basin SW Pr.

Inflow Area = 60,648 sf, 23.28% Impervious, Inflow Depth = 2.55" for 25-Year event

Inflow = 3.52 cfs @ 12.15 hrs, Volume= 12,879 cf

Primary = 3.52 cfs @ 12.15 hrs, Volume= 12,879 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

Link SW-P: Basin SW Pr.

Hydrograph

Inflow Area=60,648 sf
Type III 24-hr 50-Year Rainfall = 7.60"

Time span = 0.00-28.00 hrs, dt = 0.01 hrs, 2801 points x 2
Runoff by SCS TR-20 method, UH = SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Southwest Ex
Runoff Area = 55,117 sf  Impervious Runoff Depth = 3.73"
Flow Length = 392'  Tc = 9.2 min  CN = 66  Runoff = 4.95 cfs  17,154 cf

Subcatchment 2S: North Ex
Runoff Area = 27,793 sf  Impervious Runoff Depth = 4.18"
Flow Length = 218'  Tc = 10.4 min  CN = 71  Runoff = 2.70 cfs  9,682 cf

Subcatchment 3S: East Ex
Runoff Area = 31,431 sf  Impervious Runoff Depth = 3.82"
Flow Length = 394'  Tc = 9.3 min  CN = 67  Runoff = 3.35 cfs  10,015 cf

Subcatchment 4S: Southwest Pr
Runoff Area = 29,674 sf  Impervious Runoff Depth = 3.37"
Flow Length = 241'  Tc = 8.6 min  CN = 69  Runoff = 2.70 cfs  9,682 cf

Subcatchment 5S: Infiltration
Runoff Area = 6,333 sf  Impervious Runoff Depth = 5.60"
Flow Length = 134'  Tc = 7.0 min  CN = 74  Runoff = 2.93 cfs  9,394 cf

Subcatchment 6S: Rain Garden
Runoff Area = 24,641 sf  Impervious Runoff Depth = 4.57"
Flow Length = 184’  Tc = 5.0 min  CN = 74  Runoff = 2.93 cfs  9,394 cf

Subcatchment 7S: North Pr
Runoff Area = 27,110 sf  Impervious Runoff Depth = 4.05"
Flow Length = 241’  Tc = 8.8 min  CN = 69  Runoff = 2.70 cfs  9,142 cf

Subcatchment 8S: East Pr.
Runoff Area = 26,645 sf  Impervious Runoff Depth = 3.96"
Flow Length = 134’  Tc = 7.0 min  CN = 74  Runoff = 2.93 cfs  9,394 cf

Pond 5P: Infiltration
Peak Elev = 107.57’  Storage = 1,224 cf  Inflow = 0.96 cfs  2,953 cf
Outflow = 0.89 cfs  1,745 cf

Pond 6P: Rain Garden #1
Peak Elev = 105.43’  Storage = 2,202 cf  Inflow = 2.93 cfs  9,394 cf
Outflow = 2.68 cfs  7,778 cf

Link E-E: Basin E Ex.
Inflow = 3.35 cfs  10,015 cf  Primary = 3.35 cfs  10,015 cf

Link E-P: Basin E Pr.
Inflow = 2.94 cfs  8,791 cf  Primary = 2.94 cfs  8,791 cf

Link N-E: Basin N Ex.
Inflow = 2.70 cfs  9,682 cf  Primary = 2.70 cfs  9,682 cf

Link N-P: Basin N Pr.
Inflow = 2.70 cfs  9,142 cf  Primary = 2.70 cfs  9,142 cf

Link SW-E: Basin SW Ex.
Inflow = 4.95 cfs  17,154 cf  Primary = 4.95 cfs  17,154 cf

Link SW-P: Basin SW Pr.
Inflow = 5.89 cfs  17,845 cf  Primary = 5.89 cfs  17,845 cf
Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Southwest Ex
- Runoff Area=55,117 sf  14.81% Impervious  Runoff Depth=4.99"
- Flow Length=392’  Tc=9.2 min  CN=66  Runoff=6.63 cfs  22,898 cf

Subcatchment 2S: North Ex
- Runoff Area=27,793 sf  24.99% Impervious  Runoff Depth=5.49"
- Flow Length=218’  Tc=10.4 min  CN=71  Runoff=3.54 cfs  12,710 cf

Subcatchment 3S: East Ex
- Runoff Area=31,431 sf  14.25% Impervious  Runoff Depth=5.09"
- Tc=5.0 min  CN=67  Runoff=4.46 cfs  13,322 cf

Subcatchment 4S: Southwest Pr
- Runoff Area=29,674 sf  5.61% Impervious  Runoff Depth=4.56"
- Flow Length=394’  Tc=9.3 min  CN=63  Runoff=3.25 cfs  11,280 cf

Subcatchment 5S: Infiltration
- Runoff Area=6,333 sf  59.45% Impervious  Runoff Depth=7.03"
- Tc=5.0 min  CN=83  Runoff=1.20 cfs  3,711 cf

Subcatchment 6S: Rain Garden
- Runoff Area=24,641 sf  35.26% Impervious  Runoff Depth=5.93"
- Flow Length=134’  Tc=7.0 min  CN=74  Runoff=3.77 cfs  12,168 cf

Subcatchment 7S: North Pr
- Runoff Area=27,110 sf  21.71% Impervious  Runoff Depth=5.34"
- Flow Length=241’  Tc=8.6 min  CN=69  Runoff=3.56 cfs  12,059 cf

Subcatchment 8S: East Pr.
- Runoff Area=26,645 sf  14.39% Impervious  Runoff Depth=5.24"
- Tc=5.0 min  CN=69  Runoff=3.90 cfs  11,633 cf

Pond 5P: Infiltration
- Peak Elev=107.60’  Storage=1,228 cf  Inflow=1.20 cfs  3,711 cf  Outflow=1.20 cfs  2,503 cf

Pond 6P: Rain Garden #1
- Peak Elev=105.49’  Storage=2,313 cf  Inflow=3.77 cfs  12,168 cf  Outflow=3.52 cfs  10,553 cf

Link E-E: Basin E Ex.
- Inflow=4.46 cfs  13,322 cf  Primary=4.46 cfs  13,322 cf

Link E-P: Basin E Pr.
- Inflow=3.90 cfs  11,633 cf  Primary=3.90 cfs  11,633 cf

Link N-E: Basin N Ex.
- Inflow=3.54 cfs  12,710 cf  Primary=3.54 cfs  12,710 cf

Link N-P: Basin N Pr.
- Inflow=3.56 cfs  12,059 cf  Primary=3.56 cfs  12,059 cf

Link SW-E: Basin SW Ex.
- Inflow=6.63 cfs  22,898 cf  Primary=6.63 cfs  22,898 cf

Link SW-P: Basin SW Pr.
- Inflow=7.74 cfs  24,336 cf  Primary=7.74 cfs  24,336 cf
Appendix 4
TSS Removal and 72 Hour Drawdown Calculations
# Total Suspended Solids Removal (TSS)

| Project: | 12 Meadow Drive | Project #: | 10373 | Date: | 11/19/2021 |
| Location: | Greenwich, CT | By: | VJH | Checked: | BDH |

## Rain Garden Basin

<table>
<thead>
<tr>
<th>A BMP&lt;sup&gt;a&lt;/sup&gt;</th>
<th>B TSS removal Rate&lt;sup&gt;a&lt;/sup&gt;</th>
<th>C Starting TSS Load&lt;sup&gt;b&lt;/sup&gt;</th>
<th>D Amount Removed (B x C)</th>
<th>E Remaining Load (C - D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Deep Sump Catch Basins</td>
<td>25.0%</td>
<td>100.0%</td>
<td>25.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>2 Bioretention - Rain Gardens, Tree Filters,</td>
<td>90.0%</td>
<td>75.0%</td>
<td>67.5%</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

## Infiltration Basin

<table>
<thead>
<tr>
<th>A BMP&lt;sup&gt;a&lt;/sup&gt;</th>
<th>B TSS removal Rate&lt;sup&gt;a&lt;/sup&gt;</th>
<th>C Starting TSS Load&lt;sup&gt;b&lt;/sup&gt;</th>
<th>D Amount Removed (B x C)</th>
<th>E Remaining Load (C - D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Deep Sump Catch Basins</td>
<td>25.0%</td>
<td>100.0%</td>
<td>25.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>2 Infiltration Basins &amp; Infiltration Trenches</td>
<td>90.0%</td>
<td>75.0%</td>
<td>67.5%</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

---

<sup>a</sup> Refer to Table 5-6 from February 2014 Town of Greenwich Drainage Manual section 5.6.3

<sup>b</sup> Equal to the remaining load from the previous BMP
### 72-Hour Draw Down Calculations

**Project:** 12 Meadow Drive  
**Project #:** 10373  
**Date:** 11/19/2021  
**Location:** Greenwich, CT  
**By:** VJH  
**Checked:** BDH

<table>
<thead>
<tr>
<th>Rain Garden</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Area of Infiltration System (SA)</td>
<td>1,450 ft²</td>
</tr>
<tr>
<td>Volume of Storage of Infiltration System (VS)</td>
<td>1,615 ft³</td>
</tr>
<tr>
<td>Infiltration Rate (IR)</td>
<td>1.02 in/hr&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Theoretical Water Column Height</td>
<td>13.37 in&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Time of Draw Down</td>
<td>13.10 hr&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infiltration System</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Area of Infiltration System (SA)</td>
<td>907 ft²</td>
</tr>
<tr>
<td>Volume of Storage of Infiltration System (VS)</td>
<td>1,208 ft³</td>
</tr>
<tr>
<td>Infiltration Rate (IR)</td>
<td>1.02 in/hr&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Theoretical Water Column Height</td>
<td>15.99 in&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Time of Draw Down</td>
<td>15.68 hr&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

---

<sup>a</sup> Theoretical Water Column Height (WCH) = VS/SA*12

<sup>b</sup> Time of Draw Down = WCH/IR

<sup>c</sup> Per test pit results, soils are "sandy loam", which is represented within the NRCS Soil Classification results as well. To be conservative, the infiltration rate for sandy loam is taken to be 1.02 in/hr per the Town of Greenwich Drainage Manual. Infiltration Rate (IR) Taken From February 2014 Town of Greenwich Drainage Manual Appendix B, Table B-2.
Appendix 5
Soils Test Logs and NRCS Soils Report
SOIL EVALUATION TEST RESULTS

Project Name: 12 Meadow Drive, Greenwich, CT

Deep Test Hole # 1

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Type</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>104.95</td>
<td>Topsoil</td>
<td>0&quot;-9&quot;</td>
</tr>
<tr>
<td>103.70</td>
<td>Sandy Loam</td>
<td>9&quot;-24&quot;</td>
</tr>
<tr>
<td>98.87</td>
<td>Blue Gray Sand and Gravel w/ Mottling</td>
<td>24&quot;-82&quot;</td>
</tr>
</tbody>
</table>

Saturated Hydraulic Conductivity Test Location #:

Ground Elevation: 

Top Elevation of Proposed Infiltration System: 

Bottom Elevation of Proposed Infiltration System: 

Elevation of Test*: 

Test Method (check one of the following acceptable methods**): 

- Borehole infiltration test (NHDES, 2008) 
- Guelph permeameter - ASTM D5126-90 Method 
- Falling head permeameter - ASTM D5126-90 Method 
- Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods 
- Amoozemeter or Amoozegar (constant head) permeameter - Amoozegar 1992 

Attach field data forms for the respective infiltration test method.

Calculated Saturated Hydraulic Conductivity Rate: 

**A percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.

* All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.

* All field infiltration tests must be conducted in the actual location and soil layer where stormwater infiltration is proposed.

TEST CERTIFICATION

I HERBY CERTIFY THAT THE DATA CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Bret Holzwarth, P.E. 8/10/2021

Name of Test Conductor (deep test pit) Signature of Test Conductor Date

Name of Test Conductor (percolation test) Signature of Test Conductor Date
### SOIL EVALUATION TEST RESULTS

**Project Name:**
12 Meadow Drive, Greenwich, CT

**Project Address:**

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Type</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>102.25</td>
<td>Topsoil</td>
<td>0&quot;-9&quot;</td>
</tr>
<tr>
<td>100.33</td>
<td>Sandy Loam</td>
<td>9&quot;-32&quot;</td>
</tr>
<tr>
<td>96.50</td>
<td>Blue Gray Sand and Gravel,</td>
<td>32&quot;-78&quot;</td>
</tr>
<tr>
<td></td>
<td>Moderately Compacted w/ Mottling</td>
<td></td>
</tr>
</tbody>
</table>

**Elevation Depth in Inches**

- 102.08: Mottling 11"
- 97.25: Groundwater 69"
- Ledge n/a

*All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.*

**Saturated Hydraulic Conductivity Test Location #:**

- Ground Elevation:
- Top Elevation of Proposed Infiltration System:
- Bottom Elevation of Proposed Infiltration System:
- Elevation of Test:

**Test Method (check one of the following acceptable methods**):

- Borehole infiltration test (NHDES, 2008)
- Guelph permeameter - ASTM D5126-90 Method
- Falling head permeameter - ASTM D5126-90 Method
- Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods
- Amoozemeter or Amoozegar (constant head) permeameter - Amoozegar 1992

**Calculated Saturated Hydraulic Conductivity Rate:**

**TEST CERTIFICATION**

I HERBY CERTIFY THAT THE DATA CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Bret Holzwarth, P.E.  
8/10/2021

<table>
<thead>
<tr>
<th>Name of Test Conductor (deep test pit)</th>
<th>Signature of Test Conductor</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Test Conductor (percolation test)</td>
<td>Signature of Test Conductor</td>
<td>Date</td>
</tr>
</tbody>
</table>

**Name of Test Conductor:**

- Deep test pit: Bret Holzwarth, P.E.
- Percolation test: Bret Holzwarth, P.E.

**Date:**

- Deep test pit: 8/10/2021
- Percolation test: 8/10/2021

**Notice:**

*A percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.*

*All field infiltration tests must be conducted in the actual location and soil layer where stormwater infiltration is proposed.*
Town of Greenwich
Department of Public Works - Engineering Division
Town Hall - 101 Field Point Road, Greenwich, CT 06830
Phone 203-622-7767 - Fax 203-622-7747

Project Name: 12 Meadow Drive, Greenwich, CT

SOIL EVALUATION TEST RESULTS

Deep Test Hole # 3  Ground Elevation: 108.7

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Type</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>108.20</td>
<td>Topsoil</td>
<td>0&quot;-6&quot;</td>
</tr>
<tr>
<td>106.70</td>
<td>Fill</td>
<td>6&quot;-24&quot;</td>
</tr>
<tr>
<td>106.03</td>
<td>Tan Sandy Loam</td>
<td>24&quot;-32&quot;</td>
</tr>
<tr>
<td>104.95</td>
<td>Tan Sandy Loam w/ Mottling</td>
<td>32&quot;-45&quot;</td>
</tr>
<tr>
<td>102.45</td>
<td>Compacted Sand and Gravel w/ Mottling</td>
<td>45&quot;-75&quot;</td>
</tr>
</tbody>
</table>

Saturated Hydraulic Conductivity Test Location #:

Ground Elevation:
Top Elevation of Proposed Infiltration System:
Bottom Elevation of Proposed Infiltration System:
Elevation of Test*:

Test Method (check one of the following acceptable methods**):

- Borehole infiltration test (NHDES, 2008)
- Guelph permeameter - ASTM D5126-90 Method
- Falling head permeameter - ASTM D5126-90 Method
- Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods
- Amoozemeter or Amoozegar (constant head) permeameter - Amoozegar 1992

Attach field data forms for the respective infiltration test method.

Calculated Saturated Hydraulic Conductivity Rate:

**A percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.

*all field infiltration tests must be conducted in the actual location and soil layer where stormwater infiltration is proposed

* All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.

TEST CERTIFICATION

I HERBY CERTIFY THAT THE DATA CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Bret Holzwarth, P.E.  8/10/2021

Name of Test Conductor (deep test pit)  Signature of Test Conductor  Date

Name of Test Conductor (percolation test)  Signature of Test Conductor  Date
## SOIL EVALUATION TEST RESULTS

**Project Name:** 12 Meadow Drive, Greenwich, CT

**Engineering Firm's Name:** Redniss & Mead

**Engineer's Name:** Bret D. Holzwarth

### Soil Evaluation Test Results

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Type</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>107.20</td>
<td>Topsoil</td>
<td>0&quot;-6&quot;</td>
</tr>
<tr>
<td>106.03</td>
<td>Fill</td>
<td>6&quot;-20&quot;</td>
</tr>
<tr>
<td>104.78</td>
<td>Tan Sandy Loam</td>
<td>20&quot;-35&quot;</td>
</tr>
<tr>
<td>102.78</td>
<td>Tan Sandy Loam w/ Mottling</td>
<td>35&quot;-59&quot;</td>
</tr>
<tr>
<td>100.95</td>
<td>Compacted Sand and Gravel w/ Mottling</td>
<td>59&quot;-81&quot;</td>
</tr>
</tbody>
</table>

**Ground Elevation:** 107.7

**Test Method (check one of the following acceptable methods**):
- Borehole infiltration test (NHDES, 2008)
- Guelph permeameter - ASTM D5126-90 Method
- Falling head permeameter - ASTM D5126-90 Method
- Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods
- Amoozemeter or Amoozegar (constant head) permeameter - Amoozegar 1992

*All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.*

### Soil Evaluation Test Results

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Depth in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>104.78</td>
<td>Mottling 35&quot;</td>
</tr>
<tr>
<td>101.03</td>
<td>Groundwater 80&quot;</td>
</tr>
<tr>
<td>-</td>
<td>Ledge n/a</td>
</tr>
</tbody>
</table>

**Calculated Saturated Hydraulic Conductivity Rate:**

**Percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.**

### Test Certification

**Bret Holzwarth, P.E.**

**Date:** 8/10/2021

**Name of Test Conductor (deep test pit)**

**Signature of Test Conductor**

**Name of Test Conductor (percolation test)**

**Signature of Test Conductor**
SOIL EVALUATION TEST RESULTS

<table>
<thead>
<tr>
<th>Deep Test Hole # 5</th>
<th>Ground Elevation: 105.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>Soil Type</td>
</tr>
<tr>
<td>105.37</td>
<td>Topsoil</td>
</tr>
<tr>
<td>103.53</td>
<td>Sandy Fill</td>
</tr>
<tr>
<td>103.20</td>
<td>Original Topsoil</td>
</tr>
<tr>
<td>100.37</td>
<td>Brown Sandy Loam</td>
</tr>
<tr>
<td>99.20</td>
<td>Sand and Gravel w/ Mottling</td>
</tr>
</tbody>
</table>

Elevation Depth in Inches

100.45 Mottling 63"
-
Groundwater n/a
-
Ledge n/a

**A percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.

*all field infiltration tests must be conducted in the actual location and soil layer where stormwater infiltration is proposed

TEST CERTIFICATION

I HERBY CERTIFY THAT THE DATA CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Bret Holzwarth, P.E. 8/10/2021

Name of Test Conductor (deep test pit)
Signature of Test Conductor Date

Name of Test Conductor (percolation test)
Signature of Test Conductor Date
SOIL EVALUATION TEST RESULTS

Deep Test Hole # 6  Ground Elevation: 106.5

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Type</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
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<td>105.92</td>
<td>Topsoil</td>
<td>0&quot;-7&quot;</td>
</tr>
<tr>
<td>104.75</td>
<td>Sandy Fill</td>
<td>7&quot;-21&quot;</td>
</tr>
<tr>
<td>104.33</td>
<td>Original Topsoil</td>
<td>21&quot;-26&quot;</td>
</tr>
<tr>
<td>103.75</td>
<td>Weathered Rock</td>
<td>26&quot;-33&quot;</td>
</tr>
<tr>
<td>103.00</td>
<td>Dark Brown Sandy Loam</td>
<td>33&quot;-42&quot;</td>
</tr>
<tr>
<td>102</td>
<td>Orange Brown Sandy Loam</td>
<td>42&quot;-54&quot;</td>
</tr>
<tr>
<td>100.5</td>
<td>Sand and Gravel w/ Mottling</td>
<td>54&quot;-72&quot;</td>
</tr>
</tbody>
</table>

Ground Elevation: 106.5

Saturated Hydraulic Conductivity Test Location #:

<table>
<thead>
<tr>
<th>Ground Elevation:</th>
<th>Top Elevation of Proposed Infiltration System:</th>
<th>Bottom Elevation of Proposed Infiltration System:</th>
<th>Elevation of Test*: Test Method (check one of the following acceptable methods**):</th>
</tr>
</thead>
<tbody>
<tr>
<td>102.00</td>
<td></td>
<td></td>
<td>Borehole infiltration test (NHDES, 2008)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Guelph permeameter - ASTM D5126-90 Method</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Falling head permeameter - ASTM D5126-90 Method</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Amoozemeter or Amoozegar (constant head) permeameter - Amoozegar 1992</td>
</tr>
</tbody>
</table>

Attach field data forms for the respective infiltration test method.

Calculated Saturated Hydraulic Conductivity Rate: ____________________________

**A percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.

*all field infiltration tests must be conducted in the actual location and soil layer where stormwater infiltration is proposed

* All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.

TEST CERTIFICATION

I HERBY CERTIFY THAT THE DATA CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Bret Holzwarth, P.E.  8/10/2021

Name of Test Conductor (deep test pit) ____________________________ Signature of Test Conductor ____________________________ Date ____________________________

Name of Test Conductor (percolation test) ____________________________ Signature of Test Conductor ____________________________ Date ____________________________
SOIL EVALUATION TEST RESULTS

<table>
<thead>
<tr>
<th>Deep Test Hole # 7</th>
<th>Ground Elevation: 109.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>Soil Type</td>
</tr>
<tr>
<td>109.07</td>
<td>Topsoil</td>
</tr>
<tr>
<td>107.65</td>
<td>Brown Sandy Loam</td>
</tr>
<tr>
<td>106.57</td>
<td>Orange Brown Sandy Loam</td>
</tr>
</tbody>
</table>

Saturated Hydraulic Conductivity Test Location #:

Ground Elevation: 
Top Elevation of Proposed Infiltration System: 
Bottom Elevation of Proposed Infiltration System: 
Elevation of Test*: 

Test Method (check one of the following acceptable methods**):
- Borehole infiltration test (NHDES, 2008)
- Guelph permeameter - ASTM D5126-90 Method
- Falling head permeameter - ASTM D5126-90 Method
- Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods
- Amoozemeter or Amoozegar (constant head) permeameter - Amoozegar 1992

Attach field data forms for the respective infiltration test method.

Calculated Saturated Hydraulic Conductivity Rate: 

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Name of Test Conductor (deep test pit) ________________________________
Signature of Test Conductor ________________ Date 8/10/2021

Name of Test Conductor (percolation test) ________________________________
Signature of Test Conductor ________________ Date ____________________
**SOIL EVALUATION TEST RESULTS**

**Project Name:**
**Project Address:** 12 Meadow Drive, Greenwich, CT

<table>
<thead>
<tr>
<th>Deep Test Hole # 8</th>
<th>Ground Elevation: 107.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>Soil Type</td>
</tr>
<tr>
<td>106.67</td>
<td>Topsoil</td>
</tr>
<tr>
<td>106.42</td>
<td>Sand and Gravel</td>
</tr>
<tr>
<td>105.25</td>
<td>Gravelly Fill</td>
</tr>
<tr>
<td>104.00</td>
<td>Blue Gray Sand and Gravel</td>
</tr>
<tr>
<td>103.17</td>
<td>Sand and Gravel w/ Mottling</td>
</tr>
</tbody>
</table>

---

**Engineer's Name:** Bret D. Holzwarth

**Engineering Firm's Name:** Redniss & Mead

**Saturated Hydraulic Conductivity Test Location #:**

<table>
<thead>
<tr>
<th>Ground Elevation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Elevation of Proposed Infiltration System:</td>
</tr>
<tr>
<td>Bottom Elevation of Proposed Infiltration System:</td>
</tr>
<tr>
<td>Elevation of Test*:</td>
</tr>
</tbody>
</table>

Test Method (check one of the following acceptable methods**):

- Borehole infiltration test (NHDES, 2008)
- Guelph permeameter - ASTM D5126-90 Method
- Falling head permeameter - ASTM D5126-90 Method
- Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods
- Amoozemeter or Amoozegar (constant head) permeameter - Amoozegar 1992

Attach field data forms for the respective infiltration test method.

**Calculated Saturated Hydraulic Conductivity Rate:**

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Bret Holzwarth, P.E.

Name of Test Conductor (deep test pit) ____________________________

Signature of Test Conductor ____________________________ Date 8/10/2021

Name of Test Conductor (percolation test) ____________________________

Signature of Test Conductor ____________________________ Date ____________________________
# SOIL EVALUATION TEST RESULTS

### Deep Test Hole # 9  
**Ground Elevation: 106.7**

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Type</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>106.12</td>
<td>Topsoil</td>
<td>0&quot;-7&quot;</td>
</tr>
<tr>
<td>103.45</td>
<td>Sandy Fill</td>
<td>7&quot;-39&quot;</td>
</tr>
<tr>
<td>102.12</td>
<td>Decomposed Rock</td>
<td>39&quot;-55&quot;</td>
</tr>
<tr>
<td>101.70</td>
<td>Original Topsoil</td>
<td>55&quot;-60&quot;</td>
</tr>
<tr>
<td>100.03</td>
<td>Sand and Gravel w/ Mottling</td>
<td>60&quot;-80&quot;</td>
</tr>
</tbody>
</table>

### Saturated Hydraulic Conductivity Test Location #:

- **Ground Elevation:**  
- **Top Elevation of Proposed Infiltration System:**  
- **Bottom Elevation of Proposed Infiltration System:**  
- **Elevation of Test*:**

<table>
<thead>
<tr>
<th>Test Method (check one of the following acceptable methods**):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borehole infiltration test (NHDES, 2008)</td>
</tr>
<tr>
<td>Guelph permeameter - ASTM D5126-90 Method</td>
</tr>
<tr>
<td>Falling head permeameter - ASTM D5126-90 Method</td>
</tr>
<tr>
<td>Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods</td>
</tr>
<tr>
<td>Amoozemeter or Amoozegar (constant head) permeameter - Amoozegar 1992</td>
</tr>
</tbody>
</table>

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### Calculated Saturated Hydraulic Conductivity Rate:

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Bret Holzwarth, P.E.  
8/10/2021

---

**Name of Test Conductor (deep test pit)**

**Signature of Test Conductor**

**Date**

**Name of Test Conductor (percolation test)**

**Signature of Test Conductor**

**Date**
Project Name: 12 Meadow Drive, Greenwich, CT

SOIL EVALUATION TEST RESULTS

<table>
<thead>
<tr>
<th>Deep Test Hole #</th>
<th>Ground Elevation: 106.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>Soil Type</td>
</tr>
<tr>
<td>105.83</td>
<td>Topsoil</td>
</tr>
<tr>
<td>103.42</td>
<td>Sandy Fill</td>
</tr>
<tr>
<td>102.92</td>
<td>Decomposed Rock</td>
</tr>
<tr>
<td>102.50</td>
<td>Original Top Soil</td>
</tr>
<tr>
<td>101.42</td>
<td>Dark Brown Sandy Loam</td>
</tr>
<tr>
<td>99.42</td>
<td>Blue Gray Sand and Gravel w/ Mottling</td>
</tr>
</tbody>
</table>

| Saturated Hydraulic Conductivity Test Location #: |

Ground Elevation: ________
Top Elevation of Proposed Infiltration System: ________
Bottom Elevation of Proposed Infiltration System: ________
Elevation of Test*: ________

Test Method (check one of the following acceptable methods**): ________
Borehole infiltration test (NHDES, 2008)
Guelph permeameter - ASTM D5126-90 Method
Falling head permeameter - ASTM D5126-90 Method
Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods
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Attach field data forms for the respective infiltration test method.

Calculated Saturated Hydraulic Conductivity Rate: ________

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Bret Holzwarth, P.E.

Name of Test Conductor (deep test pit) ____________________ Signature of Test Conductor ________ Date ________

Name of Test Conductor (percolation test) ____________________ Signature of Test Conductor ________ Date ________
SOIL EVALUATION TEST RESULTS

Project Name: 12 Meadow Drive, Greenwich, CT

Elevation Depth Range in Inches
108.93 0”-14”
107.93 14”-26”
103.60 26”-78”

Engineering Firm's Name: Redniss & Mead
Engineer's Name: Bret D. Holzwarth

Saturated Hydraulic Conductivity Test Location #:

Ground Elevation:
Top Elevation of Proposed Infiltration System:
Bottom Elevation of Proposed Infiltration System:
Elevation of Test*:

Test Method (check one of the following acceptable methods**):

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- Guelph permeameter - ASTM D5126-90 Method
- Falling head permeameter - ASTM D5126-90 Method
- Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods
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Name of Test Conductor (deep test pit)
Signature of Test Conductor Date

Name of Test Conductor (percolation test)
SOIL EVALUATION TEST RESULTS

<table>
<thead>
<tr>
<th>Deep Test Hole #</th>
<th>Ground Elevation: 107.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>Soil Type</td>
</tr>
<tr>
<td>106.17</td>
<td>Topsoil</td>
</tr>
<tr>
<td>104.50</td>
<td>Sandy Fill</td>
</tr>
<tr>
<td>100.42</td>
<td>Blue Gray Sand and Gravel, Moderately Compacted w/ Mottling</td>
</tr>
</tbody>
</table>

**All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.**

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Depth in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>104.50</td>
<td>Mottling 30&quot;</td>
</tr>
<tr>
<td>102</td>
<td>Groundwater 60&quot;</td>
</tr>
<tr>
<td>-</td>
<td>Ledge n/a</td>
</tr>
</tbody>
</table>

**A percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.**

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Bret Holzwarth, P.E. 8/10/2021

Name of Test Conductor (deep test pit) Signature of Test Conductor Date

Name of Test Conductor (percolation test) Signature of Test Conductor Date
Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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<tr>
<td>Soil Map</td>
<td>6</td>
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<td>Legend</td>
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<tr>
<td>73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky</td>
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<td>Soil Information for All Uses</td>
<td>15</td>
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<td>Soil Properties and Qualities</td>
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<td>Soil Qualities and Features</td>
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<tr>
<td>Hydrologic Soil Group</td>
<td>15</td>
</tr>
<tr>
<td>References</td>
<td>20</td>
</tr>
</tbody>
</table>
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.
The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
Map Unit Legend

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>50B</td>
<td>Sutton fine sandy loam, 3 to 8 percent slopes</td>
<td>0.1</td>
<td>3.5%</td>
</tr>
<tr>
<td>73C</td>
<td>Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky</td>
<td>2.9</td>
<td>96.5%</td>
</tr>
</tbody>
</table>

Totals for Area of Interest | 3.0 | 100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the
development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An undifferentiated group is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.
State of Connecticut

50B—Sutton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting
- National map unit symbol: 2w69j
- Elevation: 0 to 1,410 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: All areas are prime farmland

Map Unit Composition
- Sutton and similar soils: 80 percent
- Minor components: 20 percent
- Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sutton

Setting
- Landform: Hills, ground moraines, ridges
- Landform position (two-dimensional): Footslope
- Landform position (three-dimensional): Base slope
- Down-slope shape: Concave
- Across-slope shape: Linear
- Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile
- Ap - 0 to 5 inches: fine sandy loam
- Bw1 - 5 to 17 inches: fine sandy loam
- Bw2 - 17 to 25 inches: sandy loam
- C1 - 25 to 39 inches: gravelly sandy loam
- C2 - 39 to 60 inches: gravelly sandy loam

Properties and qualities
- Slope: 3 to 8 percent
- Depth to restrictive feature: More than 80 inches
- Drainage class: Moderately well drained
- Runoff class: Very high
- 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: About 12 to 27 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
- Available water capacity: Moderate (about 8.3 inches)

Interpretive groups
- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 2w
- Hydrologic Soil Group: B/D
- Ecological site: F144AY008CT - Moist Till Uplands
- Hydric soil rating: No
Minor Components

Charlton
Percent of map unit: 9 percent
Landform: Hills, ground moraines, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge
Percent of map unit: 5 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Leicester
Percent of map unit: 5 percent
Landform: Depressions, drainageways, hills, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman
Percent of map unit: 1 percent
Landform: Hills, ground moraines, drumlins, depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky

Map Unit Setting
National map unit symbol: 2w698
Elevation: 0 to 1,550 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, very stony, and similar soils: 50 percent
Chatfield, very stony, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Very Stony

Setting
Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Linear, convex
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: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 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 capacity: Moderate (about 8.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Chatfield, Very Stony

Setting
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
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 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
Properties and qualities
- **Slope:** 3 to 15 percent
- **Surface area covered with cobbles, stones or boulders:** 1.6 percent
- **Depth to restrictive feature:** 20 to 41 inches to lithic bedrock
- **Drainage class:** Well drained
- **Runoff class:** 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 capacity:** Low (about 4.3 inches)

Interpretive groups
- **Land capability classification (irrigated):** None specified
- **Land capability classification (nonirrigated):** 6s
- **Hydrologic Soil Group:** B
- **Ecological site:** F144AY034CT - Well Drained Till Uplands
- **Hydric soil rating:** No

Minor Components
- **Sutton, very stony**
  - **Percent of map unit:** 5 percent
  - **Landform:** Ground moraines, hills
  - **Landform position (two-dimensional):** Footslope
  - **Landform position (three-dimensional):** Base slope
  - **Down-slope shape:** Concave
  - **Across-slope shape:** Linear
  - **Hydric soil rating:** No

- **Rock outcrop**
  - **Percent of map unit:** 5 percent
  - **Hydric soil rating:** No

- **Hollis, very stony**
  - **Percent of map unit:** 5 percent
  - **Landform:** Ridges, hills
  - **Landform position (two-dimensional):** Backslope, shoulder, summit
  - **Landform position (three-dimensional):** Crest, side slope, nose slope
  - **Down-slope shape:** Convex
  - **Across-slope shape:** Linear, convex
  - **Hydric soil rating:** No

- **Leicester, very stony**
  - **Percent of map unit:** 5 percent
  - **Landform:** Drainageways, depressions
  - **Down-slope shape:** Linear
  - **Across-slope shape:** Concave
  - **Hydric soil rating:** Yes
Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swelling potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.
The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
Table—Hydrologic Soil Group

<table>
<thead>
<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Rating</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>50B</td>
<td>Sutton fine sandy loam, 3 to 8 percent slopes</td>
<td>B/D</td>
<td>0.1</td>
<td>3.5%</td>
</tr>
<tr>
<td>73C</td>
<td>Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky</td>
<td>B</td>
<td>2.9</td>
<td>96.5%</td>
</tr>
<tr>
<td></td>
<td>Totals for Area of Interest</td>
<td></td>
<td>3.0</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition
Component Percent Cutoff: None Specified
Tie-break Rule: Higher
References


Appendix 6
DCIA Certification, L.I.D. Best Management Credits, Draft Drainage Maintenance Agreement
DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA) CERTIFICATION
PRE-CONSTRUCTION

Property Address: 12 Meadow Drive  Tax Account No.: 10-1105/S
Building Permit No.: 

PLANS & DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm: Redniss & Mead
Design Plans Date: 11/19/2021  Drainage Report Date: 11/19/2021

PROPERTY INFORMATION FOR DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA)

<table>
<thead>
<tr>
<th>Total Impervious Area</th>
<th>Total Impervious Area</th>
<th>Total Disconnected Impervious Area Under Proposed Conditions (SF)²</th>
<th>Total Directly Connected Impervious Area Under Proposed Conditions (SF)³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under Existing Conditions (SF)¹</td>
<td>Under Proposed Conditions (SF)¹</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19,587.00</td>
<td>24,785.00</td>
<td>23,119.00</td>
<td>1,666.00</td>
</tr>
</tbody>
</table>

¹ Impervious surfaces include but are not limited to roofs (including green roofs), buildings, houses, walks, patios, walls, tennis/sport courts (all surface types must be counted), landscape ponds, pools, paved streets/drives/parking areas constructed with concrete, asphalt, compacted dirt, gravel, or permeable pavements.

² All impervious surfaces that are directed to stormwater BMPs that meet the water quality volume (WQV) standard will be considered disconnected impervious cover. Acceptable stormwater BMPs are Bioretention (infiltrating/filtering), Constructed Stormwater Wetlands, Extended Dry Detention Basins (infiltration required), Gravel Wetlands, Constructed Wet Stormwater Ponds, Sand/Organic Filters (sand filters, tree filters, stormwater planters, etc.), Infiltration Systems (drywells, Cultecs, etc.), Permeable Pavement Areas (infiltrating/filtering), Green Roofs, andDisconnected Impervious Area (must meet all the standards under Simple Disconnection on page 44 and 45 of the Drainage Manual).

³ Subtract the Total Disconnected Impervious Area Under Proposed Conditions (SF) from the Total Impervious Area Under Proposed Conditions (SF).

Engineer’s Signature  

Date 11/19/2021
### Credits for Low Impact Development (LID) Best Management Practices (BMPs)

<table>
<thead>
<tr>
<th>LID Technique</th>
<th>Compliance Requirements</th>
<th>Credit</th>
<th>LID Used</th>
<th>Credit Taken</th>
</tr>
</thead>
</table>
| **Minimizing Soil Compaction (Section 4.4.1)**     | - The “no disturbance” areas are protected by having the limits of disturbance and access clearly shown on the Stormwater Management Plan, all construction drawings, and delineated/flagged/fenced in the field.  
- “No disturbance” areas are not to be stripped of existing topsoil.  
- “No disturbance” areas are not to be stripped of existing vegetation.  
- Vehicle movement, storage, or equipment/material lay-down is not to be permitted in “no disturbance” areas.  
- Use of soil amendments and additional topsoil is permitted in other areas being disturbed. Grading may be performed using low ground pressure equipment (less than 3 pounds per square inch) to reduce the potential for soil compaction.  
- Lawn and turf grass are acceptable uses. Planted meadow is an encouraged use. | Areas that comply (i.e., “no disturbance areas”) can use the forested cover and open space site cover runoff coefficient (R) when calculating the required Water Quality Volume. See Section 5.6.3 and Table 5-5, Site Cover Runoff Coefficients. | ☒        | ☐            |
| **Minimizing Site Disturbance (Section 4.4.2)**    | Site disturbance including earthwork and clearing of vegetation should be limited to 40 feet beyond the building perimeter, 10 feet beyond the primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond areas of proposed infiltration in order to limit compaction in the proposed infiltration area. This guidance is not intended to limit lawn areas. | Areas that comply can use the forested cover and open space site cover runoff coefficient (R) when calculating the required Water Quality Volume. See Section 5.6.3 and Table 5-5, Site Cover Runoff Coefficients. | ☐        | ☐            |
| **Protecting Sensitive Natural Areas (Section 4.4.3)** | Sensitive natural areas should be conserved at development sites, thereby preserving predevelopment hydrologic and water quality characteristics. The area must be permanently protected under a conservation easement. | The project proponent can subtract the conservation area from the total area in the Water Quality Volume calculation. | ☐        | ☐            |
| **Protecting Riparian Buffers (Section 4.4.4)**    | Effective treatment of stormwater runoff is achieved when pervious and impervious area runoff is discharged to a grass or forested buffer via overland flow. The use of a filter strip is recommended to treat overland flow in the green space of a development site.  
- The minimum stream buffer width (i.e., perpendicular to the stream flow path) shall be 50 feet as measured from the top bank elevation of a stream or the boundary of a wetland.  
- The maximum contributing path shall be 150 feet for pervious surfaces and 75 feet for impervious surfaces.  
- The average contributing overland slope to and across the buffer shall be less than or equal to 5%.  
- Runoff shall enter the buffer as sheet flow. A level spreader shall be utilized where local site conditions prevent sheet flow from being maintained.  
- The stream buffer remains unmanaged other than routine debris removal.  
- The buffer is protected by an acceptable conservation easement or other enforceable instrument that provides perpetual protection of the area. The easement must clearly specify how the natural area vegetation shall be protected. | The area draining by sheet flow to a buffer can be subtracted from the total area in the Water Quality Volume calculation, and the impervious area draining to the buffer by sheet flow can be subtracted from the impervious area in the Groundwater Recharge Volume calculation and post-development impervious area in the Runoff Reduction Volume calculation. | ☐        | ☐            |
## Credits for Low Impact Development (LID) Best Management Practices (BMPs)

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</tr>
</thead>
<tbody>
<tr>
<td>Avoiding Disturbance of Steep Slopes (Section 4.4.5)</td>
<td>Development on steep slope areas shall be avoided. Unnecessary grading should be avoided on all slopes, as should the flattening of hills and ridges. Development shall follow the natural contours of the landscape.</td>
<td>Undisturbed steep slope areas can use the forested cover and open space site cover runoff coefficient (R) when calculating the required Water Quality Volume. See Section 5.6.3 and Table 5-5, Site Cover Runoff Coefficients.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Siting on Permeable and Erodible Soils (Section 4.4.6)</td>
<td>Whenever possible, highly erodible soils should be left undisturbed and protected from disturbance during site construction. Gravel soils tend to be the least erodible. Also as clay and organic matter increase erodibility tends to decrease. Infiltration practices should be located on those portions of the site with the most permeable soils.</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>Protecting Natural Flow Pathways (Section 4.4.7)</td>
<td>Site designs should use and/or improve natural drainage pathways whenever possible to reduce or eliminate the need for stormwater pipe networks. Natural drainage pathways should be protected from significantly increased runoff volumes and rates due to development. The design should prevent the erosion and degradation of natural drainage pathways through the use of upstream volume and rate control BMPs, if necessary. Level spreaders, erosion control matting, revegetation, outlet stabilization, and check dams can also be used to protect natural drainage features.</td>
<td>☒</td>
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</tr>
<tr>
<td>Reducing Impervious Surfaces (Section 4.4.8)</td>
<td>By reducing the amount of paved surfaces, stormwater runoff is decreased while infiltration and evapotranspiration opportunities are increased.</td>
<td>Reducing impervious surfaces reduces the Water Quality Volume, Runoff Reduction Volume, Groundwater Recharge Volume, and Peak Flow/Runoff Attenuation requirements</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stormwater Disconnection (Section 4.4.9)</td>
<td>Disconnecting roof leaders and routing road and driveway runoff from conventional stormwater conveyance systems allows runoff to be collected and managed onsite. Runoff can be directed to vegetated areas designed for onsite storage, treatment, and volume control. All design criteria from section 4.4.9 must be met in order to obtain the credits shown.</td>
<td>Methods to compute the resultant runoff volumes and peak runoff rates from disconnected impervious areas are discussed in Section 4.6 of this manual and the design references cited therein. For simple disconnection, subtract 100% of the disconnected area from the total area in the Water Quality Volume calculation if the receiving pervious area is HSG A or B soils or 50% of the</td>
<td>☒</td>
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</tr>
</tbody>
</table>
## Credits for Low Impact Development (LID) Best Management Practices (BMPs)

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<th>Credit</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>disconnected area if the receiving pervious area is HSG C or D soils.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For disconnection to LID BMPs, subtract 100% of the disconnected area from the total area in the Water Quality Volume calculation.</td>
</tr>
<tr>
<td>Compost-Amended Soils</td>
<td>Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of infiltration BMPs.</td>
<td>Subtract 50% of any restored areas (100% of any restored and reforested areas) from the total post development site area and re-calculate the Runoff Reduction Volume.</td>
</tr>
<tr>
<td></td>
<td>- Soil must be tilled to 12 to 16 inches and amended with small amounts of organic material.</td>
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<tr>
<td></td>
<td>- For mechanical aeration of lawns/turf to be effective:</td>
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<tr>
<td></td>
<td>- Utilize a soil aerator that has a mechanical action that not only penetrates the soil surface but also shatters the soil matrix, causing the soil to decompact and crack, thus creating void space and increasing infiltration. (Passive-type aerators which simply poke a hole into the soil, whether it removes a plug or simply spikes a hole, can create a hardpan effect at the depth of penetration.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Shatter-type aerators include vertidrain, soil reliever, agrivator, and groundbreaker. Shatter-type aerators should penetrate the soil at depths of 8 to 18 inches.</td>
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<tr>
<td></td>
<td>- The depth to water table or bedrock must be greater than 18 inches.</td>
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<tr>
<td></td>
<td>- Existing soils may not be saturated or seasonal wet.</td>
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<tr>
<td></td>
<td>- Slopes may not exceed 10%.</td>
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<tr>
<td></td>
<td>- Existing tree root systems shall be avoided, no deep till or amendment under the tree drip lines.</td>
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</tr>
<tr>
<td>Rainwater Harvesting (Rain Barrels)</td>
<td>Rain barrels should hold a minimum of 50 gallons. Rain barrels can be connected in series to provide larger storage volumes.</td>
<td>Subtract 25% of the contributing drainage area from the total area in the Water Quality Volume calculation.</td>
</tr>
<tr>
<td></td>
<td>Equip rain barrels with a drain spigot near the bottom of the barrel with garden hose threading to allow easy hook up and use for watering. Provide an overflow pipe or hose near the top of the rain barrel.</td>
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</tr>
<tr>
<td></td>
<td>Provide removable, child-resistant covers.</td>
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<tr>
<td></td>
<td>Provide mosquito screening on water entry holes to prevent mosquito breeding in standing water.</td>
<td></td>
</tr>
</tbody>
</table>
## Credits for Low Impact Development (LID) Best Management Practices (BMPs)

<table>
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<tr>
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<th>LID Used</th>
<th>Credit Taken</th>
</tr>
</thead>
</table>
| Rainwater Harvesting (Cisterns)| The rooftop runoff must be captured and either (1) used on site for irrigation of lawns and gardens, wash water and other non-potable uses, or (2) treated and released, or (3) infiltrated.  
The cistern must be sized to treat the design rainfall from the roof area directed to the water harvesting system. If all of the design volume captured cannot be used, then a scaled reduction in credit will be given. The remaining volume must be treated by a properly designed BMP.  
A minimum factor of safety equal to 1.2 must be applied to the calculated cistern volume required.  
All stormwater collected must have a dedicated, year-round, use to assure no overflow of the system during a design rainfall. A water balance calculation must be used to establish the dedicated use volumes and rates. The water balance calculation must demonstrate that the design volume can: (1) be drawn down (used) within 3 days to allow for available volume in the system for the next rain event to be captured and stored, or (2) have an overflow of no more than 14 percent of the annual average historic rainfall, or (3) be drawn down within 3 days and discharged to a properly designed BMP. On a case-by-case basis, reduced credit may be given if the design volume cannot be reliably drawn down within 3 days, or if a year-round reuse is not available. The dedicated water use system must be automated to ensure that the water will be used at the rate and volume designed.  
The overflow shall discharge flows in excess of the design volume to a vegetated or natural area, or to another properly designed BMP (e.g., rain garden). This discharge shall be non-erosive flow for the 10-yr rainfall event. It shall not discharge directly to impervious surfaces. The elevation of the overflow pipe from the cistern shall be at or above the design volume elevation. If a first flush diverter is used, the bypassed water must discharge to a properly designed BMP. The first flush can be directed to a relatively small BMP next to the water harvesting system, or it can be directed to and accounted for in other BMPs on the site.  
At a minimum, a 1 mm or smaller screen at the entrance to the cistern from the gutter system shall be provided to filter out debris and to keep mosquitoes out of the cistern.  
If the water reuse system is designed to accommodate basement sump/foundation drain water and roof runoff, the design must allow for adequate storage for the full volume of roof runoff for the next design storm and basement sump/foundation drain water. | Subtract 100% of the contributing drainage area from the total area in the Water Quality Volume calculation. |         |              |
### Credits for Low Impact Development (LID) Best Management Practices (BMPs)

<table>
<thead>
<tr>
<th>LID Technique</th>
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<th>Credit</th>
<th>LID Used</th>
<th>Credit Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A properly designed footing for the cistern must be designed if the load of the cistern at full capacity is greater than the soils will support. If it is buried, buoyancy calculations must be provided to show the cistern will not float when empty. Buoyancy calculations and flotation constraints must be provided if any part of the buried cistern is below the seasonal high water table, or if the area is subject to flooding. An appropriate pump shall be selected to provide adequate pressure for its designated uses. Above ground cisterns shall be made of a material or color that prevents light from entering the cistern, which helps prevent algae growth within the cistern. Irrigation water from a cistern shall be applied so that the water infiltrates into the ground. If for any reason the designed dedicated end use becomes unavailable because of some change, it will be required that an approved alternative end use or a properly designed BMP treatment system be installed on site to manage the roof runoff. The harvesting system shall be labeled and identified as non-potable water. The harvesting system shall meet all local and state building and plumbing codes.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Stormwater Management Practices Maintenance Declaration

THIS DECLARATION is made this date, ____________, 20____, by and between the Town of Greenwich, a municipal corporation with principal offices located at 101 Field Point Road, Greenwich, CT 06830 and

John and Cindy Sites
[Owner(s) Name]

12 Meadow Drive, Greenwich, CT
(Address)

hereinafter referred to as “Owner(s)” of the “Property” as more fully described in a deed recorded in Book ______ at Page ______ of the Greenwich Land Records. In accordance with the Town of Greenwich Drainage Manual as Amended, the “Owner(s)” agree to install and maintain stormwater management practice(s) on the subject Property in accordance with approved plans and conditions. The Owner further agrees to the terms stated in this document to ensure that the stormwater management practice(s) continues serving the intended function in perpetuity. This Declaration includes the following exhibits located in the project files of one or all of the following Town of Greenwich Departments:

- Building Division – Permit #________________________
- Inland Wetlands and Watercourses Agency – Application # _____________________
- Planning and Zoning – Application # ______________________

Exhibit A: Long-term Maintenance Plan that prescribes those activities that must be carried out to maintain compliance with this Declaration. Approved Maintenance Plan dated ______________.

Exhibit B: Improvement Location Survey depicting “As-Built” conditions and showing an accurate location of each stormwater management practice affected by this Declaration. Approved Improvement Location Survey dated ______________.

Note: After construction has been verified and accepted by the Town of Greenwich for the stormwater management practices, this declaration shall be recorded by the Owner on the Greenwich Land Records and copies of the recorded document shall be submitted to all of the following Town of Greenwich Departments involved in the approval:

- Building Division
- Inland Wetlands and Watercourses Agency
- Planning and Zoning

Through this Declaration, the Owner(s) hereby subjects the Property to the following covenants, conditions, and restrictions:

1. The Owner(s), at its expense, shall secure from any affected owners of land all easements and releases of rights-of-way necessary for utilization of the stormwater practices identified in Exhibit B and shall record them with the Town Clerk. These easements and releases of rights-of-way shall
not be altered, amended, vacated, released or abandoned without prior written approval of the Town of Greenwich.

2. The Owner(s) shall be solely responsible for the installation, maintenance and repair of the stormwater management practices, drainage easements and associated landscaping identified in Exhibit B in accordance with the Operation and Maintenance Plan (Exhibit A).

3. No alterations or changes to the stormwater management practice(s) identified in Exhibit B shall be permitted unless they are deemed to comply with this Declaration and are approved in writing by the Town of Greenwich.

4. The Owner(s) shall retain the services of a qualified inspector (as described in Exhibit A) to operate and ensure the maintenance of the stormwater management practice(s) identified in Exhibit B in accordance with the Operation and Maintenance Plan (Exhibit A).

5. The Owners(s) must maintain all records (logs, invoices, reports, data, etc.) and have them readily available for inspection at all times. Inspection Documentation must be maintained as frequently as required in Exhibit A.

6. The Town of Greenwich or its designee is authorized to access the property as necessary to conduct inspections of the stormwater management practices or drainage easements to ascertain compliance with the intent of this Declaration and the activities prescribed in Exhibit A. Upon written notification by the Town of Greenwich or their designee of required maintenance or repairs, the Owner(s) shall complete the specified maintenance or repairs within a reasonable time frame determined by the Town of Greenwich. The Owner(s) shall be liable for the failure to undertake any maintenance or repairs so that the public health, safety, general welfare or the environment shall not be endangered.

7. If the Owner(s) does not keep the stormwater management practice(s) in reasonable order and condition, or complete maintenance activities in accordance with the Operation and Maintenance Plan contained in Exhibit A, or the required maintenance or repairs under 6 above within the specified time frames, the Town of Greenwich is authorized, but not required, to perform the specified inspections, maintenance or repairs in order to preserve the intended functions of the practice(s) and prevent the practice(s) from becoming a threat to public health, safety, general welfare or the environment. In the case of an emergency, as determined by the Town of Greenwich, no notice shall be required prior to the Town of Greenwich performing emergency maintenance or repairs. The Town of Greenwich may levy the costs and expenses of such inspections, maintenance, repairs and appropriate fees against the Owner(s). The Town of Greenwich at the time of entering upon said stormwater management practice for the purpose of maintenance or repair may file a notice of lien upon the property affected by the lien. If said costs and expenses are not paid by the Owner(s), the Town of Greenwich may pursue the collection of same through appropriate court actions.

8. The Owner(s) hereby conveys to the Town of Greenwich an easement over, on and in the Property for the purpose of access to the stormwater management practice(s) for the inspection, maintenance and repair thereof, should the Owner(s) fail to properly inspect, maintain and repair the practice(s). The Town of Greenwich’s execution of any repair or maintenance does not alter the Owner(s) responsibility to maintain in future.
9. The Owner(s) agrees that this Declaration shall be recorded and that the land described in a deed recorded in Book ________ at Page ________ of the Greenwich Land Records shall be subject to the covenants and obligations contained herein, and this Declaration shall bind all current and future owners of the property.

10. The Owner(s) agrees in the event that the Property is sold, transferred, or leased to provide information to the new owner, operator, or lessee regarding proper inspection, maintenance and repair of the stormwater management practice(s). The information shall accompany the first deed transfer and include Exhibits A and B and this Declaration. The transfer of this information shall also be required with any subsequent sale, transfer or lease of the Property.

11. The Owner(s) agree that the rights, obligations and responsibilities hereunder shall commence upon execution of the Declaration.

12. The parties whose signatures appear below hereby represent and warrant that they have the authority and capacity to sign this declaration and bind the respective parties hereto.

13. The Proprietor, its agents, representatives, successors and assigns shall defend, indemnify and hold the Town of Greenwich harmless from and against any claims, demands, actions, damages, injuries, costs or expenses of any nature whatsoever, hereinafter “Claims”, fixed or contingent, known or unknown, arising out of or in any way connected with the design, construction, use, maintenance, repair or operation (or omissions in such regard) of the storm drainage system referred to in the permit as Exhibit “A” hereto, appurtenances, connections and attachments thereto which are the subject of this Declaration. The Proprietor, its agents, representatives, successors and assigns shall not be required to indemnify the Town, its officers, agents, servants, or employees, against any such damages occasioned solely by acts or omissions of the Town, its officers, agents, servants or employees, other than supervisory acts or omissions of the Town, its officers, agents; servants, or employees, in connection with such Claims or the enforcement of this Declaration.
IN WITNESS WHEREOF, the “Owner(s)” have executed this Declaration on this ______day of ________________, 20____.

By: __________________________________________
    [Owner(s)]

By: __________________________________________
    [Owner(s)]

STATE OF CONNECTICUT )
    ) ss: Greenwich
COUNTY OF FAIRFIELD )

The foregoing instrument was acknowledged before me on this___________ day of ________________, 20 _____, by _____________________________________, the [Owner(s)]

“Owner(s)” of _____________________________________________________.
    [Address]

__________________________________________
Notary Public

My Commission Expires On:

WHEN RECORDED RETURN COPY TO:
[All of the following departments involved in approval:
Building Division, Inland Wetlands & Watercourses Agency, and Planning & Zoning]
Draft Exhibit A  
Operations and Maintenance Plan  
12 Meadow Drive  
Issued November 19, 2021

Scope:

The purpose of the Operations and Maintenance Plan is to ensure that the existing and proposed stormwater components installed at 12 Meadow Drive are maintained in operational condition throughout the life of the project. The service procedures associated with this plan shall be performed as required by the parties legally responsible for their maintenance.

Recommended Frequency of Service:

As further defined below, all stormwater components should be checked on a periodic basis and kept in full working order. Ultimately, the required frequency of inspection and service will depend on runoff quantities, pollutant loading, and clogging due to debris. At a minimum, we recommend that all stormwater components be inspected and serviced twice per year, once before winter begins and once during spring cleanup.

Qualified Inspector:

The inspections must be completed by an individual experienced in the construction and maintenance of stormwater drainage systems. Once every five years the inspections must be completed by a professional engineer.

Service Procedures:

1. Catch Basins & Drainage Inlets:
   a. Catch basins and drainage inlets shall be completely cleaned of accumulated debris and sediments at the completion of construction.
   b. For the first year, catch basins and drainage inlets shall be inspected on a quarterly basis.
   c. Any accumulated debris within the catch basins/inlets shall be removed and any repairs as required.
   d. From the second year onward, visual inspections shall occur twice per year, once in the spring and once in the fall, after fall cleanup of leaves has occurred.
   e. Accumulated debris within the catch basins/inlets shall be removed and repairs made as required.
   f. Accumulated sediments shall be removed at which time they are within 12 inches of the invert of the outlet pipe.
   g. Any additional maintenance required per the manufacturer’s specifications shall also be completed.

2. Storm Drainage Piping and Manholes/Junction Boxes:
   a. All storm drainage piping shall be completely flushed of debris and accumulated sediment at the completion of construction.
   b. Manholes/Junction Boxes shall be inspected and repaired on an annual basis.
c. Unless system performance indicates degradation of piping, comprehensive video inspection of storm drainage piping shall occur once every ten years.

d. Any additional maintenance required per the manufacturer’s specifications shall also be completed.

3. Stormwater Control Structures:

a. All control structures (orifice, weir, etc.) shall be completely cleaned of accumulated debris and sediments at the completion of construction. Any repairs shall be performed.

b. For the first year, control structures (orifice, weir, etc.) shall be inspected on a quarterly basis.

c. Any accumulated debris shall be removed and any repairs made to the control structures (orifice, weir, etc.) as required.

d. From the second year onward, visual inspections shall occur twice per year, once in the spring and once in the fall, after fall cleanup of leaves has occurred.

e. Accumulated debris shall be removed and repairs made as required.

f. Any additional maintenance required per the manufacturer’s specifications shall also be completed.

4. Drainage Outfalls/Splash Pads/Scour Holes/Level Spreaders:

a. All outfalls shall be completely cleaned of accumulated debris and sediments at the completion of construction. Any repairs to outlet protection material (rip rap) shall be performed.

b. For the first year, outfalls shall be inspected on a quarterly basis.

c. Any accumulated debris shall be removed and any repairs made to the outfalls as required.

d. From the second year onward, visual inspections shall occur twice per year, once in the spring and once in the fall, after fall cleanup of leaves has occurred.

e. Accumulated debris shall be removed and repairs made as required.

f. Any erosion shall be promptly repaired and the cause of the erosion shall be identified and corrected.

g. Any additional maintenance required per the manufacturer’s specifications shall also be completed.

5. Bioretention/Biofiltration Basins and Rain Gardens:

a. Bioretention/Biofiltration basins and rain gardens shall be cleaned of debris and sediments upon the completion of construction. Any filter media (bioretention soil) impacted by the construction activities shall be removed and replaced at this time.

b. The filter media (bioretention soil) shall be visually inspected on a monthly basis for the first 6 months. Any erosion or displacement of the filter media (bioretention soil) shall be promptly repaired and the cause of the problem shall be identified and corrected. Monthly inspections shall continue until successful operation of the system is confirmed.

c. Bioretention/Biofiltration areas and rain gardens with grass shall not be mowed more than twice during the growing season, preferably only in late October. More frequent mowing will eliminate native forbs and sedges from the meadow cover.

d. Bioretention/Biofiltration areas and rain gardens with mulch and plantings shall be inspected during spring cleanup and one just prior to the winter season.

e. All dead plants and missing mulch shall be replaced and any necessary pruning of vegetation shall be completed.
f. The surface of these structures shall be inspected on a quarterly basis after the first six months of successful operation and after heavy runoff events (e.g. >3.0” in a 24-hour period). One inspection shall occur immediately following the completion of winter sanding and subsequent sweeping operations, and one shall occur just prior to the winter season. Any accumulated debris and sediments shall be removed.

g. Check draining time of bioretention/biofiltration areas and rain gardens annually. Check within 72 hours after a minimum one inch rain event. If there is no standing water, infiltration is acceptable. If draining time is excessive, quantitatively determine infiltration rate. Use a double ring infiltrometer or monitor drop in water level after a significant storm. If infiltration rate <0.5 in./hour, remedial action shall be taken.

h. A soil-core investigation may be used to identify the clogged portion of stormwater facility and depth of clogging. Remedial measures may include removal of clogged soil layer and replacement with suitable media, aeration, and mixing upper strata with lower soil strata. After corrective measures have been implemented, infiltration rate and draining time shall be retested.

6. **Infiltration Systems:**

   a. All infiltrators shall be completely cleaned of accumulated debris and sediments upon the completion of construction.
   b. For the first year, the infiltrators shall be inspected on a quarterly basis.
   c. Any accumulated debris within the infiltrators shall be removed and any repairs made to the units as required.
   d. From the second year onward, visual inspection shall occur twice per year, once in the spring and once in the fall, after fall cleanup of leaves has occurred.
   e. Accumulated debris within the units shall be removed and repairs made as required.
   f. Any additional maintenance required per the manufacturer’s specifications shall also be completed.

7. **Roof Gutters:**

   a. Remove accumulated debris and inspect for damage. Any damage should be repaired as required.

8. **Lawn Care:** Lawn areas are to be planted with sod or seed. Grass mixture to be Bluegrass/Fescue/Ryegrass blend to create lawn areas which are more drought tolerant, slower growing, and less chemical dependent.

   a. Mow all lawn areas with a sharp blade to a height of 3 inches. Not more than 1/3 of grass leaf shall be removed per cutting. Use a mulching mower and leave clippings to return nutrients to soil.
   b. To promote deep root growth and out-compete weeds avoid over watering lawn. Landscape contractor shall determine sufficient rates to maintain adequate moisture in the upper 4 inches of soil. Avoid watering during the hottest parts of the day.
   c. Organic fertilizer to be applied in spring and fall to add nutrients and help reduce weeds. Fertilizer application rates shall be determined by soil tests.
   d. Every spring, lawn areas are to be aerated using aerator that punches holes in the lawn to bring air and water to the roots and lessens soil compaction.
   e. Every fall, lawn areas are to be de-thatched to loosen old clippings, thatch, sticks, and above ground roots.
Disposal of Debris and Sediment:

All debris and sediment removed from the stormwater structures and bioretention/biofiltration basins shall be disposed of legally. There shall be no dumping of silt or debris into or in proximity to any inland or tidal wetlands.

Maintenance Records:

The Owners(s) must maintain all records (logs, invoices, reports, data, etc.) and have them readily available for inspection at all times.
Opertions and Maintenance Log (Page 1 of 3)
12 Meadow Drive
Issued November 19, 2021

Type of Inspection: □ Spring    □ Fall    □ Other

Inspector’s Name:______________________________    Date of Inspection:___________________
Affiliation:_____________________________________   Phone #:___________________________

Catch Basins & Drainage Inlets:
• Has accumulated debris been removed from grates?   □ Yes □ No □ N/A
• Do any basins require additional repair? (identify below): □ Yes □ No □ N/A
• Have sumps been cleaned of sediment? □ Yes □ No □ N/A

Storm Drainage Piping and Manholes/Junction Boxes:
• Has accumulated debris been removed? □ Yes □ No □ N/A
• Do any manholes require additional repair? (identify below): □ Yes □ No □ N/A
• Is there any evidence of stormwater piping failure? □ Yes □ No □ N/A
• Has a comprehensive video inspection been completed? □ Yes □ No □ N/A

Stormwater Control Structures:
• Has accumulated debris been removed? □ Yes □ No □ N/A
• Are any repairs required? (identify below): □ Yes □ No □ N/A
• Have orifices and weirs been cleaned of debris? □ Yes □ No □ N/A

Notes:
Drainage Outfalls/Splash Pads/Scour Holes/Level Spreaders:

- Have all drainage outlets been cleared of debris? □ Yes □ No □ N/A
- Have all outlet protections been inspected/repaired? □ Yes □ No □ N/A
- Have all erosion issues been repaired? □ Yes □ No □ N/A

Notes:

Bioretention/Biofiltration Basins/Rain Gardens:

- Have basins been cleared of debris/sediments? □ Yes □ No □ N/A
- Have draining times of basins been verified? □ Yes □ No □ N/A
- Has vegetation been mowed (twice/year max.)? □ Yes □ No □ N/A
- Has plantings and mulch been replaced (twice/year)? □ Yes □ No □ N/A

Notes:

Drywells and Infiltration Systems:

- Have units been cleared of debris/sediments? □ Yes □ No □ N/A
- Do units require additional repair? (identify below): □ Yes □ No □ N/A
- Has draining times of system been verified? □ Yes □ No □ N/A

Notes:
Operations and Maintenance Log (Page 3 of 3)
12 Meadow Drive
Issued November 19, 2021

Roof Gutters:

- Has accumulated debris been removed from gutters? □ Yes □ No □ N/A
- Do any gutters require additional repair? (identify below): □ Yes □ No □ N/A

Notes:

__________________________________________________________   _____________________

Signature of Inspector:                   Date: