To construct a new single-family home and guesthouse with a total volume of 244,499 cubic feet on a 5.597-acre parcel in the RA-2 zone.

**LOCATION:**

29 Meadowcroft Lane

**EXISTING ZONING:**

RA-2 (2-acre minimum lot size)

**PARCEL SIZE:**

5.6053-acres (244,166.87 sq.ft.)

**UTILITIES:**

Private Septic System and Public Water

### Site Plan Final Special Permit

**PLPZ 2021 00211**

Denis & Jennifer Manelski

<table>
<thead>
<tr>
<th></th>
<th>EXISTING</th>
<th>ALLOWABLE</th>
<th>REQUESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROSS SQUARE FEET:</strong></td>
<td>Previous home was demolished in 2018</td>
<td>21,975 sq.ft.</td>
<td>14,179 sq.ft.</td>
</tr>
<tr>
<td><strong>FLOOR AREA RATIO:</strong></td>
<td>N/A</td>
<td>0.090</td>
<td>0.058</td>
</tr>
<tr>
<td><strong>VOLUME:</strong></td>
<td>N/A</td>
<td>Over 150,000 cu.ft.</td>
<td>+/- 244,499 cu.ft.</td>
</tr>
<tr>
<td><strong>GREEN AREA:</strong></td>
<td>100%</td>
<td>78%</td>
<td>91.3%</td>
</tr>
</tbody>
</table>

**Dwelling**

<table>
<thead>
<tr>
<th></th>
<th>EXISTING</th>
<th>ALLOWABLE</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIGHT:</strong></td>
<td>N/A</td>
<td>47.5’</td>
<td>46’-5”</td>
</tr>
<tr>
<td><strong>SIZE:</strong></td>
<td>N/A</td>
<td>12,495 sq.ft.</td>
<td></td>
</tr>
<tr>
<td><strong>STRUCTURE SETBACKS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Front Yard Depth:</td>
<td>N/A</td>
<td>75’</td>
<td>+/- 196’</td>
</tr>
<tr>
<td>• Side Yard Width:</td>
<td>N/A</td>
<td>35’</td>
<td>+/- 101’ (north) and +/- 70’ (south)</td>
</tr>
<tr>
<td>• Rear Yard Setback:</td>
<td>N/A</td>
<td>75’</td>
<td>+/- 475’</td>
</tr>
</tbody>
</table>

**Accessory Structure**

(Guest Cottage)

<table>
<thead>
<tr>
<th></th>
<th>EXISTING</th>
<th>ALLOWABLE</th>
<th>REQUESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIGHT:</strong></td>
<td>N/A</td>
<td>25’</td>
<td>24’-10 3/8”</td>
</tr>
<tr>
<td><strong>SIZE:</strong></td>
<td>N/A</td>
<td>Over 1,200 sq.ft. needs a Special Permit</td>
<td>1,684 sq.ft.</td>
</tr>
<tr>
<td><strong>STRUCTURE SETBACKS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Side Yard Setback:</td>
<td>N/A</td>
<td>25’</td>
<td>&gt;25’</td>
</tr>
<tr>
<td>• Rear Yard Setback:</td>
<td>N/A</td>
<td>25’</td>
<td>&gt;25’</td>
</tr>
</tbody>
</table>
UPDATE:
This application was opened at the 6/22/2021 Public Hearing. At that time the Commission noted their concerns of the application lacking endorsement by the Health Department, Department of Public Works (DPW), and the Conservation Team.

Conservation had concerns regarding the potential loss of 21 specimen trees from the site, the design of the rain garden and lack of a supporting planting plan. Conservation offered strategies to help improve the Soil & Erosion Control Plan through construction, and presented other keen observations for the site design.

DPW also asked for a planting plan for the rain garden design, and to enhance both the biofiltration capability of the design, as well as to better utilize non-structural low impact development (LID) design strategies for the site.

The Commission noted during the Public Hearing that they are looking for more LID designs and less structural drainage solutions, if possible. The applicant discussed utilizing the proposed meadow on the site to help the site’s infiltration, as well as other design options that could work with the existing topography.

The applicant’s landscaping team met with the Town’s Conservation team the week of 6/28/2021.

On 7/23/2021 the applicant submitted the following supplemental information:
(a) Updated Engineering Package in response to DPW Comments:
   (i) DPW Response Letter (dated 7/22/2021)
   (ii) Updated Site Plan Set showing the reconfigured rain garden and staging area (dated 7/15/2021)
(b) Updated Landscaping Package based on meeting with Conservation:
   (i) Landscape Site Plan (issue date 8/3/2021)
   (ii) Landscape Planting Plan (issue date 8/3/2021)
   (iii) Site Photos showing the conifer hedge in the Town ROW
(c) Updated Health Septic Approval Letter for the centralized system (dated 7/15/2021)

Based on the applicant’s landscape meeting with Conservation, they adjusted the plan in the following ways:

(a) They incorporated serval native species, as well as pollinator species of plants;
(b) They are now proposing to plant trees and taller shrubs to reconstitute the existing woodland edge plant community;
(c) Softened the grading around the proposed rain garden and taken a design approach for the rain garden to look like a dry stream bed that features stones in the middle and rain garden appropriate vegetation at the edges;
(d) To maintain taller naturalized grasses and wildflowers in a meadow near the water’s edge, and more frequently mowed lawn adjacent to the pool patio;
(e) Reduction of grading to the east of the terraces and dwelling is reduced;
(f) The Sedimentation and Erosion Control Plan is revised to use the existing driveway as the construction entrance;
(g) Double Silt Fence with haybales are proposed at the eastern edge of development;
(h) An additional 10 trees are shown with tree protection than in the previous version.

DWP issued revised comments on 7/27/2021 and does not have any concerns that need to be addressed at this time.

The Department of Health approved the design proposal for an on-site sewage disposal system for an 8 bedroom / 825 GPD central connection at 29 Meadowcroft Lane via a memorandum dated 7/15/2021.

The applicant submitted an email on 7/29/2021 noting they met with the Tree Warden and they will update their survey to confirm the number of trees that need to be removed for the proposed driveway.

APPLICATION SUMMARY UPDATE:
Final Site Plan and Special Permit applications are submitted by the applicant to construct a new single-family home and accessory structure guesthouse with a total volume of 244,499 cubic feet. The guest house will exceed 1,200 square feet in size. The project also includes a pool, patio, septic system, extensive landscaping and site work including a Cultic system and rain garden on a 5.597-acre parcel located at 29 Meadowcroft Lane in the RA-2 Zone.

ISSUES/RECOMMENDATIONS:
1. **The Inland Wetlands Agency (IWWA)** issued a permit, IWWA Permit No. 2020-041. The permit was issued 4/27/20 and is currently set to expire 4/27/25. for an earlier house to be built. That house was not built, and this current application shows work further from the wetland area. No further review from IWWA is necessary other than signing off on the construction plans.
2. **The Department of Health** issued comments to the applicant on 7/15/2021 and notes that they approved the submitted design proposal for an 8 bedroom / 825 GPD central connection at 29 Meadowcroft Lane.
3. **The Zoning Enforcement Officer** issued comments on 6/17/2021 and has no concerns at this time.
4. **Engineering** – DWP issued revised comments on 7/27/2021 and does not have any concerns that need to be addressed at this time.
5. **Conservation** issued comments on 6/14/2021 and lists their recommendations for the project in the attached memorandum. Conservation has concerns regarding the potential loss of 21 specimen trees on the site, the design of the rain garden, strategies to help improve the Soil & Erosion Control Plan, along with other keen observations for the site design. Updated comments are expected from Conservation soon.
6. **Tree Warden** - The applicant submitted an email on 7/29/2021 noting they met with the Tree Warden and they will update their survey to confirm the number of trees that need to be removed for the proposed driveway. The trees on Town land will need to be properly
posted prior to removal. According to the applicant, the Tree Warden wants this updated survey completed as part of the Zoning Permit Sign-Off process.

**PROPOSAL:**

Final Site Plan and Special Permit applications are submitted by the applicant to construct a new single-family home and accessory structure guesthouse with a total volume of 244,499 cubic feet. The guest house will exceed 1,200 square feet in size. The project also includes a pool, patio, septic system, extensive landscaping and site work including a Cultec system and rain garden on a 5.597-acre parcel located at 29 Meadowcroft Lane in the RA-2 Zone.

The parcel was previously occupied by a single-family home that was demolished in 2018. Approximately 1.29-acres of the eastern portion of the property is within a pond.

A special permit is required for this application for the below two reasons:

1) Per Section 6-101(a) of the BZR, as the total volume of buildings on the property is proposed to be greater than 150,000 cubic feet.
2) Per Section 6-95(a)(8) of the BZR, the guest house (accessory structure) will exceed 1,200 square feet.

**DEPARTMENT COMMENTS:**

- IWWA - IWWA Permit No. 2020-041
- DPW - see attached memo of 7/27/2021
- ZEO - see attached memo of 6/17/2021
- CONSERVATION - see attached memo of 6/14/2021 *(updated comments are expected)*
- HEALTH - see attached memo of 7/15/2021

**EXISTING CONDITIONS:** The parcel is located along the east side of Meadowcroft Lane, north of the intersection with Grahampton Lane. The property is bordered by a residential properties. The parcel was previously occupied by a single-family home that was demolished in 2018. Approximately 1.29-acres of the eastern portion of the property is within a pond. The edge of the pond has developed into a very successful meadow. The tall grasses in this area are used as a migratory corridor by local wide life. A row of boulders demarcates the wetland/watercourse buffer area.

**DRAINAGE:** The applicant notes in the Drainage Summary Report that the proposed development strategy utilizes Low Impact Development (LID) design principles and techniques as well as Best Management Practices (BMPs).

A Bioretention Rain Garden (LID strategy) is planned along with three Cultec subsurface retention systems (traditional BMP strategy).

**HEALTH:** The Health Department approved the design proposal for an on-site sewage disposal system for an 8 bedroom / 825 GPD central connection at 29 Meadowcroft Lane via a memorandum dated 7/15/2021.
**ZONING:** The proposed development looks to conforms to FAR, Green Area, and setback requirements for the RA-2 zone per Section 6-205 of the BZR.

**CONSERVATION:** Conservation issued comments on 6/14/2021 and lists their recommendations for the project in the attached memorandum. Conservation has concerns regarding the extent of the site that is planned for disturbance. Perhaps some of this disturbance is aesthetically based and may be able to be limited in scope. Updated comments are expected soon.

**IWWA:** IWWA issued a permit, IWWA Permit No. 2020-041 for an earlier house to be built. That house was not built, and this current application shows work further from the wetland area. No further review from IWWA is necessary other than signing off on the construction plans. The permit was issued on 4/27/20 and is currently set to expire 4/27/25.

**BACKGROUND:** This is the first application to Planning & Zoning for this parcel.

**APPLICABLE ZONING REGULATIONS:**
- Section 6-5 – Definitions
- Section 6-10 – Zoning Permit Applications; Plans; Contents; Survey
- Section 6-13 – Site Plan Approval Required by Planning and Zoning Commission
- Section 6-14 – [Site Plan] Procedure
- Section 6-15 – [Site Plan] Standards
- Section 6-17 – Special Permit Standards and Procedures
- Section 6-95 – Permitted Accessory Uses
- Section 6-101(a) – Special Permit for Residential Zones
- Section 6-205 – Schedule of Required Open Spaces, Limiting Heights and Bulk of Bdgs.
Hi Jackie,

Below is a description of the changes made by D’Andrea’s office in response to Conservation’s comments as well:

4. The grading in the vicinity of the rain garden has been edited to reduce the concern regarding the apparent depth of the rain garden.
5. The grading east of the dwelling and terraces has been reduced to only what is required structurally.
6. a. The Sedimentation and Erosion Control Plan has been revised to use the existing driveway as the construction entrance.
   b. Double Silt fence with hay bales is proposed at the eastern edge of the development.
   c. Additional Tree Protection has been provided.

Please let us know if you have any questions.

Thanks,

John

Hi Jackie,

Below is the summary provided by our landscape architect.

Based on the comments we received from Aleksandra Moch –

- We have incorporated several native species, as well as pollinator friendly species in our revised design.
- We proposed planting trees and taller shrubs to reconstitute the existing woodland edge plant community.
- The proposed grading around the rain garden has been softened, and we have proposed designing the rain garden to look like a dry stream bed with feature stones in the middle and rain garden appropriate vegetation at the edges. We’ve made drainage features like this before and clients have appreciated both the form and function. Included on our landscape plan is a section detail to provide a general sense of how it will look.
- We’ve shown on our landscape plan that our design intention is to maintain taller naturalized grasses and wildflowers in a meadow adjacent to the water, and more frequently mown lawn adjacent to the pool patio.

Please let us know if you have any questions.

Thanks,
Hi Jackie,

Attached as a supplement to the above referenced application, please find the following:

1. Updated Health Septic Approval Letter for the centralized system;
2. Updated Landscaping Package based on meeting with Conservation, including:
   a. Landscaping Plan;
   b. Landscaping Site Plan; and
   c. Site Photos showing the conifer hedge in the Town ROW;
3. Updated Engineering Package in response to DPW Comments:
   a. DPW Response Letter; and
   b. Updated Site Plan Set showing the reconfigured rain garden and staging area.

The landscaping package was also forwarded to the Tree Warden’s office to confirm there is no objection to the removal of the conifers for the proposed driveway. The landscape architects are preparing a narrative on the changes made based on the feedback from the Commission and their meeting with Conservation.

Please let me know if there are any other issues that you would like us to address.

Thanks,

John

---

John Heagney
Heagney, Lennon & Slane, LLP
248 Greenwich Avenue
Greenwich, CT 06830
O: 203-661-8400
F: 203-661-7496
jheagney@HLS248.com

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**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.
07/15/2021

Rocco v. D'Andrea
6 Neil Lane
Riverside CT 06878

Re: Design Proposal for CENTRALIZED system located at 29 Meadowcroft Lane

Dear Richard Regan,

This Department has received, reviewed, and approved the submitted design proposal for an on-site sewage disposal system for a 8 bedroom/825 GPD central connection at 29 MEADOWCROFT LANE.


Please be advised that this is NOT a Permit to Construct. A Permit to Construct will be issued to a septic system installer licensed in the State of Connecticut. The Application for a Permit to Construct a Sewage Disposal System must be signed by this installer, and the fee of $495 for a sewage disposal permit must be paid prior to issuance of the Permit to Construct.

Should changes to the State of Connecticut Public Health Code and/or Town of Greenwich Municipal Code be implemented prior to installation of the system, the design must be revised to meet current code requirements.

Sincerely,

Claire Durkota
Division of Environmental Services
Hi Jackie,

After meeting with the Tree Warden, we will be updating our survey to confirm the number of trees that must be removed for the proposed driveway. This will allow them to properly post all the trees to be removed.

Similarly to DPW’s comments, they did not have any issue with us completing that as part of the zoning permit sign off process.

Greg, Joe, and Mary,

Please let me know if I misstated anything.

Thanks,

John

John Heagney
Heagney, Lennon & Slane, LLP
248 Greenwich Avenue
Greenwich, CT 06830
O: 203-661-8400
F: 203-661-7496
jheagney@HLS248.com

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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.
July 22, 2021

Mr. Juan Paredes  
Department of Public Works  
Engineering Division  
Town of Greenwich  
101 Field Point Road  
Greenwich CT 06830

Re: 29 Meadowcroft Lane (Tax ID #11-1767)  
Denis and Jennifer Manelski

Dear Mr. Paredes:

Enclosed please find the following materials in further support of a Planning and Zoning Application for the above-referenced property in response to comments from DPW-Engineering Division and the Conservation Commission.

- One (1) copy of the Final Site Plan Review Set dated July 15, 2021 prepared by Rocco V. D’Andrea Inc.
- One (1) copy of the Engineering Building Section, dated July 15, 2021
- One (1) copy of supplemental Soil Test Forms, SC-101, dated July 12, 2021

- A CD with PDFs of the above application materials is included for your records.

The following responses are enumerated to correspond with comments from the Town of Greenwich Department of Public Works - Engineering Division Site Development Review, dated April 22, 2021:

a. A staging area is depicted on the sedimentation and erosion control plan, sheet 2 of 3.

b. Refer to a Landscape Plan by Mark Findlay Architects for rain garden plantings.

1. A revised form SC-107 is enclosed.
2. The project Attorney is coordinating tree removal with the Greenwich Tree Warden.
3. a. The proposed terraces will be a blue stone surface. WQV treatment is adequately provided by the 100ft of lawn and additional 100' of established protected meadow that runoff will flow through prior to reaching the pond. While slopes exceed the standard 5% for simple disconnection, the long flow path and dense meadow vegetation will provide superior treatment to a structural BMP and will be more consistent with the intent of LID design.

b. Additional test holes were excavated on July 12, 2021. Test data is shown on the plans and attached SC-101 forms. 17” of separation to groundwater seepage is provided with the current rain garden design. With the significant rain events in the days preceding the testing, it is our opinion that modifications are not warranted. Testing at the locations of all other infiltration was in excess of what is required.

c. No revisions to the Drainage Summary Report dated April 22, 2021 were required at this time.

d. Acknowledged.

4. b. The LID Plan has been edited to show all soil testing and influence areas for each test location.

c. See #2, above. The plans have been edited to callout removal of vegetation for driveway sight distance

d. A building section has been prepared and includes the requested elevations.

5. Comment appears to not apply to this project. A copy of the Operations and Maintenance Plan Report dated April 22, 2021 is enclosed.

If you have any questions or require additional materials, please contact our office.

Sincerely,

ROCCO V. D’ANDREA, INC.

[Signature]

Anthony L. D’Andrea, PE&LS

ALD:adm
21BP DPW01 TRANS
Enclosures

cc: Denis and Jennifer Manelski
    Thomas J. Heagney

ROCCO V. D’ANDREA, INC.
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION
SITE DEVELOPMENT REVIEW

Engineering Project No. 21-5(36)  Department Project No. PLPZ202100211
Submittal Received Date: 5/17/2021

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

PLAN SET INFORMATION
Plan Title: Final Site Plan Review Set
Project Address: 29 Meadowcroft Lane

Engineering Firm: Rocco V. D’Andrea, Inc.
Original Plan Date: 4/22/2021
Latest Plan Revision Date: ___

DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm: Rocco V. D’Andrea, Inc.
Original Report Date: 4/22/2021
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: Juan Paredes, P.E. - Civil Engineer II
Date: 06/17/2021

COMMENTS AND CONDITIONS OF APPROVAL:

The Engineering Division recommends the Commission/P&Z Staff discuss the following with the applicant:
a) Creating a staging area for both materials and construction vehicles as part of the e&s plan.
b) Generic rain garden detail is proposed on sheet 3 of the site plans; species, quantities and a more detailed planting plan may be further discussed.

The following are comments for the site development review:
1. A revised Form SC-107 needs to be submitted.
2. Removal of trees, shrubs and vegetation is required to meet the required sight distance. Submit a letter from the Town of Greenwich Tree Warden approving the removal of all necessary trees, shrubs and vegetation within the TOG ROW to meet the required sight distance. The Highway Permit will not be approved until the letter is received. If approval is not given the driveway location will need to be modified.
3. The Drainage Summary Report is acceptable in concept; it must be revised as follows:
   a. Subarea DA7 has 6,674sf of untreated impervious surfaces; WQV must be provided for this area.
      i. Verify the type of surface for this subarea i.e. bluestone, concrete, etc.
   b. Provide test hole data for rain garden.
   c. Revise all other computations as needed.

21-5(36) 29 Meadowcroft Lane 06-17-21 1 of 3
d. Additional comments may be issued upon resubmission.

4. The construction plan set needs to be revised as follows:
   a. Site Plan Sheets
   b. Low Impact Development Plan Sheet:
      i. Show deep test pit and saturated hydraulic conductivity test locations (include circular influence zone for each test).
      ii. Each deep test pit (2,500 SF) and the saturated hydraulic conductivity test (500 SF) for the proposed BMP’s need to include the required circular influence zone.
   c. Driveway Profile & Sight Distance Sheet
      i. Callout all vegetation (trees, bushes, shrubs, etc.) to be removed for the required sight distance to be met.
   d. Building/House Section or Elevation Sheet
      i. Show one section or elevation of the building/house.
      ii. Show all elevations to the deepest footings on section/elevation.
      iii. Show existing and proposed grade elevation on section/elevation.
      iv. Show existing mottling elevation on section/elevation.
      v. Show existing groundwater elevation on section/elevation.
      vi. Show existing ledge elevation on section/elevation.
      vii. Sheet shall be sealed and signed by a State of Connecticut Professional Engineer or Architect.

5. A copy of the Stormwater Management Practices Maintenance Declaration that was filed on the Land Records and the Long-Term Maintenance Plan Exhibit (A or C) need to be submitted.

**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).
SOIL EVALUATION TEST RESULTS

Engineering Firm's Name: Rocco U. D'Andrea, Inc.
Engineer's Name: Anthony L. D'Andrea, PE

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Texture (Percent Sand, Silt and Clay)</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>279.5</td>
<td>MISC. GRAVELY FILL</td>
<td>0.0</td>
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<tr>
<td>279.0</td>
<td>ORIGINAL TOPSOIL</td>
<td>66&quot;</td>
</tr>
<tr>
<td>277.8</td>
<td>ORIGINAL FINE BROWN LOAM</td>
<td>80&quot;</td>
</tr>
<tr>
<td>274.5</td>
<td>SANDY GRAVEL</td>
<td>120&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
- Amoozegar 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. Perculation 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 HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Name of Test Conductor: ____________________________  Signature of Test Conductor: ____________________________  Date: 7-12-21

Form 01  2012
SOIL EVALUATION TEST RESULTS

Project Name: **Single-Family Dwelling**
Project Address: **29 Meadowcroft Lane**

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Texture (Percent Sand, Silt and Clay)</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>281.1</td>
<td>MISC. GRANULAR FILL</td>
<td>34</td>
</tr>
<tr>
<td>279.1</td>
<td>COMPACTED SILTY LOAM</td>
<td>78</td>
</tr>
<tr>
<td>276.6</td>
<td>SANDY LOAM W/ GRAVEL</td>
<td>108</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 HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

K. Fowler  
Name of Test Conductor

Signature of Test Conductor  
7-12-21  
Date
**SOIL EVALUATION TEST RESULTS**

Project Name: Single-Family Dwelling

Project Address: 29 Meadowcrest Lane

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Texture (Percent Sand, Silt and Clay)</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>283.2</td>
<td>MISC. GRANULAR FILL</td>
<td>50</td>
</tr>
<tr>
<td>281.4</td>
<td>ORIGINAL TOPSOIL</td>
<td>72</td>
</tr>
<tr>
<td>278.4</td>
<td>SANDY LOAM W/ GRAVEL</td>
<td>108</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
- Amoozegar 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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* All field infiltration tests must be conducted in the actual location and soil layer where stormwater infiltration is proposed.

**TEST CERTIFICATION**

I HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

K. Fowler

Name of Test Conductor

Signature of Test Conductor

7-12-21

Date
SOIL EVALUATION TEST RESULTS

Project Name: Single-Family Dwelling
Project Address: 29 Meadowcroft Lane

Test Pit or Soil Boring #: 7-12-21-4 Ground Elevation: 289.8

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Texture (Percent Sand, Silt and Clay)</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>.288.8</td>
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<tr>
<td>.288.0</td>
<td>Fine Brown Loam</td>
<td>22</td>
</tr>
<tr>
<td>.284.8</td>
<td>Compacted Silty Loam</td>
<td>60</td>
</tr>
<tr>
<td>.281.2</td>
<td>Sandy Loam</td>
<td>102</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**):
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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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Attach field data forms for the respective infiltration test method.

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TEST CERTIFICATION

I HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

K. Fowler
Name of Test Conductor

Signature of Test Conductor 7-12-21
Date
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION
SITE DEVELOPMENT REVIEW

Engineering Project No. 21-5(36)  Department Project No. PLPZ202100211
Submittal Received Date: 7/23/2021

Submittal Reviewed For: Traffic Review Requested: No
Planning and Zoning

Review Type: Final Site Plan

PLAN SET INFORMATION

Plan Title: Final Site Plan Review Set  Project Address: 29 Meadowcroft Lane
Original Plan Date: 4/22/2021  Latest Plan Revision Date: 7/15/2021

Engineering Firm: Rocco V. D’Andrea, Inc.

DRAINAGE SUMMARY REPORT INFORMATION

Original Report Date: 4/22/2021  Latest Report Revision Date: _____

Engineering Firm: Rocco V. D’Andrea, Inc.

Rewards 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: __07/27/2021_____
Juan Paredes, P.E. - Civil Engineer II

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

1. A revised Form SC-107 needs to be submitted.
2. Removal of trees, shrubs and vegetation is required to meet the required sight distance. Submit a letter from the Town of Greenwich Tree Warden approving the removal of all necessary trees, shrubs and vegetation within the TOG ROW to meet the required sight distance. The Highway Permit will not be approved until the letter is received. If approval is not given the driveway location will need to be modified.
3. The Drainage Summary Report is acceptable in concept; it must be revised as follows:
   a. Subarea DA7 has 6,674sf of untreated impervious surfaces and does not meet the simple disconnection criteria. WQV must be provided for this area. The Engineering Division is acceptable to allow the portions of impervious surfaces in the gardens to sheet across the backyard; the areas for the pool and pool patio must be treated.
   b. For disconnected areas greater than 1,000 sq. ft., level spreaders are recommended. Previous design (01/24/20 revised to 06/02/20) directed disconnected areas to a level spreader and qualifying area.
   c. Revise all other computations as needed.
   d. Additional comments may be issued upon resubmission.
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, IWMA, 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).
ZONING ENFORCEMENT

Project No. PLPZ202100211

Reviewed for Planning and Zoning Commission.

TITLE OF PLAN REVIEWED: Maneiski

LOCATION: 29 Meadowcroft Lane

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.

Reviewed by: Jodi Couture

Date: 6/17/2021

Note: These comments do not represent Building Inspection Division approval. Plans subject to review by ZEO at time of building permit application.
TOWN OF GREENWICH
Town Hall ~ 101 Field Point Road ~ Greenwich, CT 06830
Planning & Zoning Department ~ 203-622-7894 ~ Fax 203-622-3795

Site Plan Application

Property Address: 29 Meadowcroft Lane, Greenwich, CT 06830
Property Owner: Denis & Jennifer Manelski
Address: 1925 Sears Cover, Vero Beach, FL 32963
Tax ID: 11-1767

Applicant: Denis & Jennifer Manelski
Address: 1925 Sears Cover, Vero Beach, FL 32963

Authorized Agent: Heagney, Lennon & Slane, LLP
Address: 248 Greenwich Avenue, Greenwich, CT 06830

Email: Theagney@HLS248.com

Select One: ☒ Pre-Application ☐ Final

Zone(s): RA-2
Lot Area: 5.6053 ac

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>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Floor Area</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Usable Floor Area</td>
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<tr>
<td>Parking Spaces</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>COMMERCIAL/RETAIL</strong></td>
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<td>Usable Floor Area</td>
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<td>1</td>
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<td>Number of Bedrooms</td>
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<td>Parking Spaces</td>
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<td>47'6&quot;</td>
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**THIS SITE PLAN INVOLVES:**
- ☐ Additions
- ☐ Alterations
- ☑ Demolition
- ☐ Re-Construction

pzSitePlanApp 2020
Application Signature Page

Property Address: 29 Meadowcroft Lane, Greenwich, CT 06830          Tax ID: 11-1767

Property Owner 1: Denis Manelski  Address: 1925 Sears Cover, Vero Beach, FL 32963
Email:                                      Cell Phone:                                        Other Phone:  
Signature:  *See Authorization Letter                          Date:  

Property Owner 2: Jennifer Manelski  Address: 1925 Sears Cover, Vero Beach, FL 32963
Email:                                      Cell Phone:                                        Other Phone:  
Signature:  *See Authorization Letter                          Date:  

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

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

Applicant: Denis & Jennifer Manelski  Address: 1925 Sears Cover, Vero Beach, FL 32963
Email:                                      Cell Phone:                                        Other Phone:  
Signature:  *See Authorization Letter                          Date:  

Authorized Agent: Heagney, Lennon & Slane, LLP  Address: 248 Greenwich Avenue, Greenwich, CT 06830
Email: THeagney@HLS248.com  Cell Phone:  Other Phone: (203) 661-8400  
Signature:                                      Date:  

pzSignaturePage 2020
Special Permit Application

Property Address: 29 Meadowcroft Lane, Greenwich, CT 06830
Tax ID: 11-1767

Property Owner: Denis & Jennifer Manelski
Address: 1925 Sears Cover, Vero Beach, FL 32963

Email: __________________________ Cell Phone: __________________________
Applicant: Denis & Jennifer Manelski
Address: 1925 Sears Cover, Vero Beach, FL 32963

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Address: 248 Greenwich Avenue, Greenwich, CT 06830
Email: THeagney@HLS248.com

Cell Phone: __________________________ Other Phone: __________________________

Authorized Agent: Heagney, Lennon & Slane, LLP
Address: 248 Greenwich Avenue, Greenwich, CT 06830
Email: THeagney@HLS248.com

Cell Phone: __________________________ Other Phone: (203) 661-8400

Zone(s): RA-2
Lot Area: 5.6053 ac

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 # __________________________

pzSpecialPermitApp 2020
Site Plan Review Checklist

Property Address: 29 Meadowcroft Lane, Greenwich, CT 06830
Anticipated Type of Application: Site Plan & Special Permit

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

pzSitePlanChecklist 2020
Provided, Building Height, Building Footprint, and Area Devoted to Surface parking, Building and Drives.

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

☐ 2. 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.
Planning and Zoning Commission
Town of Greenwich
101 Field Point Road
Greenwich, CT 06830

Inland Wetlands and Watercourses Agency
Town of Greenwich
101 Field Point Road
Greenwich, CT 06830

RE: 29 Meadowcroft Lane, Greenwich, CT

To Whom It May Concern:

We hereby authorize Heagney, Lennon & Slane, LLP to act as our agents to appear before the Town of Greenwich Planning and Zoning Commission, Inland Wetlands and Watercourses Agency, or any other Town Municipal Board in connection with the filing of applications on the above captioned property.

Denis Manelski

Jennifer Manelski
MANELSKI DENIS & JENNIFER W/S
1925 SEARS COVER
VERO BEACH, FL 32963
LOT NO 56 MEADOWCROFT LA E5

OWNERSHIP
MANELSKI DENIS & JENNIFER W/S
1925 SEARS COVER
VERO BEACH, FL 32963
LOT NO 56 MEADOWCROFT LA E5

TRANSFER OF OWNERSHIP
Date
09/01/2020 APRAVLEV LLC
Bk/Pg: 7729, 289
$490000
03/15/2019 MAR LLC
Bk/Pg: 7484, 226
$460600
08/17/2010 ROSEN MARTIN W & SELMA W/S
Bk/Pg: 5994, 102
$0
01/11/1995 ROSEN SELMA
Bk/Pg: 2624, 107
$0
07/14/1975 NA
Bk/Pg: 932, 1-3
$0

TAXING DISTRICT INFORMATION
Jurisdiction 57 Greenwich, CT
Area 001
Corporation 057
District 11
Section & Plat 224
Routing Number 5357800005

PUBLIC UTILITIES:
Water, Electric
Street or Road:

Topography:

Public Utilities:
Water, Electric
Street or Road:

Neighborhood: 162110 MID COUNTRY WEST - DIST 11 [3]
Property Class 101 Single Family

RESIDENTIAL

SITE DESCRIPTION
Topography:

PUBLIC UTILITIES:
Water, Electric
Street or Road:

NEIGHBORHOOD:

LEGAL ACRES:
5.5970

RESIDENTIAL

LAND DATA AND CALCULATIONS

<table>
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<th>Measured Acreage</th>
<th>Table</th>
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<th>Adjusted Rate</th>
<th>Extended Value</th>
<th>Influence Factor</th>
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1 Residential Land
2 Residential Excess

LEGAL ACRES:
5.5970

Supplemental Cards
BP18: 18-1158 Demo Single family 100% complete
18-1156 Demo Tennis Court 100% complete
18-1157 Demo Workshop 100% complete
18-1159 Demo Pool 100% complete

CUMP: 4274, 6806
LAND: Per Map 6806 Correct acreage to 5.597 acres

Supplemental Cards

TOTAL LAND VALUE
$2579100
NARRATIVE

Applicants propose to construct a new single-family home and guesthouse on the property at 29 Meadowcroft Lane. The 5.6-acre parcel was previously occupied by a single-family home which was demolished in 2018. The lot includes a portion of a pond and minor wetlands along the ponds edge. An earlier house design was submitted and approved by the Wetland Agency which was much closer to the pond than the current proposal. No further review other than signing off on the construction plans is necessary as part of the wetland approval.

The proposed home and guesthouse will total 14,179 sf. 21,975 sf is permitted for the site. The total volume proposed is 244,499 cubic feet which necessitates the site plan/special permit applications. The proposed house and guesthouse will meet all setbacks, height and green space requirements in the RA-2 zone. The site plan review set, drainage summary report, zoning location survey, grade plane analysis, floor area and volume worksheets, floorplans, elevations and sections along with a landscape plan are included in the submission.

Approval of the site plan and special permit applications is requested.

Respectfully Submitted,
Thomas J. Heagney
Dated: May 5, 2021
TOWN OF GREENWICH

AFFIDAVIT OF NOTIFICATION OF SITE PLAN AND SPECIAL PERMIT APPLICATION TO PLANNING AND ZONING COMMISSION

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

I, THOMAS J. HEAGNEY, being first duly sworn, do hereby certify that on May 4, 2021, I caused to be mailed, postage prepaid, evidenced by certificate of mailing, to those persons whose names are set forth on Exhibit A attached hereto, a copy of the notice Exhibit B. Said persons are the record owners, as of May 4, 2021, as shown on the Town Tax Assessor’s Office records of property abutting and across the street from the property located at 29 Meadowcroft Lane, Greenwich, Connecticut for which an application requesting site plan and special permit approval has been filed with the Greenwich Planning and Zoning Commission.

THOMAS J. HEAGNEY

Subscribed and sworn to before me this 4th day of May 2021

EMMA A. MUTINO
NOTARY PUBLIC
My Commission Expires Apr. 30, 2025
EXHIBIT A

Abutting property owners of 29 Meadowcroft Lane, Greenwich:

Avi Barkai
26 Meadowcroft Lane
Greenwich, CT 06830
11-1814

Meadowlark Manor LLC
343 Greenwich Avenue, Un 200
Greenwich, CT 06830
11-1257

Arthur D. Sanders
62 Clapboard Ridge Road
Greenwich, CT 06830
11-1182

Blakely W. Holden
30 Meadowcroft Lane
Greenwich, CT 06830
11-1871

Thomas L. Melly, TR
25 Meadowcroft Lane
Greenwich, CT 06830
11-1536

Jan Pelsert & Rosenblatt
31 Meadowcroft Lane
Greenwich, CT 06830
11-1868
EXHIBIT B

May 4, 2021

To Whom It May Concern:

Notice is hereby given that Denis and Jennifer Manelski have filed an application with the Town of Greenwich Planning and Zoning Commission to request site plan and special permit approval to construct a new home, guesthouse, pool and associated site improvements on their property located at 29 Meadowcroft Lane in Greenwich, Connecticut.

Further information regarding this application may be obtained at the Planning and Zoning Commission or this office.

Thomas J. Heagney

For information contact:
Planning and Zoning Commission
Town Hall, 101 Field Point Road
Greenwich, CT 06836
Tel: 203-622-7753
May 4, 2021

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Further information regarding this application may be obtained at the Planning and Zoning Commission or this office.

For information contact:
Planning and Zoning Commission
Town Hall, 101 Field Point Road
Greenwich, CT 06836
Tel: 203-622-7753
DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA) CERTIFICATION
PRE-CONSTRUCTION

Property Address: 29 Meadowcroft Lane, Greenwich

Building Permit No.: ________________

Tax Account No.: 11-1767

PLANS & DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm: Rocco V. D'Andrea, Inc.

Design Plans Date: 4/22/2021

Drainage Report Date: 4/22/2021

PROPERTY INFORMATION FOR DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA)

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<th>Total Impervious Area</th>
<th>Total Impervious Area</th>
<th>Total Disconnected Impervious Area</th>
<th>Total Directly Connected Impervious Area</th>
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<td>Under Existing Conditions (SF)¹</td>
<td>Under Proposed Conditions (SF)¹</td>
<td>Under Proposed Conditions (SF)²</td>
<td>Under Proposed Conditions (SF)²</td>
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<td>26,058.00</td>
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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, Culverts, etc.), Permeable Pavement Areas (infiltrating/filtering), Green Roofs, and Disconnected 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: 4/22/21

Engineer’s Seal

Form SC-107

February 2021
DRAINAGE SUMMARY REPORT

For

29 MEADOWCROFT LANE
GREENWICH, CONNECTICUT

Prepared For

DENIS MANELSKI
JENNIFER MANELSKI

APRIL 22, 2021

Anthony L. D’Andrea, PE & LS
CT License No. 9673
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1. Introduction & LID Techniques

1.1. Project Narrative

The applicant is proposing to construct a single-family dwelling on the property at 29 Meadowcroft Lane. The proposed improvements will include the construction of a new driveway, pool, patio, and guest cottage. Associated improvements will include installation of a sewage disposal system, storm drainage systems, and underground utilities, site grading, and the installation of landscaping. This office had prepared a design for the previous owner of the property which was approved in 2020, but never constructed. The extent of the project for the current owner is less, results in less impervious coverage, and provides a greater buffer to the wetlands.

For a depiction of existing conditions and the proposed development refer to a development plan set entitled “Site Plan Review Set, Single-Family Dwelling, Location 29 Meadowcroft Lane, Greenwich, Connecticut, prepared for Aprazivel LLC,” as prepared by Rocco V. D’Andrea, Inc.

The subject parcel, approximately 5.6053 Acres, is located along the east side of Meadowcroft Lane, approximately 1,700 feet north from the intersection with Grahamton Lane, in Greenwich, Connecticut. The property is bordered by a residential property to the north, south, and east and Meadowcroft Lane to the west. Approximately 1.29 Acres of the eastern portion of the property are within a pond. Under recently existing conditions, the site supported a dwelling, a pool, a patio, and a driveway. The remainder of the site consisted of well-manicured lawn and lightly wooded areas. Approximately 183,600 square feet of the site will be disturbed during the proposed construction. Natural flow pathways will be maintained, as all runoff from the site will either be infiltrated or continue to flow toward the existing points of concern in a similar manner as under existing conditions. The proposed re-development of the parcel will result in approximately 1,715 S.F. decrease in impervious coverage from the recently existing conditions on the site. Low Impact Development (LID) and traditional Best Management Practices (BMPs) have been proposed to help pre-treat, filter, and control stormwater runoff, so that there will be no adverse effects to adjoining properties or local drainage systems. Natural flow pathways will be maintained, as all runoff from the site will continue to flow toward the existing points of concern in a similar manner as under existing conditions. Refer to Appendix “B” for the “Credits for Low Impact Development Best Management Practices Checklist” outlining the inclusions or exclusion of each non-structural BMP.

The proposed stormwater management plan uses LID design and includes a Bioretention Rain Garden. Additionally, three cul-tec subsurface retention systems are proposed. These systems will provide runoff volume reduction. A reduction in peak flows is provided for up to the 25-year storm. These systems will also satisfy both water quality filtration and infiltration requirements and will aid in the pre-treatment and thermal cooling of stormwater runoff from the dwelling and driveway.

This project will conform to all applicable Town stormwater management standards to the maximum extent practicable. Refer to Appendix “A” for a narrative detailing the projects compliance with each stormwater management standard.
1.2. **Land Use Regulations**

The subject parcel is located in the “RA-2” zone. All applicable zoning setbacks and regulations will be adhered to.

1.3. **Site Inventory & Evaluation**

The site consists of gently to moderately sloped lawn and lightly wooded areas. Runoff flows east to the wetlands and pond in the rear of the property.

Soils on the property are classified as Woodbridge fine sandy loams classified with a Hydrologic Soil Group (HSG) rating of C/D in the western portion of the site. The central portion of the site is classified as Paxton and Montauk fine sandy loams with a HSG rating of C and a smaller portion at the edge of the pond as Leicester fine sandy loam with a HSG rating of B/D. Refer to Exhibit “C” for the results of the Initial Feasibility Evaluation from the NRCS Web Soil Survey. Deep test borings were conducted in the areas of the proposed structural BMPs to confirm adequate conditions for infiltration. This testing revealed sandy loam. Hydraulic Conductivity testing will be performed to confirm adequate infiltration rates prior to building permit. Refer to Appendix “G” for results of completed soil testing.

Existing drainage patterns will generally be maintained under post-construction conditions.

1.4. **Development Envelope**

Construction will disturb an area of approximately 183,600 S.F. Sedimentation and erosion controls will be installed around the proposed development envelope prior to the start of construction to minimize the impact to the surrounding areas.

1.5. **LID Control Strategies**

In the analysis of the existing and proposed topography, the site has been divided into various sub-drainage areas discharging to three (3) “points of concern.” On Exhibits A and B, point of concern (POC) A is depicted as the Meadowcroft Lane roadway, POC B as the south property line, and POC C which drains to the wetland and pond to the east.

Under existing conditions, the property is divided into three drainage areas. Refer to Exhibit “A” for a depiction of the existing conditions drainage areas and flowpaths. Refer to Table 1 for a summary of all existing stormwater runoff flows.

Stormwater runoff from the northwest corner of the lightly wooded areas, Drainage Area 1, flows overland to POC A. Stormwater from the southwestern portion of the property is discharged to a lightly wooded area on the southern property line, POC B.
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<th>Area ID</th>
<th>POC</th>
<th>Area (ft²)</th>
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<th>UI Adj. CN</th>
<th>Tc (min)</th>
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<th>2-YR (q ft³/s)</th>
<th>5-YR (q ft³/s)</th>
<th>10-YR (q ft³/s)</th>
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<td>12.89</td>
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</table>

*Table 1: Summary of Drainage Areas and Peak Flow Rates for Existing Conditions.*

Under proposed conditions, the property was divided into eight drainage areas. Refer to Exhibit “B” for a depiction of the proposed conditions drainage areas and flowpaths. Refer to *Table II* for a summary of all proposed stormwater runoff flows.

Proposed Drainage Area 1 will be similar to existing and flows to POC A. Drainage Area 2 will be the southwestern portion of the property and sheet flows to POC B. Drainage Area 3 consists of the lawn and wooded area and a portion of the driveway which sheet flows to the rain garden. Drainage Area 4 is the dwelling’s roof and is routed to the Rain Garden. The Rain Garden’s flow controls are routed to Retention Systems #1 and #2 for further flow control. Drainage Area 5 consists of the driveway to the rear parking court and is routed to Retention System #3. Drainage Area 6 is the guest cottage roof and is routed to Retention System #3. Drainage Area 7 is the pool and garden area. Drainage Area 8 is the rear yard. Combined, these systems provide water quality volume, runoff reduction volume, groundwater recharge volume, and peak flow attenuation. Additional stormwater will be discharged via a level spreader and will sheet flow to POC C.
Refer to Table III for a comparison of existing and proposed condition stormwater runoff volumes and flow rates.

2. Structural BMPs

2.1. Water Quality Volume and TSS Removal

Refer to Appendix “C” for Water Quality Volume calculations. The proposed Bioretention rain garden and Retention System #3 will provide adequate storage for the water quality volume.

Deep sumps, the rain garden, and retention systems provide adequate treatment of total suspended solids (TSS). Refer to Appendix “D” for TSS removal calculations.

2.2. Runoff Reduction Volume

The Runoff Reduction is satisfied. Refer to Runoff Reduction Volume calculations in Appendix “C.”

2.3. Groundwater Recharge Volume

Refer to Appendix “C” for Groundwater Recharge Volume calculations.
2.4. Peak Runoff Attenuation

The bioretention rain garden and the retention systems will provide a reduction in peak flow for up to the 25-year design storm. Refer to Appendices “E” and “F”.

3. Conclusion

The proposed re-development of 29 Meadowcroft Lane will result in a net decrease in the impervious coverage on the site. One LID and three traditional structural BMPs are proposed to provide the treatment of the Water Quality Volume. This system will also provide the necessary storage volume to reduce runoff volume for the 1-year design storm and provide peak flow rate reduction to POC C for up to the 25-year design storm.

Since the proposed development incorporates pre-treatment and attenuation of runoff to below existing conditions, if the proposed development is constructed as depicted on the proposed development plans, then there will be no adverse impacts to adjoining properties or downstream infrastructure due to the re-development of the property.
<table>
<thead>
<tr>
<th>Storm Event</th>
<th>POC</th>
<th>Flow/Volume</th>
<th>Existing</th>
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<td></td>
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<td>-884</td>
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<tr>
<td></td>
<td>B</td>
<td>q (ft³/s)</td>
<td>v (ft³)</td>
<td>5.10</td>
<td>4.259</td>
<td>-1,151</td>
</tr>
<tr>
<td>50 Year Storm</td>
<td>A</td>
<td>q (ft³/s)</td>
<td>q (ft³/s)</td>
<td>0.46</td>
<td>0.46</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>q (ft³/s)</td>
<td>v (ft³)</td>
<td>2,151</td>
<td>2,129</td>
<td>-22</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>q (ft³/s)</td>
<td>v (ft³)</td>
<td>13.15</td>
<td>13.64</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>q (ft³/s)</td>
<td>v (ft³)</td>
<td>66,286</td>
<td>63,299</td>
<td>-2,987</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>q (ft³/s)</td>
<td>v (ft³)</td>
<td>66,286</td>
<td>63,299</td>
<td>-2,987</td>
</tr>
<tr>
<td>100 Year Storm</td>
<td>A</td>
<td>q (ft³/s)</td>
<td>q (ft³/s)</td>
<td>0.60</td>
<td>0.59</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>q (ft³/s)</td>
<td>v (ft³)</td>
<td>2,011</td>
<td>1,61</td>
<td>-3.7</td>
</tr>
</tbody>
</table>

*Proposed Values include Retention/Retention

Table III: Comparison of Existing and Proposed Peak Flow Rates and Volumes
Exhibits "A" & "B"

Watershed Maps
Existing & Proposed Conditions
Exhibit "C"

USDA Soil Delineation Map
MAP LEGEND

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

Soils
- Soil Rating Polygons
  - A
  - A/D
  - B
  - B/D
  - C
  - C/D
  - D
  - Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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:
Coordinate System: 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 19, Sep 13, 2019

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.
# 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>4</td>
<td>Leicester fine sandy loam</td>
<td>B/D</td>
<td>1.9</td>
<td>16.7%</td>
</tr>
<tr>
<td>45A</td>
<td>Woodbridge fine sandy loam, 0 to 3 percent slopes</td>
<td>C/D</td>
<td>1.6</td>
<td>13.8%</td>
</tr>
<tr>
<td>45B</td>
<td>Woodbridge fine sandy loam, 3 to 8 percent slopes</td>
<td>C/D</td>
<td>2.2</td>
<td>19.1%</td>
</tr>
<tr>
<td>84C</td>
<td>Paxton and Montauk fine sandy loams, 8 to 15 percent slopes</td>
<td>C</td>
<td>2.0</td>
<td>23.0%</td>
</tr>
<tr>
<td>W</td>
<td>Water</td>
<td></td>
<td>3.1</td>
<td>27.5%</td>
</tr>
<tr>
<td><strong>Totals for Area of Interest</strong></td>
<td></td>
<td></td>
<td><strong>11.5</strong></td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Description

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-swell 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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher
Appendix "A"

Stormwater Management
Standard Narrative
Stormwater Management Standards Narrative

Name: Manelski
Address: 29 Meadowcroft Lane, Greenwich, Connecticut
Project: Single Family Dwelling
Date: April 2021

1. **Standard 1: Low Impact Development**
   Low Impact Development site planning and design techniques are used to the maximum extent practical in the development of the subject parcel.

   Under recently existing conditions, the site supported a dwelling, a patio, a deck, and a driveway. The remainder of the site consisted of well-manicured lawn and lightly wooded areas. The development envelope will enclose approximately 183,600 square feet. Infiltration practices will be sited on the most permeable soils on the site. Natural flow pathways will be maintained, as all runoff from the site will either be infiltrated or continue to flow toward the existing points of concern in a similar manner as under existing conditions. Refer to Appendix “B” for the “Credits for Low Impact Development Best Management Practices Checklist” outlining the inclusions or exclusion of each non-structural BMP.

2. **Standard 2: Protection of Natural Hydrology**
   
   A. **Site Disturbance**
      The majority of the site consists of unnatural, previously developed areas. This project proposes to re-disturb the majority of the site for the construction of the proposed improvements and the implementation of landscaping. The project disturbance area has been depicted on the design plans. Only areas necessary to accommodate construction activities will be disturbed.

   B. **Soil Compaction**
      It has been noted on the plans that the contractor shall not place excavation equipment in the bottom of the infiltration areas during any point of construction.

   C. **Time of Concentration**
      Post-development time of concentration values are similar to those of pre-development values as the majority of the proposed site grading and ground cover will be similar in nature to the site grading under existing conditions. The collection and infiltration of stormwater runoff will also help slow down the time of concentration to more match that of existing conditions.

   D. **Grading Plan**
      The proposed grading plan is similar in nature to the existing grades on the site.
E. **Compost Amended Soils**
Compost amended soils are not proposed for this project.

F. **Ground Disturbance**
Per the site design, no disturbed ground is to be left as exposed bare soil at project completion. All disturbed areas, excluding the proposed driveway, structures, and hardscapes, are proposed to be covered with topsoil and planted with grass or landscaped with vegetation.

G. **Surface Water Systems**
This sub-standard is not applicable to this site.

H. **Roadway and Driveway Crossings (Surface Waters)**
This sub-standard is not applicable to this project.

I. **Roadway and Driveway Crossings (Streams)**
This sub-standard is not applicable to this project.

3. **Standard 3: Stormwater Best Management Practices**
One structural LID BMP and three traditional structural BMPs will be utilized to meet the conditions for runoff volumes, peak flows, pollutant reduction, and maintenance of groundwater recharge.

   A. **Hydrologic and Geologic Conditions**
   Structural BMPs were incorporated into the design to take advantage of the existing geological soil conditions on the site for the promotion of groundwater infiltration.

   B. **Design Calculations**
   Design calculations for runoff reduction, groundwater recharge, peak flow control, and pollutant reduction are provided in the attached appendices.

   C. **Shutdown & Containment**
   Shutdown and containment of the Rain Garden is not feasible. The cultec systems could be shut down if necessary at the controlling junction boxes.

   D. **Pumping of Stormwater**
   No pumping of stormwater is included in the site design.

   E. **Pumping of Uncontaminated Groundwater**
   No pumping of groundwater is included in the site design.
4. **Standard 4: Runoff Volume Reduction and Groundwater Recharge**

   A. **Runoff Volume Reduction**
      The post-development runoff volumes will be reduced to be less than the pre-development runoff volumes for the 1-year, 24-hour storm to all Points of Concern (POC). Refer to Appendix “C” for Runoff Reduction Volume Calculations.

   B. **Groundwater Recharge**
      The proposed Porous Asphalt system provides sufficient storage for the Groundwater Recharge Volume. Refer to Appendix “C” for Groundwater Recharge Volume Calculations.

   C. **Runoff Capture**
      This sub-standard is not applicable to this project.

5. **Standard 5: Peak Flow Control**

   A. **Stream Channel Protection**
      The Stream Channel Protection sub-standard is not applicable to this project.

   B. **Conveyance Protection**
      All proposed storm drainage pipes will be designed to convey a minimum of their collected 25-year storm event peak flow rate. Therefore, the Conveyance Protection standard will be met. Storm Drain System Conveyance Calculations will be provided prior to building permit.

   C. **Peak Runoff Attenuation**
      The proposed BMPs will attenuate peak flow rates to less than pre-construction conditions to all Points of Concern for up to the 25-year, 24-hour storm. Refer to Tables 1, 2, and 3 of the “Introduction” for a summary and comparison of peak flow rates as well as Appendices “E” and “F” for the results of the Hydrologic Analyses for existing and proposed conditions, respectively.

   D. **Emergency Outlet Sizing**
      The storm drain system is designed to safely pass large storm events without damaging downstream drainage systems and property more than would occur during a similar event under pre-development conditions.

6. **Standard 6: Pollutant Reduction**

   A. **TSS Removal**
      The proposed drainage systems will provide removal of 90.0% of the average post-construction load of Total Suspended Solids (TSS) from the contributing impervious areas. Refer to Appendix “C” for TSS Removal Calculations.
7. **Standard 7: High Load Areas**
The proposed development does not classify this site as a High Load Area. Therefore standard 7 is not applicable to this project.

8. **Standard 8: Critical Areas**
The site is not located within a “Critical Area”.
   
   A. **Source Control, Pollution Prevention Measures, Structural Stormwater BMPs**
   The proposed BMPs have been designed to meet the pollutant reduction standard and the water quality volume standard.

   B. **Higher Potential Pollutant Loads**
   The proposed development does not classify this site as a High Load Area. Therefore this standard is not applicable to this project.

9. **Standard 9: Re-development**
   
   A. **Re-development Definition**
   This project will include the removal of the existing dwelling, driveway, and other site features, the construction of a new dwelling and driveway, the installation of storm drainage improvements and underground utilities, site grading, and the installation of landscaping. This project is considered a re-development.

   B. **Meet the Standards**
   As previously outlined in this report, the proposed project meets the standards to the maximum extent possible, including the evaluation of LID site planning and the inclusion of LID stormwater BMPs.

   C. **Undeveloped Portions of the Property**
   The majority of the site consists of unnatural, previously developed areas. This project proposes to re-disturb the existing lawn areas for the construction of the proposed improvements and the implementation of landscaping.

   D. **Stormwater Controls**
   The use of proposed structural stormwater LID BMPs have been designed to reduce pollutant loads, reduce runoff volumes and peak flows, and increase groundwater recharge as required.

   E. **Infiltration through Hazardous Substances**
   There are no known hazardous substances or areas with soil or groundwater contamination on the site. Therefore, this standard is not applicable to this project.
10. **Standard 10: Construct Erosion and Sediment Control**

   **A. Sedimentation and Erosion Control Plan**
   Refer to the Sedimentation and Erosion Control Plan, for a depiction of the proposed sedimentation and erosion control measures including but not limited to construction fencing, silt fencing, stockpile areas, an anti-tracking pad at the construction entrance, and tree protection.

   **B. Sedimentation and Erosion Control Measures Installation and Removal**
   The proposed site design instructs the contractor to install all sedimentation and erosion control measures prior to commencing construction and appropriately remove these measures at the completion of construction.

11. **Standard 11: Construction Inspections**

   **A. Surety**
   If requested by the approving authority, the proponent will post a bond, cash, or other acceptable surety in an amount deemed sufficient to ensure the work will be completed in accordance with the approved plans.

   **B. Notification of Work**
   The proponent will be instructed to notify the approving authority before starting land-disturbing activity and before construction of the key components of the stormwater management system.

   **C. Stormwater Management System Inspections**
   The project engineer will complete periodic inspections of the stormwater management system.

   **D. Site Inspections**
   The project engineer will complete site inspections in accordance with this sub-standard and the Field Inspection Record form (SC-106). The project engineer will inspect the stormwater management system during a storm event if possible.

   **E. Failing Stormwater Management System**
   The approving authority will be notified if the system is found to be inadequate due to operational failure, regardless of its compliance with the approved plans. The design of the system shall then be corrected before final approval is granted by the approving authority.

   **F. Project Completion**
   Upon project completion, the project's compliance with the approved plans will be certified and all required inspection certifications will be provided to the approving authority.
12. **Standard 12: Operation and Maintenance**

A. **Operation and Maintenance Plan**
   Refer to the Operations and Maintenance Plan Report prepared for the project outlining maintenance measures to ensure functionality of the proposed stormwater management system.

B. **O&M Plan Components**
   The Operations and Maintenance Plan will identify all applicable items in Section 5 and Section 7 of the Town of Greenwich Drainage Manual.

C. **O&M Plan Implementation**
   The Operation and Maintenance Plan Report will identify the parties legally responsible for implementing the O&M Plan.

D. **O&M Plan Records**
   The appropriate parties will be instructed to complete and retain documents relating to installation, maintenance and repairs to the stormwater management system.

E. **Proof of O&M Plan Records**
   The appropriate parties will be instructed to provide records of maintenance and repairs to the approving authority during inspections and/or upon request.

F. **Failure to Implement O&M Plan**
   The appropriate parties will be informed that failure to implement the O&M Plan can result in the municipality assuming responsibility for their implementation and securing reimbursement for associated expenses.

   The drainage design depicted on the Development Plans for the site is congruent with the stormwater management plan outlined in this report.

14. **Standard 14: Illicit Discharges**
   Illicit discharges do not currently exist on the site. The proposed site design does not depict any illicit discharges to be installed.
Appendix “B”

Credits for LID BMPs Checklist
# 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 | 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)

<table>
<thead>
<tr>
<th>LID Technique</th>
<th>Compliance Requirements</th>
<th>Credit</th>
<th>LID Used</th>
<th>Credit Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoiding Disturbance of Steep Slopes (Section 4.4.3)</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 4.4.5)</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>
<td></td>
</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 mats, revegetation, outlet stabilization, and check dams can also be used to protect natural drainage features.</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>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></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>
<td></td>
</tr>
</tbody>
</table>
## 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>
<tbody>
<tr>
<td>Compost-Amended Soils</td>
<td><strong>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.</strong>&lt;br&gt;• Soil must be tilled to 12 to 16 inches and amended with small amounts of organic material.&lt;br&gt;• For mechanical aeration of lawns/turf to be effective:&lt;br&gt;  o 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 decompress 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.)&lt;br&gt;  o Shatter-type aerators include vertidrain, soil reliever, agrivator, and groundbreaker. Shatter-type aerators should penetrate the soil at depths of 8 to 18 inches.&lt;br&gt;• The depth to water table or bedrock must be greater than 18 inches.&lt;br&gt;• Existing soils may not be saturated or seasonal wet.&lt;br&gt;• Slopes may not exceed 10%.&lt;br&gt;• Existing tree root systems shall be avoided, no deep till or amendment under the tree drip lines.</td>
<td><strong>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.</strong></td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Rainwater Harvesting</td>
<td><strong>Rain barrels should hold a minimum of 50 gallons.</strong>&lt;br&gt;<strong>Rain barrels can be connected in series to provide larger storage volumes.</strong>&lt;br&gt;<strong>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.</strong>&lt;br&gt;<strong>Provide an overflow pipe or hose near the top of the rain barrel.</strong>&lt;br&gt;<strong>Provide removable, child-resistant covers.</strong>&lt;br&gt;<strong>Provide mosquito screening on water entry holes to prevent mosquito breeding in standing water.</strong></td>
<td><strong>Subtract 25% of the contributing drainage area from the total area in the Water Quality Volume calculation.</strong></td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>
## Credits for Low Impact Development (LID) Best Management Practices (BMPs)

<table>
<thead>
<tr>
<th>LID Technique</th>
<th>Compliance Requirements</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainwater Harvesting (Cisterns)</td>
<td>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-erodible 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.</td>
<td>Subtract 100% of the contributing drainage area from the total area in the Water Quality Volume calculation.</td>
</tr>
<tr>
<td>LID Technique</td>
<td>Compliance Requirements</td>
<td>Credit</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<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>
</tr>
</tbody>
</table>
Appendix “C”

Runoff Volume & Retention System Design Calculations
Water Quality Volume (DA 3 & 4 > Rain Garden)

<table>
<thead>
<tr>
<th>Watershed Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Watershed Area</td>
<td>67,450 ft²</td>
</tr>
<tr>
<td>Pervious Cover</td>
<td>53,406 ft²</td>
</tr>
<tr>
<td>Impervious Cover</td>
<td>14,044 ft²</td>
</tr>
<tr>
<td>% Pervious Coverage</td>
<td>79.2 %</td>
</tr>
<tr>
<td>% Impervious Coverage</td>
<td>20.8 %</td>
</tr>
</tbody>
</table>

\[
WQV = \frac{1 \text{ in}}{12 \text{ in}} \times RA
\]

\[
R = 0.792(0.20) + 0.208(0.95) = 0.356
\]

Where:
- WQV = Water quality volume
- R = Site cover runoff coefficient
- A = Watershed area

\[
WQV = \frac{1}{12} (0.356)(67,450) = 2,001 \text{ ft}^3
\]

Water Quality Volume (WQV) = 2,001 ft³

Storage Volume in Rain Garden = 2,000 ft³

Water Quality Volume (DA 5 & DA 6 > RS #3)

<table>
<thead>
<tr>
<th>Watershed Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Watershed Area</td>
<td>10,925 ft²</td>
</tr>
<tr>
<td>Pervious Cover</td>
<td>6,548 ft²</td>
</tr>
<tr>
<td>Impervious Cover</td>
<td>4,377 ft²</td>
</tr>
<tr>
<td>% Pervious Coverage</td>
<td>59.9 %</td>
</tr>
<tr>
<td>% Impervious Coverage</td>
<td>40.1 %</td>
</tr>
</tbody>
</table>

\[
WQV = \frac{1 \text{ in}}{12 \text{ in}} \times RA
\]

\[
R = 0.599(0.20) + 0.401(0.95) = 0.501
\]

Where:
- WQV = Water quality volume
- R = Site cover runoff coefficient
- A = Watershed area

\[
WQV = \frac{1}{12} (0.501)(5,802) = 0.501
\]

Storage Volume in Rain Garden = 2,000 ft³
\[ WQV = \frac{1}{12} (0.501)(10,925) = 456 \text{ ft}^3 \]

**Water Quality Volume (WQV) = 456 ft}^3**

**Storage Volume in RS #3 = 515 ft}^3**

**Groundwater Recharge Volume**

Watershed Information
- Existing Impervious Cover = 27,773 ft²
- Proposed Impervious Cover = 26,058 ft²

\[ GRV = F \times I \]

Where:
- \( GRV \) = Required groundwater recharge volume
- \( F \) = Target depth factor = 0.25 in (HSG B)*
- \( I \) = Net increase in impervious area = 0 ft²

\[ GRV = \frac{0.25}{12} (0) = 0 \text{ ft}^3 \]

**Groundwater Recharge Volume (GRV) = 0 ft}^3**

**Storage Volume in Rain Garden, and RS #3 = 2,515 ft}^3**

**Runoff Reduction Volume (POC C)**

1-Year Storm Runoff Data
- Pre-development runoff volume = 13,082 ft³
- Post-development runoff volume (No BMPs) = 15,026 ft³

\[ RRV = 15,026 - 13,082 = 1,944 \text{ ft}^3 \]

**RRV = 1,944 ft}^3**

**Storage Volume in Rain Garden and RS #3 = 2,515 ft}^3**

**Drawdown Calculations**

Field infiltration rates have been calculated using Hydraulic Conductivity Testing. Field rates were significantly above the standard rate for HSG C soils, as a result Drawdown times have been calculated based on HSG B Loam rates of 0.52 in/hr. Refer to Appendix "F" for soil testing results.

**Proposed Retention System #1 Drawdown Time:**

\[ t_{\text{drawdown}} = \frac{DV}{kA} \]
Where:

\[ \begin{align*}
DV &= \text{Design Volume (Below orifice)} = 74 \text{ ft}^3 \\
k &= \text{Infiltration Rate} = 0.52 \text{ in/hr (L. HSG-B)*} \\
A &= \text{Bottom Area} = 616 \text{ ft}^2 \\
*(\text{Default Infiltration Rate for Silt Loam})
\end{align*} \]

\[ t_{\text{drawdown}} = \frac{74}{(0.52)(\sqrt{616})} = 2.8 \text{ hrs} \]

Retention System #1 will drawdown within 2.8 hrs. (Standard met)

**Proposed Retention System #2 Drawdown Time:**

\[ t_{\text{drawdown}} = \frac{DV}{kA} \]

Where:

\[ \begin{align*}
DV &= \text{Design Volume} = 803 \text{ ft}^3 \\
k &= \text{Infiltration Rate} = 0.52 \text{ in/hr (L. HSG-B)*} \\
A &= \text{Bottom Area} = 430 \text{ ft}^2 \\
*(\text{Default Infiltration Rate for Silt Loam})
\end{align*} \]

\[ t_{\text{drawdown}} = \frac{803}{(0.52)(\sqrt{430})} = 43.1 \text{ hrs} \]

Retention System #2 will drawdown within 43.1 hrs. (Standard met)

**Proposed Retention System #3 Drawdown Time:**

\[ t_{\text{drawdown}} = \frac{DV}{kA} \]

Where:

\[ \begin{align*}
DV &= \text{Design Volume} = 515 \text{ ft}^3 \\
k &= \text{Infiltration Rate} = 0.52 \text{ in/hr (L. HSG-B)*} \\
A &= \text{Bottom Area} = 288 \text{ ft}^2 \\
*(\text{Default Infiltration Rate for Silt Loam})
\end{align*} \]

\[ t_{\text{drawdown}} = \frac{515}{(0.52)(\sqrt{288})} = 41.3 \text{ hrs} \]

Retention System #3 will drawdown within 41.3 hrs. (Standard met)

**Proposed Rain Garden Drawdown Time:**

\[ t_{\text{drawdown}} = \frac{DV}{kA} \]

Where:

\[ \begin{align*}
DV &= \text{Design Volume} = 2,000 \text{ ft}^3 \\
k &= \text{Infiltration Rate} = 0.52 \text{ in/hr (L. HSG-B)*} \\
A &= \text{Bottom Area} = 2,000 \text{ ft}^2 \\
*(\text{Default Infiltration Rate for Silt Loam})
\end{align*} \]

Rocco V. D'Andrea, Inc
\[ t_{\text{drawdown}} = \frac{2,000}{(0.52)\left(\frac{1}{12}\right)(2,000)} = 23.1 \text{hrs} \]

The Rain Garden will drawdown within 23.1 hrs. (Standard met)

- **Total Suspended Solids Removal Rates**

- **Rain Garden:**
  \[ R = A + B - \frac{(AXB)}{100} \]
  
  \( R = \) Total TSS Removal Rate  
  \( A = \) TSS Removal Rate for Crushed Stone Bed = 90%

  Total Removal Rate (R) = 90.0%

- **Retention System #3:**
  \[ R = A + B - \frac{(AXB)}{100} \]
  
  \( R = \) Total TSS Removal Rate  
  \( A = \) TSS Removal Rate for Drywell System = 90%  
  \( B = \) TSS Removal Rate for Deep Sump Catch Basin = 25%

  \[ R = 25 + 90 - \frac{(25x90)}{100} = 92.5\% \]

  Total Removal Rate (R) = 92.5%
Appendix “D”

HydroCAD Analysis - Existing Conditions
### Area Listing (all nodes)

<table>
<thead>
<tr>
<th>Area (sq-ft)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>88,031</td>
<td>74.0</td>
<td>&gt;75% Grass cover, Good, HSG C (2S, 3S)</td>
</tr>
<tr>
<td>8,910</td>
<td>98.0</td>
<td>Paved parking, HSG C (1S, 3S)</td>
</tr>
<tr>
<td>11,377</td>
<td>98.0</td>
<td>Unconnected pavement, HSG C (3S)</td>
</tr>
<tr>
<td>6,372</td>
<td>99.0</td>
<td>Unconnected roofs, HSG C (3S)</td>
</tr>
<tr>
<td>1,114</td>
<td>99.0</td>
<td>Water Surface, HSG C (3S)</td>
</tr>
<tr>
<td>71,444</td>
<td>72.0</td>
<td>Woods/grass comb., Good, HSG C (1S, 2S, 3S)</td>
</tr>
</tbody>
</table>
### Summary for Subcatchment 1S: DA1

Runoff = 0.35 cfs @ 12.30 hrs, Volume= 1.648 cf, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>94</td>
<td>98.0</td>
<td>Paved parking, HSG C</td>
</tr>
<tr>
<td>5,905</td>
<td>72.0</td>
<td>Woods/grass comb., Good, HSG C</td>
</tr>
<tr>
<td>5,811</td>
<td>72.4</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>5,811</td>
<td>98.41</td>
<td>Pervious Area</td>
</tr>
<tr>
<td>94</td>
<td>1.59%</td>
<td>Impervious Area</td>
</tr>
</tbody>
</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>19.1</td>
<td>100</td>
<td>0.0250</td>
<td>0.09</td>
<td></td>
<td>Sheet Flow, 1) Sheet</td>
</tr>
<tr>
<td>0.3</td>
<td>0</td>
<td>0.0250</td>
<td>0.79</td>
<td></td>
<td>Woods: Light underbrush n= 0.400 P2%= 3.40&quot;</td>
</tr>
<tr>
<td>0.3</td>
<td>0</td>
<td>0.0250</td>
<td>0.79</td>
<td></td>
<td>Shallow Concentrated Flow, 2) Shallow</td>
</tr>
<tr>
<td>0.3</td>
<td>0</td>
<td>0.0250</td>
<td>0.79</td>
<td></td>
<td>Shallow Concentrated Flow, 3) Shallow</td>
</tr>
<tr>
<td>0.3</td>
<td>0</td>
<td>0.0250</td>
<td>0.79</td>
<td></td>
<td>Paved, Kv= 20.3 fps</td>
</tr>
</tbody>
</table>

21.1 360 Total

### Summary for Subcatchment 2S: DA2

Runoff = 1.19 cfs @ 12.13 hrs, Volume= 4.151 cf, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>98.0</td>
<td>Paved parking, HSG C</td>
</tr>
<tr>
<td>5,811</td>
<td>72.0</td>
<td>Woods/grass comb., Good, HSG C</td>
</tr>
<tr>
<td>8,780</td>
<td>72.0</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>14,666</td>
<td>72.8</td>
<td>Pervious Area</td>
</tr>
</tbody>
</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>7.8</td>
<td>100</td>
<td>0.0850</td>
<td>0.21</td>
<td></td>
<td>Sheet Flow, 1) Sheet</td>
</tr>
<tr>
<td>1.7</td>
<td>146</td>
<td>0.0850</td>
<td>1.46</td>
<td></td>
<td>Grass: Dense n= 0.240 P2%= 3.40&quot;</td>
</tr>
<tr>
<td>9.5</td>
<td>246</td>
<td>Total</td>
<td></td>
<td></td>
<td>Shallow Concentrated Flow, 2) Shallow</td>
</tr>
<tr>
<td>9.5</td>
<td>246</td>
<td>Total</td>
<td></td>
<td></td>
<td>Woodland, Kv= 5.0 fps</td>
</tr>
</tbody>
</table>

### Hydrograph

#### Subcatchment 1S: DA1
![Graph showing hydrograph data]

#### Subcatchment 2S: DA2
![Graph showing hydrograph data]
Summary for Subcatchment 3S: DA3

Runoff = 10.25 cfs @ 12.35 hrs, Volume = 51,516 cf, Depth > 3.71"

Runoff by SCS TR-20 method, Uh=SCS, Weighted-CN, Time Span = 0.00-24.00 hrs, dt = 0.01 hrs
Type III 24-hr 25-Year Rainfall = 6.40"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Adj</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,372</td>
<td>98.0</td>
<td></td>
<td>Unconnected roofs, HSG C</td>
</tr>
<tr>
<td>8,816</td>
<td>98.0</td>
<td></td>
<td>Paved parking, HSG C</td>
</tr>
<tr>
<td>11,377</td>
<td>98.0</td>
<td></td>
<td>Unconnected pavement, HSG C</td>
</tr>
<tr>
<td>1,114</td>
<td>98.0</td>
<td></td>
<td>Water Surface, HSG C</td>
</tr>
<tr>
<td>62,145</td>
<td>74.0</td>
<td></td>
<td>&gt;75% Grass cover, Good, HSG C</td>
</tr>
<tr>
<td>56,853</td>
<td>72.0</td>
<td></td>
<td>Woods/grass combo, Good, HSG C</td>
</tr>
<tr>
<td>166,677</td>
<td>77.3</td>
<td>76.0</td>
<td>Weighted Average, UI Adjusted</td>
</tr>
<tr>
<td>139,958</td>
<td>83.39%</td>
<td></td>
<td>Pervious Area</td>
</tr>
<tr>
<td>27,679</td>
<td>16.61%</td>
<td></td>
<td>Impervious Area</td>
</tr>
<tr>
<td>17,748</td>
<td>64.12%</td>
<td></td>
<td>Unconnected</td>
</tr>
</tbody>
</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>18.5</td>
<td>100</td>
<td>0.0270</td>
<td>0.09</td>
<td></td>
<td>Sheet Flow, 1) Sheet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Woods: Light underbrush n = 0.400 P2 = 3.40&quot;</td>
</tr>
<tr>
<td>5.1</td>
<td>250</td>
<td>0.0270</td>
<td>0.82</td>
<td></td>
<td>Shallow Concentrated Flow, 2) Shallow</td>
</tr>
<tr>
<td>1.0</td>
<td>217</td>
<td>0.0340</td>
<td>3.74</td>
<td></td>
<td>Woodland K = 5.0 fps</td>
</tr>
<tr>
<td>0.5</td>
<td>180</td>
<td>0.1400</td>
<td>5.61</td>
<td></td>
<td>Shallow Concentrated Flow, 3) Shallow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved K = 20.3 fps</td>
</tr>
<tr>
<td>25.1</td>
<td>747</td>
<td></td>
<td></td>
<td></td>
<td>Shallow Concentrated Flow, 4) Shallow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grasped Waterway K = 15.0 fps</td>
</tr>
</tbody>
</table>

Subcatchment 3S: DA3

Hydrograph

Type III 24-hr 25-Year Rainfall = 6.40"
Runoff Area = 166,677 sf
Runoff Volume = 51,516 cf
Runoff Depth > 3.71"
Flow Length = 747"
Tc = 25.1 min
UI Adjusted CN = 76.0
Summary for Link 4L: POC A

Inflow Area = 5,905 sf, 1.59% impervious, Inflow Depth > 3.35" for 25-Year event
Inflow = 0.35 cfs @ 12.30 hrs, Volume = 1,648 cf
Primary = 0.35 cfs @ 12.30 hrs, Volume = 1,648 cf, Attenuation = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-24.00 hrs, dt = 0.01 hrs

Summary for Link 5L: POC B

Inflow Area = 14,666 sf, 0.00% impervious, Inflow Depth > 3.40" for 25-Year event
Inflow = 1.19 cfs @ 12.13 hrs, Volume = 4,151 cf
Primary = 1.19 cfs @ 12.13 hrs, Volume = 4,151 cf, Attenuation = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-24.00 hrs, dt = 0.01 hrs
Summary for Link 6L: POC C

Inflow Area = 166,677 sf, 16.61% impervious, Inflow Depth > 3.71" for 25-Year event
Inflow = 10.25 cfs @ 12.35 hrs, Volume= 51,516 cf
Primary = 10.23 cfs @ 12.35 hrs, Volume= 51,516 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Subcatchment 1S: DA1
Runoff Area=5,905 sf 1.99% impervious  Runoff Depth=0.78”
Flow Length=360’ Tc=21.1 min  CN=72.4  Runoff=0.07 cfs 376 cf

Subcatchment 2S: DA2
Runoff Area=14,666 sf 0.00% impervious  Runoff Depth=0.78”
Flow Length=246’ Slope=0.0850’ Tc=9.5 min  CN=72.8  Runoff=0.25 cfs 959 cf

Subcatchment 3S: DA3
Runoff Area=166,677 sf 16.61% impervious  Runoff Depth=0.94”
Flow Length=747’ Tc=25.1 min  UI Adjusted CN=76.0  Runoff=2.46 cfs 13,082 cf

Link 4L: POC A
Inflow=0.07 cfs 376 cf
Primary=0.07 cfs 376 cf

Link 5L: POC B
Inflow=0 25 cfs 959 cf
Primary=0 25 cfs 959 cf

Link 6L: POC C
Inflow=2.46 cfs 13,082 cf
Primary=2.46 cfs 13,082 cf

Total Runoff Area = 187,248 sf  Runoff Volume = 14,417 cf  Average Runoff Depth = 0.92”
85.17% Pervious = 159,475 sf  14.83% Impervious = 27,773 sf
Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: DA1
Runoff Area=5,905 sf 1.59% Impervious Runoff Depth>1.65'
Flow Length=360' Tc=21.1 min CN=72.4 Runoff=0.17 cfs 834 cf

Subcatchment 2S: DA2
Runoff Area=14,666 sf 0.00% Impervious Runoff Depth>1.73'
Flow Length=246' Slope=0.050' Tc=9.5 min CN=72.8 Runoff=0.59 cfs 2,112 cf

Subcatchment 3S: DA3
Runoff Area=166,677 sf 16.61% Impervious Runoff Depth>1.96'
Flow Length=747' Tc=25.1 min UI Adjusted CN=76.0 Runoff=5.37 cfs 27,225 cf

Link 4L: POC A
Inflow=0.17 cfs 834 cf
Primary=0.17 cfs 834 cf

Link 5L: POC B
Inflow=0.59 cfs 2,112 cf
Primary=0.59 cfs 2,112 cf

Link 6L: POC C
Inflow=5.37 cfs 27,225 cf
Primary=5.37 cfs 27,225 cf

Total Runoff Area = 187,248 sf Runoff Volume = 30,170 cf Average Runoff Depth = 1.93'
85.17% Pervious = 159,475 sf 14.83% Impervious = 27,773 sf
Subcatchment 1S: DA1
Runoff Area=5,905 sf 1.59% Impervious  Runoff Depth>3.35"  
Flow Length=360' Tc=21.1 min  CN=72.4  Runoff=0.35 cfs 1,648 cf

Subcatchment 2S: DA2
Runoff Area=14,666 sf 0.00% Impervious  Runoff Depth>3.40"  
Flow Length=246' Slope=0.0850' Tc=9.5 min  CN=72.8  Runoff=1.19 cfs 4,151 cf

Subcatchment 3S: DA3
Runoff Area=166,677 sf 16.61% Impervious  Runoff Depth>3.71"  
Flow Length=747' Tc=25.1 min  UI Adjusted CN=76.0  Runoff=10.25 cfs 51,516 cf

Link 4L: POC A
Inflow=0.35 cfs 1,648 cf  
Primary=0.35 cfs 1,648 cf

Link 5L: POC B
Inflow=1.19 cfs 4,151 cf  
Primary=1.19 cfs 4,151 cf

Link 6L: POC C
Inflow=10.25 cfs 51,516 cf  
Primary=10.25 cfs 51,516 cf

Total Runoff Area = 187,248 sf  Runoff Volume = 57,315 cf  Average Runoff Depth = 3.67"  
85.17% Pervious = 159,475 sf  14.83% Impervious = 27,773 sf

Subcatchment 1S: DA1
Runoff Area=5,905 sf 1.59% Impervious  Runoff Depth>4.37"  
Flow Length=360' Tc=21.1 min  CN=72.4  Runoff=0.46 cfs 2,151 cf

Subcatchment 2S: DA2
Runoff Area=14,666 sf 0.00% Impervious  Runoff Depth>4.43"  
Flow Length=246' Slope=0.0850' Tc=9.5 min  CN=72.8  Runoff=1.55 cfs 5,410 cf

Subcatchment 3S: DA3
Runoff Area=166,677 sf 16.61% Impervious  Runoff Depth>4.77"  
Flow Length=747' Tc=25.1 min  UI Adjusted CN=76.0  Runoff=13.15 cfs 66,286 cf

Link 4L: POC A
Inflow=0.46 cfs 2,151 cf  
Primary=0.46 cfs 2,151 cf

Link 5L: POC B
Inflow=1.55 cfs 5,410 cf  
Primary=1.55 cfs 5,410 cf

Link 6L: POC C
Inflow=13.15 cfs 66,286 cf  
Primary=13.15 cfs 66,286 cf

Total Runoff Area = 187,248 sf  Runoff Volume = 73,847 cf  Average Runoff Depth = 4.73"  
85.17% Pervious = 159,475 sf  14.83% Impervious = 27,773 sf
29 Meadowcroft Existing Conditions

Type III 24-hr 100-Year Rainfall = 9.10" 
Prepared by Rocco V. D'Andrea, Inc. 
Printed 4/28/2020 
HydroCAD 10.00-24 s/n 07880 © 2018 HydroCAD Software Solutions LLC 

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

Subcatchment 1S: DA1 
Runoff Area = 5,906 sf 1.59% Impervious 
Runoff Depth = 0.00' 
Flow Length = 360' Tc = 21.1 min CN = 72.4 Runoff = 0.60 cfs 2,804 cf 

Subcatchment 2S: DA2 
Runoff Area = 14,666 sf 0.00% Impervious 
Runoff Depth = 0.00' 
Flow Length = 246' Slope = 0.0850' Tc = 9.5 min CN = 72.6 Runoff = 2.02 cfs 7,041 cf 

Subcatchment 3S: DA3 
Runoff Area = 166,677 sf 16.61% Impervious 
Runoff Depth = 0.08' 
Flow Length = 747' Tc = 25.1 min U1 Adjusted CN = 76.0 Runoff = 16.82 cfs 85,283 cf 

Link 4L: POC A 
Inflow = 0.60 cfs 2,804 cf 
Primary = 0.60 cfs 2,804 cf 

Link 5L: POC B 
Inflow = 2.02 cfs 7,041 cf 
Primary = 2.02 cfs 7,041 cf 

Link 6L: POC C 
Inflow = 16.82 cfs 85,283 cf 
Primary = 16.82 cfs 85,283 cf 

Total Runoff Area = 187,248 sf Runoff Volume = 95,128 cf Average Runoff Depth = 0.10" 
85.17% Pervious = 199,475 sf 14.83% Impervious = 27,773 sf
Appendix “E”

HydroCAD Analysis -
Proposed Conditions
Area Listing (all nodes)

<table>
<thead>
<tr>
<th>Area (sq-ft)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>112,581</td>
<td>74.0</td>
<td>&gt;75% Grass cover, Good, HSG C (2S, 3S, 5S, 7S, 8S)</td>
</tr>
<tr>
<td>7,808</td>
<td>98.0</td>
<td>Paved parking, HSG C (3S, 5S)</td>
</tr>
<tr>
<td>10,124</td>
<td>98.0</td>
<td>Roofs, HSG C (4S, 6S)</td>
</tr>
<tr>
<td>11,075</td>
<td>98.0</td>
<td>Unconnected pavement, HSG C (3S, 5S, 7S)</td>
</tr>
<tr>
<td>963</td>
<td>98.0</td>
<td>Water Surface, HSG C (7S)</td>
</tr>
<tr>
<td>36,195</td>
<td>72.0</td>
<td>Woods/grass comb., Good, HSG C (1S, 2S, 3S, 8S)</td>
</tr>
</tbody>
</table>
### Summary for Subcatchment 1S: DA1

Runoff = 0.35 cfs @ 12.30 hrs, Volume= 1,628 cf, Depth> 3.31"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dw= 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>5,904</td>
<td>72.0</td>
<td>Woods/grass comb., Good, HSG C</td>
</tr>
<tr>
<td>5,904</td>
<td></td>
<td>100.00% Pervious Area</td>
</tr>
</tbody>
</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>19.1</td>
<td>100</td>
<td>0.0250</td>
<td>0.09</td>
<td></td>
<td>Sheet Flow, 1) Sheet Woods: Light underbrush n= 0.400 P2= 3.40&quot;</td>
</tr>
<tr>
<td>0.3</td>
<td>13</td>
<td>0.0250</td>
<td>0.79</td>
<td></td>
<td>Shallow Concentrated Flow, 2) Shallow Woodland Kv= 5.0 fps</td>
</tr>
<tr>
<td>1.7</td>
<td>247</td>
<td>0.0140</td>
<td>2.40</td>
<td></td>
<td>Shallow Concentrated Flow, 3) Shallow Paved Kv= 20.3 fps</td>
</tr>
<tr>
<td>21.1</td>
<td>360</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Subcatchment 1S: DA1 Hydrograph

Type III 24-hr 25-Year Rainfall=6.40"  
Runoff Area=5,904 sf  
Runoff Volume=1,628 cf  
Runoff Depth>3.31"  
Flow Length=360'  
Tc=21.1 min  
CN=72.0

### Summary for Subcatchment 2S: DA2

Runoff = 0.95 cfs @ 12.13 hrs, Volume= 3,267 cf, Depth> 3.39"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dw= 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>98.0</td>
<td></td>
<td>Paved parking, HSG C</td>
</tr>
<tr>
<td>3,864</td>
<td>74.0</td>
<td>&gt;75% Grass cover, Good, HSG C</td>
</tr>
<tr>
<td>7,711</td>
<td>72.0</td>
<td>Wood/grass comb., Good, HSG C</td>
</tr>
<tr>
<td>11,575</td>
<td>72.7</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>11,575</td>
<td></td>
<td>100.00% Pervious Area</td>
</tr>
</tbody>
</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>8.9</td>
<td>100</td>
<td>0.0600</td>
<td>0.19</td>
<td></td>
<td>Sheet Flow, 1) Sheet Grass: Dense n= 0.240 P2= 3.40&quot;</td>
</tr>
<tr>
<td>0.2</td>
<td>12</td>
<td>0.0600</td>
<td>1.22</td>
<td></td>
<td>Shallow Concentrated Flow, 2) Shallow Woodland Kv= 5.0 fps</td>
</tr>
<tr>
<td>9.1</td>
<td>112</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Subcatchment 2S: DA2 Hydrograph

Type III 24-hr 25-Year Rainfall=6.40"  
Runoff Area=11,575 sf  
Runoff Volume=3,267 cf  
Runoff Depth>3.39"  
Flow Length=112'  
Tc=9.1 min  
CN=72.7
Summary for Subcatchment 3S: DA3

Runoff = 3.77 cfs @ 12.31 hrs, Volume = 17,997 cf, Depth > 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-24.00 hrs, d=0.01 hrs
Type II 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Adj</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>98.0</td>
<td></td>
<td>Unconnected roofs, HSG C</td>
</tr>
<tr>
<td>5,111</td>
<td>98.0</td>
<td></td>
<td>Paved parking, HSG C</td>
</tr>
<tr>
<td>486</td>
<td>98.0</td>
<td></td>
<td>Unconnected pavement, HSG C</td>
</tr>
<tr>
<td>34,191</td>
<td>74.0</td>
<td></td>
<td>&gt;75% Grass cover, Good, HSG C</td>
</tr>
<tr>
<td>18,215</td>
<td>72.0</td>
<td></td>
<td>Wood/grass comb., Good, HSG C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>59,005</td>
<td>75.6</td>
<td>75.5</td>
<td>Weighted Average, UI Adjusted</td>
</tr>
<tr>
<td>53,406</td>
<td>90.51% Pervious Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5,599</td>
<td>9.49% Impervious Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>488</td>
<td>8.72% Unconnected</td>
<td></td>
<td></td>
</tr>
</tbody>
</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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<tbody>
<tr>
<td>20.8</td>
<td>100</td>
<td>0.0200</td>
<td>0.08</td>
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<td>Sheet Flow, 1) Sheet</td>
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<tr>
<td>0.9</td>
<td>38</td>
<td>0.0200</td>
<td>0.71</td>
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<td>Shallow Concentrated Flow, 2) Shallow</td>
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<tr>
<td>0.4</td>
<td>77</td>
<td>0.0500</td>
<td>3.35</td>
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<td>Shallow Concentrated Flow, 3) Shallow</td>
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<tr>
<td>0.1</td>
<td>29</td>
<td>0.0300</td>
<td>3.52</td>
<td></td>
<td>Shallow Concentrated Flow, 4) Shallow</td>
</tr>
</tbody>
</table>

22.2  244  Total

Subcatchment 3S: DA3

Hydrograph

Type II 24-hr 25-Year Rainfall=6.40"
Runoff Area = 59,005 sf
Runoff Volume = 17,997 cf
Runoff Depth = 3.66"
Flow Length = 244'
Tc = 22.2 min
UI Adjusted CN = 75.5
Summary for Subcatchment 4S: DA4

Runoff = 1.26 cfs @ 12.07 hrs, Volume = 4,333 cf, Depth > 6.16"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.40"  

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,445</td>
<td>98.0</td>
<td>Roofs, HSG C</td>
</tr>
<tr>
<td>8,445</td>
<td>100.0% Impervious Area</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc</th>
<th>Length (ft)</th>
<th>Slope</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Entry, Roofs</td>
</tr>
</tbody>
</table>

Subcatchment 4S: DA4

Type III 24-hr 25-Year Rainfall=6.40"  
Runoff Area=8,445 sf  
Runoff Volume=4,333 cf  
Runoff Depth>6.16"  
Tc=5.0 min  
CN=98.0

Summary for Subcatchment 5S: DA5

Runoff = 0.83 cfs @ 12.17 hrs, Volume = 3,201 cf, Depth > 4.16"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=6.40"  

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,697</td>
<td>98.0</td>
<td>Pavement, HSG C</td>
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<tr>
<td>2,635</td>
<td>74.0</td>
<td>&gt;75% Grass cover, Good, HSG C</td>
</tr>
<tr>
<td>3,913</td>
<td>72.0</td>
<td>Woods/grass comb., Good, HSG C</td>
</tr>
<tr>
<td>9,245</td>
<td>80.2</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>6,548</td>
<td>70.83% Pervious Area</td>
<td></td>
</tr>
<tr>
<td>2,697</td>
<td>29.17% Impervious Area</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc</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>9.0</td>
<td>61</td>
<td>0.0600</td>
<td>0.11</td>
<td></td>
<td>Sheet Flow, 1) Sheet Woods, Light underbrush n= 0.400 P2= 3.40&quot;</td>
</tr>
<tr>
<td>3.7</td>
<td>39</td>
<td>0.0800</td>
<td>0.17</td>
<td></td>
<td>Sheet Flow, 2) Sheet Grass Dense n= 0.240 P2= 3.40&quot;</td>
</tr>
<tr>
<td>0.2</td>
<td>40</td>
<td>0.0800</td>
<td>4.24</td>
<td></td>
<td>Shallow Concentrated Flow, 3) Shallow Grassed Waterway Kc= 15.0 fps</td>
</tr>
</tbody>
</table>

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>12.9</td>
<td>140</td>
<td>Total</td>
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<td></td>
<td></td>
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</table>

Subcatchment 5S: DA5

Type III 24-hr 25-Year Rainfall=6.40"  
Runoff Area=9,245 sf  
Runoff Volume=3,201 cf  
Runoff Depth>4.16"  
Flow Length=140'  
Tc=12.9 min  
CN=80.2
Summary for Subcatchment 6S: DA6

Runoff = 0.25 cfs @ 12.07 hrs, Volume= 662 cf, Depth> 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
<tr>
<th>Area (ft²)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,679</td>
<td>98.0</td>
<td>Roofs, HSG C</td>
</tr>
<tr>
<td>1,679</td>
<td>100.00%</td>
<td>Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc</th>
<th>Length (ft)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Entry, Roofs</td>
</tr>
</tbody>
</table>

Subcatchment 6S: DA6

Hydrograph

Summary for Subcatchment 7S: DA7

Runoff = 2.15 cfs @ 12.07 hrs, Volume= 6,561 cf, Depth> 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.40"

<table>
<thead>
<tr>
<th>Area (ft²)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>963</td>
<td>98.0</td>
<td>Water Surface, HSG C</td>
</tr>
<tr>
<td>6,674</td>
<td>98.0</td>
<td>Unconnected pavement, HSG C</td>
</tr>
<tr>
<td>9,276</td>
<td>98.0</td>
<td>Roofs, HSG C</td>
</tr>
<tr>
<td>0</td>
<td>74.9</td>
<td>&gt;75% Grass cover, Good, HSG C</td>
</tr>
<tr>
<td>16,913</td>
<td>84.8</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>9,276</td>
<td>54.85%</td>
<td>Pervious Area</td>
</tr>
<tr>
<td>7,637</td>
<td>45.15%</td>
<td>Impervious Area</td>
</tr>
<tr>
<td>6,674</td>
<td>87.39%</td>
<td>Unconnected</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Tc</th>
<th>Length (ft)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Entry, PATIO</td>
</tr>
</tbody>
</table>

Subcatchment 7S: DA7

Hydrograph
Summary for Subcatchment 8S: DA8

Runoff = 5.65 cfs @ 12.13 hrs, Volume = 19,403 cf, Depth = 3.51".

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-24.00 hrs, dt = 0.01 hrs
Type II 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>0</td>
<td>98.0</td>
<td>Water Surface, HSG C</td>
</tr>
<tr>
<td>0</td>
<td>98.0</td>
<td>Unconnected pavement, HSG B</td>
</tr>
<tr>
<td>0</td>
<td>98.0</td>
<td>Unconnected pavement, HSG C</td>
</tr>
<tr>
<td>63,015</td>
<td>74.0</td>
<td>&gt;75% Grass cover, Good, HSG C</td>
</tr>
<tr>
<td>3,365</td>
<td>72.0</td>
<td>Woodsgrass comb., Good, HSG C</td>
</tr>
<tr>
<td>68,380</td>
<td>73.9</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>68,380</td>
<td>100.0%</td>
<td>Pervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (feet/th rate)</th>
<th>Velocity (fps)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.8</td>
<td>76</td>
<td>0.1000</td>
<td>0.22</td>
<td>Sheet Flow, 1 Sheet Grass: Dense n = 0.240 P2 = 3.40&quot;</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>24</td>
<td>0.1000</td>
<td>0.17</td>
<td>Sheet Flow, 2 Sheet Grass: Dense n = 0.240 P2 = 3.40&quot;</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>288</td>
<td>0.1000</td>
<td>4.74</td>
<td>Shallow Concentrated Flow, 3 Shallow Grassed Waterway Kv = 15.0 fps</td>
<td></td>
</tr>
<tr>
<td>9.1</td>
<td>388</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subcatchment 8S: DA8

Type II 24-hr 25-Year Rainfall = 6.40"
Runoff Area = 66,380 sf
Runoff Volume = 19,403 cf
Runoff Depth = 3.51"
Flow Length = 388'
Slope = 0.1000 '/'
Tc = 9.1 min
CN = 73.9

Summary for Pond 1P: RG

Inflow Area = 67,450 sf, 20.82% Impervious, Inflow Depth > 3.97" for 25-Year event
Flow = 4.22 cfs @ 12.30 hrs, Volume = 22,330 cf
Outlet = 4.21 cfs @ 12.31 hrs, Volume = 20,279 cf, Attenuation = 6%, Latent = 1.1 min
Primary = 6.00 cfs @ 0.00 hrs, Volume = 0 cf
Secondary = 2.80 cfs @ 12.31 hrs, Volume = 17,306 cf
Tertiary = 1.41 cfs @ 12.31 hrs, Volume = 2,973 cf

Routing by Dyn-Store-Ind method, Time Span = 0.00-24.00 hrs, dt = 0.01 hrs
Peak Elev = 287.47 @ 12.31 hrs Surf Area = 10,844 sf Storage = 2,557 cf
Plug-Flow detention time = 73.7 min calculated for 20,271 cf of inflow
Center-of-Mass det. time = 26.7 min (845.5 - 816.8)

<table>
<thead>
<tr>
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<th>Invert</th>
<th>Available Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>284.20</td>
<td>800 cf</td>
<td>stone reservoir course (Prismatic) Listed below (Recalc)</td>
</tr>
<tr>
<td>#2</td>
<td>285.20</td>
<td>180 cf</td>
<td>Custom Stage Data (Prismatic) Listed below (Recalc)</td>
</tr>
<tr>
<td>#3</td>
<td>285.50</td>
<td>900 cf</td>
<td>Bioretention soil course (Prismatic) Listed below (Recalc)</td>
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<tr>
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<td>120 cf</td>
<td>Mulch Layer (Prismatic) Listed below (Recalc)</td>
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<td>#5</td>
<td>287.20</td>
<td>2,860 cf</td>
<td>Surface Ponding (Prismatic) Listed below (Recalc)</td>
</tr>
</tbody>
</table>

Volume = 4,860 cf Total Available Storage
### 29 Meadowcroft Proposed Conditions_rev4

**Type III 24-hr 25-Year Rainfall=6.40”**

Prepared by Rocco V. D'Andrea, Inc.  
Printed 4/20/2021  
HydroCAD 10.03-24  
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---

**Device Routing**  
- **#1 Secondary**  
  - 284.20  
  - 8.0” Round Culvert  
  - L= 50.0’, CPP, square edge headwall, $K_e = 0.500$  
  - Inlet / Outlet Invert= 284.20’ / 280.00’ $S_e = 0.0840$’ $C_e = 0.900$  
  - $n = 0.010$ PVC, smooth interior, Flow Area= 0.35 sf  

- **#2 Device 1**  
  - 287.20  
  - 24.0” x 12.0” Horiz. Orifice/Grate  
  - C= 0.600  
  - Limited to weir flow at low heads

- **#3 Tertiary**  
  - 284.20  
  - 8.0” Round Culvert  
  - L= 50.0’, CPP, square edge headwall, $K_e = 0.500$  
  - Inlet / Outlet Invert= 284.20’ / 280.00’ $S_e = 0.0840$’ $C_e = 0.900$  
  - $n = 0.010$ PVC, smooth interior, Flow Area= 0.35 sf

- **#4 Device 3**  
  - 287.30  
  - 24.0” x 12.0” Horiz. Orifice/Grate  
  - C= 0.600  
  - Limited to weir flow at low heads

- **#5 Primary**  
  - 287.70  
  - 24.0” x 12.0” Horiz. Orifice/Grate X 2.00  
  - C= 0.600  
  - Limited to weir flow at low heads

**Primary Outflow**  
- Max=0.00 cfs @ 0.00 hrs, HW=284.20’ $TW=0.00’$ (Dynamic Tailwater)  
- $S_e=0$ Orifice/Grate (Controls 0.00 cfs)

**Secondary Outflow**  
- Max=2.80 cfs @ 12.31 hrs HW=287.47’ $TW=283.90’$ (Dynamic Tailwater)  
- L=Culvert (Passes 2.80 cfs of 2.88 cfs potential flow)

**Tertiary Outflow**  
- Max=1.41 cfs @ 12.31 hrs HW=287.47’ $TW=284.00’$ (Dynamic Tailwater)  
- L=Culvert (Passes 1.41 cfs of 2.88 cfs potential flow)

---

**Pond 1P: RG**

**Inflow Area=67,450**  
**Peak Elev=287.47’**  
**Storage=2,557 cf**

---

### Stage-Area-Storage for Pond 1P: RG

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<thead>
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<th>Elevation (feet)</th>
<th>Storage (cubic-feet)</th>
<th>Elevation (feet)</th>
<th>Storage (cubic-feet)</th>
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</table>
Summary for Pond 2P: RS #1

Inflow = 2.80 cfs @ 12.31 hrs, Volume = 17,306 cf
Outflow = 2.78 cfs @ 12.34 hrs, Volume = 17,168 cf, Atten=1%, Lag=1.7 min
Primary = 2.78 cfs @ 12.34 hrs, Volume = 17,168 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt=0.01 hrs
Peak Elev= 283.91' @ 12.34 hrs
Surf.Area= 616 sf Storage= 1,320 cf
Plug-Flow detention time = 14.2 min calculated for 17,181 cf (99% of inflow)
Center-of-Mass detention time = 10.3 min (873.6 - 863.3)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A: 280.80'</td>
<td>546 cf</td>
<td>16.00' x 38.50'</td>
<td>x 3.54'H Field A</td>
</tr>
<tr>
<td>#2A: 281.00'</td>
<td>816 cf</td>
<td>16.00' x 38.50'</td>
<td>x 3.54'H Field A</td>
</tr>
</tbody>
</table>

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size = 47.8' x 30.0'H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size = 52.0'W x 30.5'H x 8.50'L with 1.50' Overlap
Row Length Adjustment = +1.50' x 7.45 sf x 3 rows
52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

Chamber Storage + Stone Storage = 1,362.2 cf = 0.031 af
Overall Storage Efficiency = 62.4%
Overall System Size = 38.50' x 16.00' x 3.54'

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Pond 2P: RS #1 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size = 47.8' x 30.0'H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size = 52.0'W x 30.5'H x 8.50'L with 1.50' Overlap
Row Length Adjustment = +1.50' x 7.45 sf x 3 rows
52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0' End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf of Chamber Storage
2,181.7 cf Field - 815.9 cf of Chambers = 1,365.8 cf of Stone x 40.0% Voids = 546.3 cf of Stone Storage

Chamber Storage + Stone Storage = 1,362.2 cf = 0.031 af
Overall Storage Efficiency = 62.4%
Overall System Size = 38.50' x 16.00' x 3.54'

15 Chambers
60.8 cf Field
50.8 cf Stone
Peak Elev=283.9 ft
Storage=1,330 cf
Summary for Pond 3P: RS #2

Inflow
1.41 cfs @ 12.31 hrs, Volume= 2,973 cf

Outflow
1.40 cfs @ 12.33 hrs, Volume= 2,170 cf, Atten= 1%, Lag= 1.1 min

Primary
1.40 cfs @ 12.33 hrs, Volume= 2,170 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 284.00' @ 12.33 hrs Surv.Area= 430 sf Storage= 929 cf
Plug-Flow detention time= 15.9 min calculated for 2,170 cf (73% of inflow)
Center-of-Mass det. time= 6.7 min (750.9 - 742.2)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Available Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>280.50'</td>
<td>391 cf</td>
<td>11.17&quot;W x 38.50'L x 3.54'H Field A</td>
</tr>
<tr>
<td>#2A</td>
<td>281.00'</td>
<td>544 cf</td>
<td>Cultec R-330XLHD x 10 Inside #1</td>
</tr>
</tbody>
</table>

Effective Size= 47.8" W x 30.0" H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0" W x 30.5" H x 8.50'L with 1.50' overlap
Row Length Adjustment= +1.50' x 7.45 sf x 2 rows

935 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Primary 283.30' 10.0" Round Culvert
L= 15.0" CPP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 283.30' / 279.20' S= 0.2733' T Cc= 0.000
n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary Outflow Max=1.40 cfs @ 12.33 hrs HW=284.00' TW=0.00' (Dynamic Tailwater)

---

Pond 3P: RS #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8" W x 30.0" H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0" W x 30.5" H x 8.50'L with 1.50' overlap
Row Length Adjustment= +1.50' x 7.45 sf x 2 rows

5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0' End Stone x 2 = 38.50' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 35.4' Field Height

10 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 543.9 cf Chamber Storage
1,522.6 cf Field - 543.9 cf Chambers = 978.7 cf Stone x 40.0% Voids = 391.5 cf Stone Storage

Chamber Storage + Stone Storage = 935.4 cf - 0.021 af
Overall Storage Efficiency = 61.4%
Overall System Size = 38.50' x 11.17' x 3.54'

10 Chambers
56.4 cy Field
36.2 cy Stone
Summary for Pond 4P: RS #3

**Inflow Area =** 10,924 sf, 40.06% impervious, inflow Depth > 4.46" for 25-Year event

**Inflow =** 0.97 cfs @ 12.17 hrs, Volume= 4,063 cft

**Outflow =** 0.97 cfs @ 12.17 hrs, Volume= 3,540 cft, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, d= 0.01 hrs
Peak Elev= 283.85' @ 12.17 hrs Surf.Area= 286 sf Storage= 581 cft
Plug-Flow detention time= 93.3 min calculated for 3,539 cft (87% of inflow)
Center-of-Mass det. time= 35.6 min (836.0 - 800.4)

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<thead>
<tr>
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<th>Invert</th>
<th>Avail Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A 280.50'</td>
<td>279 cf</td>
<td>6.33'W x 45.50'L x 3.54'H Field A</td>
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<tr>
<td>#2A 281.00'</td>
<td>324 cf</td>
<td>Cultec R-330XLHD x 8 Inside #1</td>
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</table>

- Effective Size= 47.5'W x 30.0'H x 7.45'F x 7.00'L x 52.2 cft
- Overall Size= 52.0'W x 30.5'H x 8.50'L with 1.50' Overlap
- Row Length Adjustment= +1.50' x 7.45' x 1 rows

- 360 cft Total Available Storage

Storage Group A created with Chamber Wizard

**Device Routing Invert Outlet Devices**

1. Primary 283.30' 10.00' Round Culvert
   - L= 15.0' CIP, square edge headwall, Ke= 0.500
   - Inlet / Outlet Invert= 283.30' / 278.80', S= 0.3000', Cc= 0.900
   - n= 0.010 PVC, smooth interior, Flow Area= 0.65 sf

**Primary Outflow Max=0.97 cfs @ 12.17 hrs HW= 283.85' TW=0.00' (Dynamic Tailwater)**

1. Culvert (Inlet Controls 0.97 cfs @ 2.53 fps)
Inflow Area = 10,924 sq ft
Peak Elev = 283.85'
Storage = 581 cf
10.0”
Round Culvert
n = 0.010
L = 15.0’
S = 0.300’/’
Summary for Link 4L: POC A

Inflow Area = 5,904 sf, 0.00% Impervious, Inflow Depth > 3.31" for 25-Year event
Inflow = 0.35 cfs @ 12.30 hrs, Volume= 1,628 cf
Primary = 0.35 cfs @ 12.30 hrs, Volume= 1,628 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 5L: POC B

Inflow Area = 11,575 sf, 0.00% Impervious, Inflow Depth > 3.39" for 25-Year event
Inflow = 0.95 cfs @ 12.13 hrs, Volume= 3,267 cf
Primary = 0.95 cfs @ 12.13 hrs, Volume= 3,267 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Summary for Link 6L: POC C

Inflow Area = 161,667 sf, 16.12% Impervious, Inflow Depth > 3.63" for 25-Year event
Inflow = 9.96 cfs @ 12.14 hrs, Volume= 48,862 cf
Primary = 9.96 cfs @ 12.14 hrs, Volume= 48,862 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Inflow Area=161,667 sf
Subcatchment 1S: DA1

Runoff Area = 5,904 ft²
0.00% Impervious
Runoff Depth = 0.74".
Flow Length = 360' Tc = 21.1 min CN = 72.0 Runoff = 0.07 cf/s 366 cf

Subcatchment 2S: DA2

Runoff Area = 11,575 ft²
0.00% Impervious
Runoff Depth = 0.78".
Flow Length = 112' Slope = 0.060' Tc = 9.1 min CN = 72.7 Runoff = 0.20 cf/s 753 cf

Subcatchment 3S: DA3

Runoff Area = 59,005 ft²
9.49% Impervious
Runoff Depth = 0.92".
Flow Length = 244' Tc = 22.2 min UI Adjusted CN = 75.5 Runoff = 0.89 cf/s 4,506 cf

Subcatchment 4S: DA4

Runoff Area = 8,445 ft²
100.00% Impervious
Runoff Depth = 2.67".
Tc = 5.0 min CN = 98.0 Runoff = 0.56 cf/s 1,877 cf

Subcatchment 5S: DA5

Runoff Area = 9,245 ft²
29.17% Impervious
Runoff Depth = 1.18".
Flow Length = 140' Tc = 12.9 min CN = 80.2 Runoff = 0.23 cf/s 912 cf

Subcatchment 6S: DA6

Runoff Area = 1,679 ft²
100.00% Impervious
Runoff Depth = 2.67".
Tc = 5.0 min CN = 98.0 Runoff = 0.11 cf/s 373 cf

Subcatchment 7S: DA7

Runoff Area = 16,913 ft²
45.15% Impervious
Runoff Depth = 1.49".
Tc = 6.0 min CN = 84.8 Runoff = 0.70 cf/s 2,098 cf

Subcatchment 8S: DA8

Runoff Area = 66,380 ft²
0.00% Impervious
Runoff Depth = 0.84".
Flow Length = 388' Slope = 1.000' Tc = 9.1 min CN = 73.9 Runoff = 1.24 cf/s 4,638 cf

Pond 1P: RG

Peak Elev = 287.32' Storage = 2,342 cf Inflow = 1.08 cf Outflow = 0.87 cf 6,383 cf
Primary = 0.00 ft² Secondary = 0.81 ft² Tertiary = 0.05 ft² 29 cf Outflow = 0.87 cf 4,357 cf

Pond 2P: RS #1

Peak Elev = 281.67' Storage = 460 cf Inflow = 0.81 cf Outflow = 0.53 cf 4,229 cf

Pond 3P: RS #2

Peak Elev = 280.67' Storage = 29 cf Inflow = 0.05 cf 29 cf 10.0' Round Culvert n=0.010 L=15.0' S=0.2733' Outflow = 0.00 cf 0 cf

Pond 4P: RS #3

Peak Elev = 283.52' Storage = 542 cf Inflow = 0.30 cf 1,285 cf 10.0' Round Culvert n=0.010 L=15.0' S=0.3000' Outflow = 0.18 cf 766 cf

Link 4L: POC A

Inflow = 0.07 cf 366 cf Primary = 0.07 cf 366 cf

Link 5L: POC B

Inflow = 0.20 cf 753 cf Primary = 0.20 cf 753 cf

Link 6L: POC C

Inflow = 1.83 cf 11,730 cf Primary = 1.83 cf 11,730 cf

Total Runoff Area = 179,146 ft² Runoff Volume = 15,523 ft³ Average Runoff Depth = 1.04"
85.45% Pervious = 153,089 ft³ 14.55% Impervious = 26,057 ft³
Subcatchment 1S: DA1
Runoff Area=5,904 sf
Runoff Depth=1.87" Flow Length=360' Tc=21.1 min CN=72.0 Runoff=0.17 cf 819 cfs

Subcatchment 2S: DA2
Runoff Area=11,575 sf
Runoff Depth=1.72" Flow Length=112' Slope=0.0600' Tc=9.1 min CN=72.7 Runoff=0.47 cf 1,660 cfs

Subcatchment 3S: DA3
Runoff Area=59,005 sf
Runoff Depth=1.92" Flow Length=244' Tc=22.2 min Ul Adjusted CN=75.5 Runoff=1.96 cf 9,456 cfs

Subcatchment 4S: DA4
Runoff Area=8,445 sf
Runoff Depth=4.06" Tc=5.0 min CN=98.0 Runoff=0.84 cf 2,858 cfs

Subcatchment 5S: DA5
Runoff Area=9,245 sf
Runoff Depth=2.30" Flow Length=140' Tc=12.9 min CN=80.2 Runoff=0.46 cf 1,774 cfs

Subcatchment 6S: DA6
Runoff Area=1,679 sf
Runoff Depth=4.06" Tc=5.0 min CN=98.0 Runoff=0.17 cf 568 cfs

Subcatchment 7S: DA7
Runoff Area=16,913 sf
Runoff Depth=2.71" Tc=5.0 min CN=81.8 Runoff=1.27 cf 3,815 cfs

Subcatchment 8S: DA8
Runoff Area=66,380 sf
Runoff Depth=1.81" Flow Length=388' Slope=0.000' Tc=9.1 min CN=73.9 Runoff=2.86 cf 10,005 cfs

Pond 1P: RG
Peak Elev=287.39' Storage=2.394 cf Inflow=2.26 cf 12,314 cfs

Pond 2P: RS #1
Peak Elev=283.43' Storage=1.211 cf Inflow=1.68 cf 9,354 cfs

Pond 3P: RS #2
Peak Elev=283.50' Storage=0.57 cf 10.0' Round Culvert n=0.013 L=15.0' S=0.2733' Outflow=0.15 cf 120 cfs

Pond 4P: RS #3
Peak Elev=283.70' Storage=0.56 cf 10.0' Round Culvert n=0.010 L=15.0' S=0.0000' Outflow=0.56 cf 1,621 cfs

Link 4L: POC A
Inflow=0.17 cf 819 cfs Primary=0.17 cf 819 cfs

Link 5L: POC B
Inflow=0.47 cf 1,660 cfs Primary=0.47 cf 1,660 cfs

Link 6L: POC C
Inflow=4.78 cf 25,008 cfs Primary=4.78 cf 25,008 cfs

Total Runoff Area = 179,146 sf Runoff Volume = 30,956 cf Average Runoff Depth = 2.07" 85.45% Pervious = 153,089 sf 14.55% Impervious = 26,057 sf

Subcatchment 1S: DA1
Runoff Area=5,904 sf
Runoff Depth=2.26" Flow Length=360' Tc=21.1 min CN=72.0 Runoff=0.24 cf 1,114 cfs

Subcatchment 2S: DA2
Runoff Area=11,575 sf
Runoff Depth=2.33" Flow Length=112' Slope=0.0600' Tc=9.1 min CN=72.7 Runoff=0.65 cf 2,247 cfs

Subcatchment 3S: DA3
Runoff Area=59,005 sf
Runoff Depth=2.96" Flow Length=244' Tc=22.2 min Ul Adjusted CN=75.5 Runoff=2.63 cf 12,597 cfs

Subcatchment 4S: DA4
Runoff Area=8,445 sf
Runoff Depth=4.88" Tc=5.0 min CN=98.0 Runoff=1.00 cf 3,420 cfs

Subcatchment 5S: DA5
Runoff Area=9,245 sf
Runoff Depth=2.99" Flow Length=140' Tc=12.9 min CN=80.2 Runoff=0.60 cf 2,305 cfs

Subcatchment 6S: DA6
Runoff Area=1,679 sf
Runoff Depth=4.86" Tc=5.0 min CN=98.0 Runoff=0.20 cf 680 cfs

Subcatchment 7S: DA7
Runoff Area=16,913 sf
Runoff Depth=3.44" Tc=5.0 min CN=84.8 Runoff=1.61 cf 4,845 cfs

Subcatchment 8S: DA8
Runoff Area=66,380 sf
Runoff Depth=2.43" Flow Length=388' Slope=0.000' Tc=9.1 min CN=73.9 Runoff=3.89 cf 13,447 cfs

Pond 1P: RG
Peak Elev=287.43' Storage=2.469 cf Inflow=2.99 cf 16,017 cfs

Pond 2P: RS #1
Peak Elev=283.66' Storage=1.269 cf Inflow=2.10 cf 12,313 cfs

Pond 3P: RS #2
Peak Elev=283.78' Storage=0.87 cf 10.0' Round Culvert n=0.010 L=15.0' S=0.0000' Outflow=0.77 cf 656 cfs

Pond 4P: RS #3
Peak Elev=283.76' Storage=0.71 cf 10.0' Round Culvert n=0.010 L=15.0' S=0.0000' Outflow=0.71 cf 2,463 cfs

Link 4L: POC A
Inflow=0.24 cf 1114 cfs Primary=0.24 cf 1114 cfs

Link 5L: POC B
Inflow=0.65 cf 2,247 cfs Primary=0.65 cf 2,247 cfs

Link 6L: POC C
Inflow=6.82 cf 33,815 cfs Primary=6.82 cf 33,815 cfs

Total Runoff Area = 179,146 sf Runoff Volume = 40,655 cf Average Runoff Depth = 2.72" 85.45% Pervious = 153,089 sf 14.55% Impervious = 26,057 sf
<table>
<thead>
<tr>
<th>Subcatchment 1S: DA1</th>
<th>Runoff Area = 5,904 sf</th>
<th>0.00% Impervious</th>
<th>Runoff Depth = 3.31&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flow Length = 360' Tc=21.1 min CN = 72.2 Runoff = 0.36 cfs 1,626 cf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcatchment 2S: DA2</td>
<td>Runoff Area = 11,575 sf</td>
<td>0.00% Impervious</td>
<td>Runoff Depth = 3.39&quot;</td>
</tr>
<tr>
<td></td>
<td>Flow Length = 112' Slope = 0.0600' Tc=9.1 min CN = 72.7 Runoff = 0.95 cfs 3,267 cf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcatchment 3S: DA3</td>
<td>Runoff Area = 59,005 sf</td>
<td>9.49% Impervious</td>
<td>Runoff Depth = 3.66&quot;</td>
</tr>
<tr>
<td></td>
<td>Flow Length = 244' Tc=22.2 min UI Adjusted CN = 75.5 Runoff = 3.77 cfs 17,997 cf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcatchment 4S: DA4</td>
<td>Runoff Area = 8,445 sf</td>
<td>100.00% Impervious</td>
<td>Runoff Depth = 6.16&quot;</td>
</tr>
<tr>
<td></td>
<td>Tc = 5.0 min CN = 98.0 Runoff = 1.26 cfs 4,333 cf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcatchment 5S: DA5</td>
<td>Runoff Area = 9,245 sf</td>
<td>29.17% Impervious</td>
<td>Runoff Depth = 4.16&quot;</td>
</tr>
<tr>
<td></td>
<td>Flow Length = 140' Tc=12.9 min CN = 80.2 Runoff = 0.83 cfs 3,201 cf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcatchment 6S: DA6</td>
<td>Runoff Area = 1,679 sf</td>
<td>100.00% Impervious</td>
<td>Runoff Depth = 6.16&quot;</td>
</tr>
<tr>
<td></td>
<td>Tc = 5.0 min CN = 79.0 Runoff = 0.25 cfs 862 cf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcatchment 7S: DA7</td>
<td>Runoff Area = 16,913 sf</td>
<td>45.15% Impervious</td>
<td>Runoff Depth = 4.66&quot;</td>
</tr>
<tr>
<td></td>
<td>Tc = 5.0 min CN = 84.8 Runoff = 2.15 cfs 6,616 cf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcatchment 8S: DA8</td>
<td>Runoff Area = 66,380 sf</td>
<td>0.00% Impervious</td>
<td>Runoff Depth = 3.51&quot;</td>
</tr>
<tr>
<td></td>
<td>Flow Length = 388' Slope = 0.1000' Tc=9.6 min CN = 73.9 Runoff = 5.85 cfs 19,403 cf</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Pond 1P: RG | Peak Elev = 287.47' Storage = 2,557 cf Inflow = 4.22 cfs 22.330 cf |
| Primary = 0.00 cfs 0 cf Secondary = 2.80 cfs 17,306 cf Tertiary = 1.41 cfs 2.973 cf Outflow = 6.21 cfs 20,279 cf |
| Pond 2P: RS #1 | Peak Elev = 283.91' Storage = 1.330 cf Inflow = 2.80 cfs 17.306 cf Outflow = 2.78 cfs 17,186 cf |
| Pond 3P: RS #2 | Peak Elev = 284.02' Storage = 629 cf Inflow = 1.41 cfs 2.973 cf 10.0' Round Culvert n = 0.010 L = 15.0' S = 0.2733' Outflow = 1.40 cfs 2.170 cf |
| Pond 4P: RS #3 | Peak Elev = 283.85' Storage = 581 cf Inflow = 0.97 cfs 4.063 cf 10.0' Round Culvert n = 0.010 L = 15.0' S = 0.3000' Outflow = 0.97 cfs 3.540 cf |

**Link 4L: POC A**
- Inflow = 0.35 cfs 1.628 cf
- Primary = 0.35 cfs 1.628 cf

**Link 5L: POC B**
- Inflow = 0.95 cfs 3.267 cf
- Primary = 0.95 cfs 3.267 cf

**Link 6L: POC C**
- Inflow = 9.98 cfs 48,862 cf
- Primary = 9.98 cfs 48,862 cf

**Total Runoff Area = 179,146 sf**
- Runoff Volume = 57,252 cf
- Average Runoff Depth = 3.83"
- 85.45% Pervious = 153,089 sf
- 14.55% Impervious = 26,057 sf
Subcatchment 1S: DA1
- Runoff Area: 5,504 sf
- Impervious Runoff Depth: 5.65" (Tc=21.1 min, CN=73.0)
- Flow Length: 360' Slope=0.000%

Subcatchment 2S: DA2
- Runoff Area: 11,576 sf
- Impervious Runoff Depth: 5.75" (Tc=9.1 min, CN=73.7)
- Flow Length: 112' Slope=0.000%

Subcatchment 3S: DA3
- Runoff Area: 59,005 sf
- Impervious Runoff Depth: 6.08" (Tc=22.3 min, CN=75.5)
- Flow Length: 244'

Subcatchment 4S: DA4
- Runoff Area: 8,445 sf
- Impervious Runoff Depth: 8.85" (Tc=5.0 min, CN=98.0)

Subcatchment 5S: DA5
- Runoff Area: 9,245 sf
- Impervious Runoff Depth: 6.67" (Tc=12.9 min, CN=80.2)

Subcatchment 6S: DA6
- Runoff Area: 1,679 sf
- Impervious Runoff Depth: 8.85" (Tc=5.0 min, CN=93.0)

Subcatchment 7S: DA7
- Runoff Area: 16,913 sf
- Impervious Runoff Depth: 7.25" (Tc=5.0 min, CN=84.8)

Subcatchment 8S: DA8
- Runoff Area: 66,380 sf
- Impervious Runoff Depth: 5.90" (Tc=9.1 min, CN=73.9)

Pond 1P: RG
- Peak Elevation: 287.78'
- Storage: 3,205 cf
- Inflow: 6.87 cfs
- Outflow: 0.82 cfs

Pond 2P: RS #1
- Peak Elevation: 284.03'
- Storage: 1,359 cf
- Inflow: 3.03 cfs
- Outflow: 3.02 cfs

Pond 3P: RS #2
- Peak Elevation: 285.21'
- Storage: 933 cf
- Inflow: 2.90 cfs
- Outflow: 3.21 cfs

Pond 4P: RS #3
- Peak Elevation: 284.05'
- Storage: 603 cf
- Inflow: 1.52 cfs
- Outflow: 1.52 cfs

Link 4L: POC A
- Inflow: 0.59 cfs
- Primary: 0.59 cfs

Link 5L: POC B
- Inflow: 1.61 cfs
- Primary: 1.61 cfs

Link 6L: POC C
- Inflow: 18.86 cfs
- Primary: 18.86 cfs

Total Runoff Area = 179,146 sf
Runoff Volume = 93,682 cf
Average Runoff Depth = 6.28"
Appendix “F”

Soil Test Results
Forms
# SOIL EVALUATION TEST RESULTS

**Project Name:** Single Family Dwelling  
**Project Address:** 29 Meadowcrest Lane

<table>
<thead>
<tr>
<th>Test Pit or Soil Boring #</th>
<th>Ground Elevation</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>Soil Texture (Percent Sand, Silt and Clay)</td>
<td></td>
</tr>
<tr>
<td>287.7</td>
<td>Orange, brown sandy loam</td>
<td>28</td>
</tr>
<tr>
<td>287.0</td>
<td>Old asphalt</td>
<td>36</td>
</tr>
<tr>
<td>282.0</td>
<td>Tan, silty sandy loam</td>
<td>96</td>
</tr>
</tbody>
</table>

**Saturated Hydraulic Conductivity Test Location #:**

<table>
<thead>
<tr>
<th>Ground Elevation:</th>
<th>290.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Elevation of Proposed Infiltration System:</td>
<td>291.0</td>
</tr>
<tr>
<td>Bottom Elevation of Proposed Infiltration System:</td>
<td>287.5</td>
</tr>
<tr>
<td>Elevation of Test*:</td>
<td>287.0</td>
</tr>
<tr>
<td>Test Method (check one of the following acceptable methods**):</td>
<td>Borehole infiltration test (NHDES, 2008)</td>
</tr>
<tr>
<td><strong>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.</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Attach field data forms for the respective infiltration test method.**

**Calculated Saturated Hydraulic Conductivity Rate:** 2.28 in/hr

* 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 HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

**Name of Test Conductor:** Kevin Fowler  
**Signature of Test Conductor:** [Signature]  
**Date:** 3-11-20
**SOIL EVALUATION TEST RESULTS**

**Project Name:** Single Family Dwelling  
**Project Address:** 29 Meadowcroft Lane

<table>
<thead>
<tr>
<th>Test Pit or Soil Boring #</th>
<th>Ground Elevation: 291.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>Soil Texture (Percent Sand, Silt and Clay)</td>
</tr>
<tr>
<td>289.2</td>
<td>Orange-Brown Sandy Loam Fill</td>
</tr>
<tr>
<td>287.5</td>
<td>Old Asphlat</td>
</tr>
<tr>
<td>283.0</td>
<td>Tan Silty Sandy Loam</td>
</tr>
</tbody>
</table>

**Saturated Hydraulic Conductivity Test Location #: 2**

<table>
<thead>
<tr>
<th>Ground Elevation:</th>
<th>291.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Elevation of Proposed Infiltration System:</td>
<td>291.0</td>
</tr>
<tr>
<td>Bottom Elevation of Proposed Infiltration System:</td>
<td>287.5</td>
</tr>
<tr>
<td>Elevation of Test*:</td>
<td>286.5</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
- Amoozegar 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.

**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 HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

*Name of Test Conductor*  
*Signature of Test Conductor*  
*Date*  

[Signature]  
3-11-20

Department of Public Works - Engineering Division  
Town Hall - 101 Field Point Road, Greenwich, CT 06830  
Phone 203-622-7767 - Fax 203-622-7747
# Soil Evaluation Test Results

**Project Name:** Single Family Dwelling  
**Project Address:** 29 Meadowcroft Lane

## Test Pit or Soil Boring #3

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Soil Texture (Percent Sand, Silt and Clay)</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>266.0</td>
<td>Topsoil</td>
<td>12</td>
</tr>
<tr>
<td>265.0</td>
<td>Orange Brown Lain</td>
<td>24</td>
</tr>
<tr>
<td>264.0</td>
<td>Tan Clayey Lain</td>
<td>36</td>
</tr>
<tr>
<td>263.5</td>
<td>Dark Brown Sand &amp; Silt</td>
<td>90</td>
</tr>
</tbody>
</table>

**Ground Elevation:** 267.0

## Saturated Hydraulic Conductivity Test Location #3

<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*</th>
</tr>
</thead>
<tbody>
<tr>
<td>267.5</td>
<td>268.7</td>
<td>269.2</td>
<td>264.5</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
- Amooneimeter or Amoozgar (constant head) permeameter – Amoozgar 1992

Attach field data forms for the respective infiltration test method.

Calculated Saturated Hydraulic Conductivity Rate: 2.83 m/hr

---

**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 HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.**

**Name of Test Conductor:** Kevin Fowler  
**Signature of Test Conductor:** [Signature]  
**Date:** 3-11-20

Form 01  
January 2012
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: Single Family Dwelling
Project Address: 29 Meadow Crest Lane

SOIL EVALUATION TEST RESULTS

Testing Firm’s Name: Rocco V. D’Andrea, Inc
Engineer’s Name: Anthony L. D’Andrea, PE

<table>
<thead>
<tr>
<th>Test Pit or Soil Boring #</th>
<th>Ground Elevation</th>
<th>Elevation</th>
<th>Soil Texture (Percent Sand, Silt and Clay)</th>
<th>Depth Range in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>274.0</td>
<td>273.2</td>
<td>TOPSOIL</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>271.5</td>
<td>LIGHT BROWN LOAM FILL</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>270.5</td>
<td>DIFF. TOPSOIL</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>268.5</td>
<td>ORANGE BROWN LOAM</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td></td>
<td>267.5</td>
<td>TAN CLAYEY LOAM</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>263.0</td>
<td>DARK BROWN SAND &amp; SILT</td>
<td>108</td>
</tr>
</tbody>
</table>

Saturated Hydraulic Conductivity Test Location # 4

<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*</th>
</tr>
</thead>
<tbody>
<tr>
<td>274.0</td>
<td></td>
<td></td>
<td>278.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>273.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>273.0</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
- Amoozegar or Amoozegar (constant head) permeameter – Amoozegar 1992

Attach field data forms for the respective infiltration test method.

Calculated Saturated Hydraulic Conductivity Rate: 3.05 in/hr

**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.

TEST CERTIFICATION

I HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Name of Test Conductor: A. Fowler
Signature of Test Conductor: K.
Date: 3-11-20

Form SC 101
February 2012
SOIL EVALUATION TEST RESULTS

Engineering Firm's Name:  Pocono V D'Andrea, Inc
Engineer's Name:  Anthony L D'Andrea, PE

<table>
<thead>
<tr>
<th>Test Pit or Soil Boring #</th>
<th>Ground Elevation: 274.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>Soil Texture (Percent Sand, Silt and Clay)</td>
</tr>
<tr>
<td>272.0</td>
<td>Topsoil</td>
</tr>
<tr>
<td>270.2</td>
<td>Orange Brown Sandy Loam</td>
</tr>
<tr>
<td>269.2</td>
<td>Tan Clayey Loam</td>
</tr>
<tr>
<td>265.0</td>
<td>Dark Brown Silty Sand</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
- Amoozometer or Amoozgar (constant head) permeameter - Amoozgar 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 HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Kevin Fowler  
Name of Test Conductor

Signature of Test Conductor  
Date 3-11-20

Form 01  
vary 2012
**SOIL EVALUATION TEST RESULTS**

**Project Name:** Single Family Dwelling  
**Project Address:** 29 Meadview Lane

**Engineering Firm's Name:** Roche V. D'Andrea, Inc  
**Engineer's Name:** Anthony L. D'Andrea, PE

<table>
<thead>
<tr>
<th>Test Pit or Soil Boring #</th>
<th>Ground Elevation</th>
<th>Topography</th>
<th>Depth Range in inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>279.5</td>
<td>Topsoil</td>
<td>12</td>
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<tr>
<td>279.0</td>
<td>Misc. Loam Fill w/ Stones</td>
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<tr>
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<td>Gravel, Topsoil</td>
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<td>271.3</td>
<td>Orange Brown Sand/Loam</td>
<td>98</td>
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**Saturated Hydraulic Conductivity Test Location #:** 6

- **Ground Elevation:** 279.0  
- **Top Elevation of Proposed Infiltration System:** 278.0  
- **Bottom Elevation of Proposed Infiltration System:** 277.5  
- **Elevation of Test:** 277.5

**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**  
- **Amoozegar and Amoozegar (constant head) permeameter - Amoozegar 1992**

Attach field data forms for the respective infiltration test method.

**Calculated Saturated Hydraulic Conductivity Rate:** 1.37 in/hr

**Notes:**  
- All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.  
- **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 hereby certify that the information contained in this report is true and correct.

Name of Test Conductor: [Signature]  
Signature of Test Conductor: [Signature]  
Date: 3-11-20
OPERATIONS AND MAINTENANCE PLAN REPORT

For

29 Meadowcroft Lane
Greenwich, Connecticut

Prepared For

Denis and Jennifer Manelski

April 22, 2021
Stormwater Management Practices
Maintenance Declaration
Stormwater Management Practices Maintenance Declaration

THIS DECLARATION is made this date, ____________, 2021, by and between the Town of Greenwich, a municipal corporation with principal offices located at 101 Field Point Road, Greenwich, CT 06830 and

Denis & Jennifer Manelski

[Owner(s) Name]

29 Meadowcroft Lane, Greenwich

[Address]

hereinafter referred to as “Owner(s)” of the “Property” as more fully described in a deed recorded in Book 7484 at Page 226 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 # 2020-041
- 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 7484, at Page 226 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
COUNTY OF FAIRFIELD

) ss: Greenwich

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]
Exhibit “A”

Operation and Maintenance Plan with Log
Exhibit A
Operations and Maintenance Plan
Denis & Jennifer Manelski
29 Meadowcroft, Greenwich, CT
April 22, 2020

Scope:

The purpose of the Operations and Maintenance Plan is to ensure that the existing and proposed stormwater components installed at 29 Meadowcroft Lane 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. **Drywells and Infiltration Systems:**

   a. All drywells/infiltrators shall be completely cleaned of accumulated debris and sediments upon the completion of construction.

   b. For the first year, the drywells/infiltrators shall be inspected on a quarterly basis.

   c. Any accumulated debris within the drywells/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.
6. **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.

7. **Roof Gutters:**

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

**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.
# Operations and Maintenance Log (Page 1 of 4)

Denis & Jennifer Manelski  
29 Meadowcroft, Greenwich, CT  
April 22, 2021

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<th>Type of Inspection:</th>
<th>☐ Spring</th>
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<th>☐ Other</th>
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## 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

### Notes:

## 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

### Notes:
Operations and Maintenance Log (Page 2 of 4)
Denis & Jennifer Manelski
29 Meadowcroft, Greenwich, CT
April 22, 2021

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:

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 4)
Denis & Jennifer Manelski
29 Meadowcroft, Greenwich, CT
April 22, 2021

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:

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:
Please make additional notes/observations and particular concerns below. Also record any additional maintenance that has been performed:

Signature of Inspector: ___________________________ Date: ________________
FINAL SITE PLAN REVIEW SET
"SINGLE-FAMILY DWELLING"
LOCATION
29 MEADOWCROFT LANE
GREENWICH, CONNECTICUT
PREPARED FOR
DENIS MANELSKI
JENNIFER MANELSKI

SHEET INDEX

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<td>SEDIMENTATION &amp; EROSION CONTROL PLAN</td>
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