Final Subdivision
PLPZ 2020 00192

Aquarion Water Company of Connecticut
Proposed four (4) lot subdivision

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>836 Lake Avenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZONE</td>
<td>RA-4</td>
</tr>
<tr>
<td>LOT AREA</td>
<td>98.271 +/- acres</td>
</tr>
<tr>
<td>NUMBER OF CURRENT LOTS:</td>
<td>1</td>
</tr>
<tr>
<td>NUMBER OF LOTS PROPOSED:</td>
<td>4</td>
</tr>
<tr>
<td>LOT SIZES:</td>
<td></td>
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<tr>
<td>Lot #1 (for residential development)</td>
<td>4 acres</td>
</tr>
<tr>
<td>Lot #2 (for residential development)</td>
<td>4 acres</td>
</tr>
<tr>
<td>Lot #3 (to remain with Water Company)</td>
<td>18 +/- acres</td>
</tr>
<tr>
<td>OPEN SPACE</td>
<td>72.271 +/- acres</td>
</tr>
<tr>
<td></td>
<td>(73.5% of the total lot area)</td>
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</tbody>
</table>

STAFF REPORT UPDATE:
The applicant was last before the Commission at their September 9, 2020 Meeting. At that time the Commission left the item open to allow the Town’s Health Department to review revised conceptual septic designs received earlier in the week. The Health Department has responded positively, accepting the conceptual designs for Lots 1 and 2, (see their memos dated 9/10/2020). The following is an updated staff report.

APPLICATION SUMMARY:
The Applicant is seeking Final Subdivision Approval to subdivide a 98.271 +/- acres parcel of land into four (4) lots. Two lots (Lots 1 and 2) would be 4-acres in size, and intended to be developed as residential parcels, one (1) parcel (Lot 3) would be 18 +/- acres and kept by the Aquarion Water Company for their continued use, and the last parcel (Lot 4) would be an open space parcel of 72.271 +/- acres located at 836 Lake Avenue in the RA-4 Zone.

ISSUES/COMMENTS TO BE ADDRESSED:
1) HEALTH – the Health Department has witnessed percolation tests, and has now received acceptable Septic Designs for which they have noted conceptual approval.
2) ZONING – The ZEO has noted that the revised layouts do not call out a 300-foot lot shape circle required per Sec. 6-205. The applicant has noted the width of the lot shape circle on the submitted plans.
3) CONSERVATION – the Conservation Commission is meeting to discuss this application at their September 3, 2020 meeting. Results of that meeting were presented to the Commission, by the Commissioner of Environmental Affairs at the 9/9/2020 meeting.
4) ENGINEERING: The Engineering Division are ok with the conceptual design but do note items that will need to be addressed with any application for construction.
5) IWWA - The applicant received IWWA approval at their July 27, 2020 meeting;
6) Open Space Deed Restriction documents should be submitted to Conservation and the Law Department for review and acceptance prior to be filed with any approved subdivision record sheet (aka a “Mylar”).

7) If approved as a final subdivision or re-subdivision, the applicant should prepare a record sheet in a form suitable for the Chairman of the Planning and Zoning Commission to sign and file with the Greenwich Land Records, and the following notes shall be added:
   a. Any proposed change in the status of the Open Space area such as change in size or ownership, and any change in the size of approved subdivision lots shall require submission of a revised plan and Declarations of Restrictions for review by the Conservation Department and approval by Planning and Zoning. The revised maps may require approval from the Commission as a re-subdivision and the Declaration may require amendments to reflect the changes.
   b. Pursuant to Section 6-287, all subdivision lots shall be reviewed for compliance with Town drainage standards and a detailed drainage plan for each lot should be submitted to Planning & Zoning and DPW for review, prior to the issuance of any building permits. Drainage Maintenance Agreements may be required.
   c. Any proposed blasting will require the preparation of a pre-blast survey.
   d. Prior to issuance of a building permit for any lot, plans showing proposed house location, setbacks, driveways, accessory structures and uses, grading and drainage, erosion control plans, and protection measures for protecting trees to remain shall be submitted and approved by Planning and Zoning and Conservation for review.

8) Staff notes that, if approved, the applicant, prior to issuance of a Zoning Permit for any of these lots shall provide the following:
   a. A soil and erosion control plan shall be developed for each lot including the location of silt fences, stockpile areas, tree protection/removal and the location of foundation dewatering controls.
   b. In order to keep the disturbance to a minimum, none of the erosion/sedimentation controls shall be installed within the open space/ easement areas.
   c. There shall be no earth disturbance, grade changes, removal of trees or issuance of any town permits until Planning and Zoning or its designee has reviewed and approved the S&E plans and confirms that all controls are properly in place in the field to avoid damage to natural resources during the construction period.

**DEPARTMENT COMMENTS**

ZEO - See attached
CONSERVATION - discussed at 9/9/2020 meeting
DPW - See attached
HEALTH - See attached
PROPOSAL:
The subject parcel is land that has been held by the Aquarion Water Company in their storage and delivery of drinking water to the Town. The 92+/- acres property is oversized for the RA-4 zone (where a four-acre minimum lot area is required) and is not served by Town sewer. The property is largely undeveloped, contains not only a lake, and watercourse, but wetlands, steep slopes and mature vegetation.

The proposed action would make four (4) parcels, where there is now only one (1). Two parcels would be 4-acres in sizes and are intended for residential development. The remaining acreage would be divided into a 72.271+/- acres deed restricted open space and the remaining 18-acres would continue to be held by the Water Company for their use to provide water.

Hypothetical building and driveway designs have been provided which show a simplistic development of each proposed lot. The proposed drainage summary report has not been accepted by the Town’s Engineering Division.

In review of the proposed lot layout the ZEO has noted that the required lot shape of Sec. 6-205, a 300-foot circle, has now been labeled as such on the revised plans.

OPEN SPACE
The areas proposed for open space would equal 72.271+/- acres in fee simple open space (735% of the total lot area in fee). This would far exceed the 15% maximum requirement of the Subdivision regulations. The areas designated for Open Space contain steep slopes, watercourses, wetlands, and Class III watershed lands. The State classifies land adjacent to and surround drinking sources, controlled by water companies, into classes. Aquarion is able to sell off Class III lands, but not Class I and II, in protection of water sources. This open space is the subject of a pending Municipal Improvement, endorsed by the Board of Selectman and the Director of Environmental Affairs, to acquire an access easement, with the Greenwich Land Trust, the contracted recipient of this open space, to allow the Town use and access of this land as a park/natural preserve, once transferred. The applicant should prepare a draft Open Space Deed Restrictions document for consideration of the Environmental Affairs Dept. and the Law Dept. and to be filed with any approved record sheet (Mylar) that may result for an approval of this application.

CONSERVATION:
The Conservation Commission presented their comments to the Commission at their September 9, 2020 meeting through the Commissioner of Environmental Affairs.
ENGINEERING AND DRAINAGE:
The Engineering Division has received the revised materials and are ok with the conceptual design but do note items that will need to be addressed with any application for construction.

HEALTH:
The proposed parcels would have to be serviced by septic systems as the parcel is outside of the Town’s Sewer Benefit Area. The Health Department has reviewed the conceptual septic plans and have noted conceptual approval for lots 1 and 2.

IWWA
The IWWA granted conceptual approval for the subdivision plan at their July 27, 2020 meeting. The decisions of that meeting have not been posted but their approval has been confirmed in conversation with the Director of Environmental Affairs.

BACKGROUND
The land is presently owned by Aquarion Water Company of Connecticut, it consists of Class I, II & III Lands in the Watershed Area (classifications to describe lands in and around public water supplies). Portions of the property appears to have been owned by Aquarion Water Company (and its predecessors) going back to as early as 1897. The current parcel appears to have been created by a series of acquisitions through the 1920’s. Although title holder’s names have changed it appears that this land has been controlled by a water company, since that time.

The chain of title and deed history, submitted by the applicant, details the history of the parcel and the chain of title over the past 100+ years.

APPLICABLE ZONING REGULATIONS
Subdivision Regulations: Sections 6-261, 6-266, 6-268 thru 6-273, 6-275, 6-287 and 6-297
Building Zone Regulations: Sections. 6-5, 6-93 and 6-205,
Ok for Zoning Permit Sign-off with the following revisions:

The applicant should note the required lot shapes on the plan.

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.
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION
SITE DEVELOPMENT REVIEW

Engineering Project No. 20-4(5)  Department Project No. PLPZ202000192
Submittal Received Date: 8/28/2020

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

PLAN SET INFORMATION

Plan Title: 4 Lot Residential Subdivision  Project Address: 836 Lake Avenue
Engineering Firm: Dymar Corp.  Original Plan Date: 6/19/2020  Latest Plan Revision Date: 8/17/2020

DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm: Luchs Consulting Engineers  Original Report Date: 6/24/2020  Latest Report Revision Date: 8/20/2020

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: 09/09/20

COMMENTS AND CONDITIONS OF APPROVAL: See Comments Below

The subdivision is acceptable upon filing of the subdivision map (dated June 16, 2020 and revised to August 3, 2020) on the Town of Greenwich Land Records.

The drainage design for each parcel shall meet the standards of the Town of Greenwich Drainage Manual in effect at the time a building permit application is submitted. The full standards of the Town of Greenwich Drainage Manual shall be met. No waivers or exceptions will be granted for any of the standards.

The comments below must be addressed prior to continuing with the subdivision as currently proposed on the supporting documentation (site plans and drainage report).

1. A revised Form SC-100 needs to be submitted.
2. Form SC-107 needs to be submitted for each lot.
3. The Drainage Summary Report needs the following revisions and additional information submitted:
   a. Applicant is advised to contact Juan P. Paredes, PE and schedule a zoom conference call to review the watershed delineation; a written request may be submitted to: jparedes@greenwichct.org.
   b. The proposed conditions with BMPs need to include the following:
      i. A detailed watershed map for Lot 1 and Lot 2 needs to be included.
ii. Each watershed boundary for the area directed to each BMP must be included (must include other areas that drain onto or into the BMP).

iii. The watershed map must show the Tc path for each of the watersheds (Tc path not needed for watersheds with short direct discharges to BMPs).

c. The site plans need to be revised to match the HydroCad model labeling nomenclature for BMPs.

d. The HydroCad analysis needs to be revised to include the three points of concern.

i. CN values must be accompanied with the hydrologic soil classification (A, B, C, D).

ii. Watershed area values must be entered in square feet (sf) not acres (ac.).

iii. Verify CN value of subcatchment 2NA2, house roofs should be modeled as having CN value of 98; otherwise, break up values to differentiate between impervious and pervious.

iv. Verify CN value of subcatchment 2NA4, roofs should be modeled as having CN value of 98; otherwise, break up values to differentiate between impervious and pervious.

v. Verify CN value of subcatchment 2NB2, roofs should be modeled as having CN value of 98; otherwise, break up values to differentiate between impervious and pervious.

vi. Verify CN value of subcatchment 2SA2, driveways should be modeled as having CN value of 98; otherwise, break up values to differentiate between impervious and pervious.

vii. Verify CN value of subcatchment 2SB2, driveways should be modeled as having CN value of 98; otherwise, break up values to differentiate between impervious and pervious.

viii. Minimum direct tC values should be entered as 6 minutes (verify all subcatchment modeling).

ix. Pond1bA:

1. Add label on site plan to match HydroCad model;
2. Areas and elevations from HydroCad model must be shown on the site plans;
3. Outlet structure model (rectangular weir) does not match site plan (catch basin/ CB#1) and construction detail (63D/ underdrain pipe)
4. 63D detail shows perforated underdrain pipe; if in fact proposed, RRV standard is not met.

x. Pond 1EP:

1. Add label on site plan to match HydroCad model;
2. Areas and elevations from HydroCad model must be shown on the site plans;
3. Outlet structure model (rectangular weir) overflowing into 1G2 (Infil Gal 2) does not match site plan (overflow directly into DP-1);

xi. Pond 1G2:

1. Add label on site plan to match HydroCad model;
2. Type and size of BMP in HydroCad model must match site plan;
3. Response letter to initial review indicated exfiltration values were removed; verify and revise accordingly;

xii. Pond 2G1:

1. Add label on site plan to match HydroCad model;
2. Type and inverts of BMP in HydroCad model must match site plan;

xiii. Pond 2IT1:

1. Add label on site plan to match HydroCad model;
2. It is not immediately evident the outlet structure will mimic a rectangular weir; consider modeling it as cross-section of the trench at the lowest elevation;

xiv. Pond 2IT2:

1. Add label on site plan to match HydroCad model;
2. It is not immediately evident the outlet structure will mimic a rectangular weir; consider modeling it as cross-section of the trench at the lowest elevation;

xv. Pond 2IT3:

1. Add label on site plan to match HydroCad model;
2. It is not immediately evident the outlet structure will mimic a rectangular weir; consider modeling it as cross-section of the trench at the lowest elevation;

3. Response letter to initial review indicated exfiltration values were removed; verify and revise accordingly;

xvi. Pond 2NB1P:

1. Add label on site plan to match HydroCad model;
2. Areas and elevations from HydroCad model must be shown on the site plans;
3. Outlet structure model (rectangular weir) overflowing into Rain Garden #2A does not match site plan (overflow via slotted deck drain towards 24” high precast concrete galleries);

xvii. Pond 2NPD:
   1. Add label on site plan to match HydroCad model;
   2. Outlet structure model (rectangular weir) does not match site plan (yard drain/ YD#3) and construction detail (63D/ underdrain pipe)
   3. 63D detail shows perforated underdrain pipe; if in fact proposed, RRV standard is not met.
   4. It appears the 24” high precast concrete galleries are embedded into the porous drive stone reservoir; it so, it must be modeled accordingly;
   5. Response letter to initial review indicated exfiltration values were removed; verify and revise accordingly;

xviii. Pond IG1:
   1. Add label on site plan to match HydroCad model;
   2. Type, size and inverts of BMP in HydroCad model must match site plan;
   3. Outlet structure (OCS#1A) model data must match site plan;

xix. Pond RG#2A:
   1. Planting mix subgrade elevation in HydroCad model must match site plan;
   2. Outlet structure model (8.0’ long overflow weir) does not match site plan (yard drain);
   3. Both Rain Garden details show perforated underdrain pipes; if in fact proposed, RRV standard is not met;

xx. Pond RG#2B:
   1. Areas and elevations from HydroCad model must match those shown on the site plans;
   2. Outlet structure model (6.0’ long overflow weir) elevation does not match site plan (showing underdrain);
   3. Both Rain Garden details show perforated underdrain pipes; if in fact proposed, RRV standard is not met;

xxi. Pond RG#2C:
   1. Areas and elevations from HydroCad model must match those shown on the site plans;
   2. Outlet structure model (6.0’ long overflow weir) elevation does not match site plan (showing underdrain);
   3. Both Rain Garden details show perforated underdrain pipes; if in fact proposed, RRV standard is not met;
e. Following is a breakdown of the LID and RRV-qualifying BMPs:

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<tr>
<th>POC</th>
<th>Watershed</th>
<th>Proposed Impervious (ac)</th>
<th>Proposed Impervious (sf)</th>
<th>Proposed BMP</th>
<th>BMP-LID?</th>
<th>Infiltration BMP?</th>
<th>Impervious treated by LID BMP(%)</th>
</tr>
</thead>
<tbody>
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<tr>
<td>DP-1</td>
<td>1F</td>
<td>0.000</td>
<td>0</td>
<td>1bA (Porous Drive)</td>
<td>YES</td>
<td>NO (Underdrain)</td>
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<tr>
<td></td>
<td>1B</td>
<td>0.080</td>
<td>3,485</td>
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<td></td>
<td>1C</td>
<td>0.045</td>
<td>1,960</td>
<td>NO (&gt;1,000sf impervious)</td>
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N/A (not applicable)
ND (no development)

f. There is no sufficient data to verify if 60% of the proposed impervious surfaces are treated by an LID-BMP. Responses to comments above may prove that the standard is met;
g. There is no sufficient data to verify if RRV is met. Responses to comments above may prove that the standard is met;
h. Review and revise all other computations as needed.

4. The construction plan set must be revised as follows:
a. Site Plan:
   i. Show location of footing drains; if any, they may not be directed to BMPs treating stormwater runoff.
b. Building/House Section or Elevation Sheet (required prior to zoning/building permit sign-off)
   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. The Operations and Maintenance Plan Report must be a separate document for each lot and include the following:
   b. Exhibit A: Long-term Maintenance Plan that prescribes those activities that must be carried out to maintain compliance with this Declaration. A maintenance log form must also be included. A draft must be completed prior to Final Site Plan Approval. The final version must be submitted with the request for Certificate of Occupancy.
   c. Exhibit B: Improvement Location Survey showing a location of the Property and an accurate location of each stormwater management practice affected by this Declaration. This must be submitted prior to the issuance of the Certificate of Occupancy.
   d. The Maintenance Declaration will need 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.

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).
09/10/2020

Dymar
800 Main Street South
Southbury CT 06488-4230

Re: Design Date: 09/08/2020
Design Number: SAN2-A&B

Dear Mark:

This Department has received, reviewed, and approved the submitted design proposal for an on-site sewage disposal system for a 6 bedroom/675 GPD at 836 LAKE AVENUE (Cherry Valley Lot#2).


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 $488 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
09/10/2020

Dymar
800 Main Street South
Southbury CT 064884230

Re: Design Date: 09/08/2020
Design Number: SAN1-A&B

Dear Mark:

This Department has received, reviewed, and approved the submitted design proposal for an on-site sewage disposal system for a 6 bedroom/675 GPD at 836 LAKE AVENUE (Cherry Valley Lot #1).

The design IS in conformance with the State of Connecticut Public Health Code and the Town of Greenwich Municipal Code. Please note: **No catch basin or manhole that collects storm water shall be within 25 feet of the proposed leaching fields per Table 1, Item F of the Connecticut Technical Standards.**

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 $488 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
Ms. Claire Durkota
Environmental Hygenist
Division of Environmental Services
Town of Greenwich
102 Field Point Road
Greenwich, CT 06830

RE: 836 Lake Avenue (Cherry Valley Lot #1 & #2)
Job # 00445

Dear Ms. Durkota:

We are in response to your comments received September 4 in the order transmitted based on the application and plans expressed mailed to your office on August 6th. Kindly consider the following revisions per the attached plans:

1. The revised septic plans separate each lot with the information shown on two sheets per lot as requested.
2. A key plan has been added to the upper right hand corner of the septic plan, as currently shown on the P&Z drawing package.
3. Plot plan lot #, size and property lines have been included, as currently shown on the P&Z drawing package.
4. A legend has been added to each lot Plot Plan, noting that each of these indicators are currently called out on the plans as well for clarity.
5. Benchmarks with horizontal and vertical information have been added as obtained from the surveyor of record, Ochman Associates, noting that benchmarks may have to be transferred closer to the house and septic area once the area is cleared.
6. We concur on the soil test data witnessed by GHD was for pits 401-409. All other information provided is for use for by others.
7. Well location, radius and supply line to dwelling has been provided, as currently shown on the P&Z drawing package.
8. Driveway location and other site data is included for each lot, as currently shown on the P&Z drawing package.
9. A 100% reserve area was shown on plan and profile for each lot; design data also included for each lot.
10. MLSS Calculation revised not to include TP#303 on Lot #1.
We believe we have addressed your comments to allow a favorable response that both lots are technically feasible. We have submitted the plans first electronically for your review. If these revisions are to your satisfaction, we will express mail two certified copies as a follow-up.

Thank you in advance for your prompt attention to this matter. Please call Scott Lukowski, PE should you need any questions answered.

Very truly yours

Mr. Mark E. Lancor, P.E.
Principal

Cc: Liz Camerino Schultz lschultz@aquarionwater.com
    Jacqueline O. Kaufman JKaufman@carmodylaw.com
    Jason A. Klein JKlein@carmodylaw.com
August 27, 2020

VIA E-MAIL HAND-DELIVERY

Ms. Katie DeLuca, AICP
Director, Planning & Zoning Department
Town of Greenwich
101 Field Point Road, 2nd Floor
Greenwich, CT 06830
Katie.DeLuca@greenwichct.org

Peter Mangs
Application Coordinator
Town Hall, Planning & Zoning Department
101 Field Point Road, 2nd Floor
Greenwich, CT 06830
Peter.Mangs@greenwichct.org

RE: Subdivision of 836 Lake Avenue, Greenwich, Connecticut
Aquarion Water Company of Connecticut
Final Subdivision Application PLPZ 2020 00192

Dear Ms. DeLuca and Mr. Mangs:

On behalf of Aquarion Water Company of Connecticut (the “Applicant”), enclosed please find application materials submitted in connection with the above-referenced Final Subdivision Application. The enclosed plans have been revised in accordance with comments received from Planning and Zoning and Department of Public Works (“DPW”) staff.

For further details related to this proposal, please refer to the enclosed application materials which include:

- Eleven (11) copies of a response to comments received from the DPW;
- One (1) original and ten (10) copies of updated Forms SC-100 & SC-107 from Mark Lancor and Terrence Gallagher;

{57263214}

• Eleven (11) full-size and reduced-size surveys and plans prepared by Ochman Associates, Inc. dated June 16, 2020, revised to August 3, 2020, entitled:
  • “North: 4-Lot Residential Subdivision Plan, 1 of 8;”
  • “South: 4-Lot Residential Subdivision Plan, 2 of 8;”
  • “North: Existing Conditions, 3 of 8;”
  • “South: Existing Conditions, 4 of 8;”
  • “Lot 1: Existing Conditions, 5 of 8;”
  • “Lot 2: Existing Conditions, 6 of 8;”
  • “Lot 1: Sight Distance/Plan & Profile, 7 of 8;” and
  • “Lot 2: Sight Distance Plan/Profile, 8 of 8;”

• Eleven (11) full-size and reduced-size Civil Engineering Plans prepared by Dymar LLC, dated June 19, 2020, entitled:
  • “4 Lot Residential Subdivision, Lake Avenue and Cherry Valley Road, Greenwich, Connecticut [Cover Sheet];”
  • “General Legend, Abbreviations & Notes, C-1,” revised to June 24, 2020;
  • “Existing Conditions Site Analysis Map, C-2;”
  • “Regulated Activity Impact Plan, C-3,” revised to June 24, 2020;
  • “Lot #1 Grading, Drainage & Utility Plan, C-4A,” revised to August 17, 2020;
  • “Lot #2 Grading, Drainage & Utility Plan, C-4B,” revised to August 17, 2020;
  • “Septic Disposal Plans, C-5A,” revised to August 17, 2020;
  • “Test Hole Data & Septic Feasibility Data, C-6B,” revised to July 31, 2020;
  • “Lot #1 Erosion & Sedimentation Control Plan, C-6A,” revised to August 17, 2020;
  • “Lot 2 Erosion & Sedimentation Control Plan, C-6B,” revised to July 31, 2020;
  • “Erosion & Sediment Control Narrative, C-6C;”
  • “Erosion & Sediment Control Construction Standards and Miscellaneous Details, C-6D;”
  • “Erosion & Sediment Control Details, C-6E;”
  • “Construction Driveway Plan & Profiles, C-7,” revised to August 17, 2020;
  • “Paving, Storm Sewer & Utility Details, C-8A;” revised to August 17, 2020;
  • “Miscellaneous Site Details, C-8B,” revised to August 17, 2020;
  • “Construction Specifications & Standards, C-9A,” revised to August 17, 2020;
  • “Earthwork Specifications, C-9B;”
  • “Lot #1 Low Impact Development Plan, C-10A,” revised to June 24, 2020; and
  • “Lot #2 Low Impact Development Plan, C-10B,” revised to June 24, 2020; and

Should you have any questions, please do not hesitate to contact me. Otherwise, we look forward to presenting this application to the Planning & Zoning Commission at its September 9, 2020 meeting.

Sincerely,

Jason A. Klein

Enclosure

cc: P. LaRow
    Development Team
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION
SITE DEVELOPMENT REVIEW

Engineering Project No. 20-4(5)              Department Project No.  
PLPZ2020000192                             Submittal Received Date: 7/7/2020

Submittal Reviewed For:                      Traffic ReviewRequested: No             Review Type: Final Subdivision
Planning and Zoning

PLAN SET INFORMATION

Plan Title: 4 Lot Residential Subdivision    Project Address: 836 Lake Avenue
Engineering Firm: Dymar Corp.               Original Plan Date: 6/19/2020       Latest Plan Revision Date: 6/24/2020

DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm:                            Original Report Date: 6/24/2020       Latest Report Revision Date: ______
Luchs Consulting Engineers

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

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

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

Reviewed and Approved by:                     Date: ____________________________

Scott Marucci - Senior Civil Engineer        7/24/20
COMMENTS AND CONDITIONS OF APPROVAL:  Resubmit Prior to Final Subdivision Approval
Response Comments Noted in Red – 8-24-20

1. The following notes shall be added to the subdivision map:
   a. Upon approval of this subdivision plan, the owners agree with the Town that unless otherwise
      specified hereon, the areas within at least ten (10) feet of the centerline of any drainage facility (20 feet
      total), ditch
      or stream shown hereon are dedicated for drainage, that no building or other structure shall be located
      thereon and that the Town shall not be under any obligation to maintain, clean, enclose or otherwise alter or
      improve, such drainage facility. However, any drainage line, ditch, or stream, whether or not depicted hereon
      and not within an established easement, may be relocated by owner with prior approval of the Inland
      Wetlands & Watercourses Agency.
      Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note
      12A, and as provided in Appendix A.
   b. The grantee of any parcel having a watercourse agrees to maintain the watercourse so as to permit the
      free flowing of water therein, after obtaining approval for the required work from the Inland Wetlands
      & Watercourses Agency. If any grantee fails to maintain the watercourse the Town of
      Greenwich shall have
      the privilege of entering upon the property to perform the required work and the cost thereof shall be
      paid by the owner of the parcel in default.
      Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note
      12B, in Appendix A.
   c. The drainage design for each parcel shall meet the standards of the Town of Greenwich Drainage Manual
      in effect at the time a building permit application is submitted. The full standards of the Town of Greenwich
      Drainage Manual shall be met. No waivers or exceptions will be granted for any of the standards.
      Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note
      12C, in Appendix A.
   d. Construction Plans for review by Planning and Zoning and DPW-Engineering Division prior to issuance of a
      building permit.
      Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note
      12D, and as provided in Appendix A.
   e. If the runoff from any of the site’s cause an icing condition on the road, modifications to the site’s
      stormwater BMPs and stormwater/groundwater controls will be required to correct the icing condition.
      Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note
      12E, and as provided in Appendix A.

1. A revised Form SC-100 needs to be submitted.
Response: New Forms enclosed

2. Form SC-107 needs to be submitted for each lot.
Response: Forms Enclosed

3. The Drainage Summary Report needs the following revisions and additional information
   Submitted:
      a. The comparison table must include the existing and proposed peak flow (cfs), volumes (acres or
         cubic feet), and the difference and percent difference for the 1, 2, 5, 10, 25, 50, and 100-year storms for
         each point of
            concern.
      Response: Additional summary tables have been provided for each discharge point as requested.
   b. The Credits for Low Impact Development Best Management Practices in Appendix C of the Town of
      Greenwich Drainage Manual February 2012 as amended shall be included.
Response: The LID Credit Forms have been added to the report.

c. The Custom Soils Resource Report needs to include a table that includes the Soil Group (A, B, C, D).
Response: The NRCS Custom Soils Report has been revised with Hydrologic Soils Groups and is in Appendix B.

d. The existing conditions watersheds need to include the following:
   i. Three points of concern must be included in the analysis.
      1. Lot 1 – Watershed 1 at the property line with the open space parcel.
      2. Lot 2 – Watershed 2S at the property line with Lot 1.
      3. Lot 2 – Watershed 2N at the property line with the open space parcel.
      4. The watershed map must callout the three points of concern.
   ii. The watershed map must show the Tc path for each of the watersheds.
   iii. The property lines for Lot 1 and Lot 2 must be shown.
Response: The Existing Drainage Basins Plan DA-1 has been revised as requested. The three discharge points are called out and labeled. The Time of Concentration paths are shown. The overall watershed boundaries have been off-set slightly from the property lines so they are visible. The overall watershed boundaries were drawn along the property lines for the two lots.

e. The proposed conditions with no BMPs need to include the following:
   i. This analysis is not required but can be included.
   ii. Three points of concern must be included in the analysis.
      1. Lot 1 – Watershed 1 at the property line with the open space parcel.
      2. Lot 2 – Watershed 2SA at the property line with Lot 1.
      3. Lot 2 – Watershed 2SB should be broken into two watersheds one to same point of concern as 2SA and one to the same as 2NA.
      4. Lot 2 – Watershed 2NA at the property line with the open space parcel.
      5. Lot 2 – Watershed 2NB at the property line with the open space parcel.
      6. The watershed map must callout the three points of concern.
   iii. The watershed map must show the Tc path for each of the watersheds.
   iv. The property lines for Lot 1 and Lot 2 must be shown.
Response: The Proposed Conditions with no BMP’s HydroCAD model has been omitted to reduce the size of the report.

f. The proposed conditions with BMPs need to include the following:
   i. A detailed watershed map for Lot 1 and Lot 2 needs to be included.
   ii. Each watershed boundary for the area directed to each BMP must be included (must include other areas that drain onto or into the BMP).
   iii. Three points of concern must be included in the analysis.
      1. Lot 1 – The property line with the open space parcel.
      2. Lot 2 – The property line with Lot 1.
      3. Lot 2 – The property line with the open space parcel.
      4. The watershed map must callout the three points of concern.
   iv. The watershed map must show the Tc path for each of the watersheds (Tc path not needed for watersheds with short direct discharges to BMPs).
   v. The property lines for Lot 1 and Lot 2 must be shown.
Response: The Proposed Drainage Basins Plan DA-2 has been updated similar to the Existing Conditions map.

g. The HydroCad analysis needs to be revised to include the three points of concern.
Response: The HydroCAD analysis contains the three points of concerns (labeled DP-1, DP-2, and DP-3) and the analysis will be revised in accordance with the Drainage Basin Plans.

h. The HydroCad analysis must use a minimum time span of 0-24 Hrs. for existing and proposed conditions.
Response: The HydroCad analysis has been revised for a 0-30 Hr. time span for all files for comparison purposes.
i. The HydroCad analysis uses a curve number of 92 for a wooded wetland. How was this curve
number determined?
Response: The CN=92 for wetlands is an average between forested woodlands with Type D soil (CN=82), and open water (CN=100). This average has been found to work well when comparing flows to historic flooding because at some times of the year a wooded swamp may have standing water, and at other times it may be dry.

j. The HydroCad analysis shall use a maximum sheet flow length of 100-feet.
Response: The maximum sheet flow length for Time of Concentrations was adjusted to 100 feet for existing and proposed conditions.

k. The HydroCad analysis must use square feet for areas and cubic feet for volumes.
Response: The units used in the HydroCAD output reports were adjusted as requested. Some of the input charts still list the drainage areas in acres.

l. The HydroCad analysis must include the Stage-Area-Storage Tables for each of the BMP’s. This is required to verify the storage provided at the outlet elevation of each BMP.
Response: The summary output has been reviewed and adjusted to comply.

m. The use of an exfiltration rate within the HydroCad analysis must follow the requirements of Appendix B in Town of Greenwich Drainage Manual February 2012. Please contact the Engineering Division to discuss what is required. To use an exfiltration rate in the analysis a saturated hydraulic conductivity test must be completed in the proposed location of each BMP.
Response: The initial design used the Static Method as outlined in Appendix B of the Drainage Manual. Following discussions with DPW the use of infiltration as an outlet device was omitted for existing and proposed HydroCAD models. The depth of crushed stone or other storage areas was increased to account for this Static condition, which is a conservative analysis. Final design of the houses may wish to revisit this aspect of design with possible additional field tests.

n. Need to discuss the rain garden storage tables.
   i. A minimum 3” mulch layer needs to be in the analysis (10% void ratio can be used).
   ii. The bioretention soil must be a minimum of 18-inches (30% void ratio can be used).
   iii. A stone storage layer below the bioretention soil can be included.
   iv. Any design with an underdrain can only be considered a filtration BMP and no credit for infiltration can be taken.
Response: The rain garden storage tables were updated as requested for Type B soils; a maximum ponding depth of 9” was used for Water Quality Volumes, a 3” mulch layer was added with 18” of sandy soil storage, as noted. No stone storage layers were provided. The need for an underdrain should be reviewed in the field during construction, if necessary. The current design assumes that the three rain gardens on Lot #2 are not infiltrating anything to groundwater, which is a conservative assumption.

o. The WQV computations must include the entire area that is directed to each BMP. Review and revise the WQV computations for each watershed area as needed.
Response: The Water Quality Volumes have been revised from a per-lot basis to and individual basis as requested. Tributary runoff from lawn areas onto individual BMP’s, such as porous pavers, were revised as requested. The WQV calculations have been updated in Appendix D.

p. The WQV must be calculated for each area directed to a BMP. All imperious areas must be directed to a BMP.
Response: The Water Quality Volumes calculations have been updated as requested. All imperious area drain toward some type of Best Management Practice.

q. The RRV computations must use the values generated in the detailed HydroCad analysis and not the proposed HydroCad with no BMPs.
   i. Proposed RRV for Lot 1: 1A + 1B + 1C + 1D + 1E = .112 + .018 + .010 + .010 + .018 = .168 AC-
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION
SITE DEVELOPMENT REVIEW
FT = 7,318 CF and not .126 AC-FT.

ii. Proposed RRV for Lot 2: 2NA + 2NA1 + 2NA2 + 2NA3 + 2NA4 + 2NB + 2NB1 + 2NB2 + 2SA
+ 2SA2 + 2SB + 2SB2 + 2SB3 = .045 + .002 + .007 + .029 + .020 + .015 + .018 + .006 + .025 +
.013 + .024 + .016 + .002 = .222 AC-FT = 9,760 CF and not .159 AC-FT.

iii. Lot 1 required RRV is 7,318 – 4,051 = 3,267 CF. This must be provided in the BMPs during the 1-year storm.

iv. Lot 2 required RRV is 9,670 – 5,663 = 4,007 CF. This must be provided in the BMPs during the 1-year storm.

Response: The RRV computations have been updated. Some of the acre-foot volumes appeared different because some of the hydrograph time spans were not the same between some of the models.

r. Review and revise all other computations as needed.

Response: The other calculations were updated as noted.

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

Response: The culvert analysis has been added.

4. The construction plan set was not reviewed in detail at this time. The following information must be added to the plans:

a. Existing Conditions Survey Sheet

   i. Show a note certifying the survey A-2.

   ii. Show a note certifying the survey T-2.

   iii. Show one (1) permanent benchmark on the site within one hundred feet of the proposed construction.

Response: Subdivision Plans prepared by Ochman & Associates include this information.

b. Site Plan Sheets (Submitted Lot 1 and Lot 2 Grading, Drainage & Utility)

   i. Show excavation and fill quantities in a table.

Response: Cut and Fill Volumes shown on Sheets C-4A and 4B for each lot

   ii. Show the entire pipe network from the starting point (roof leaders, catch basin, etc.) to the outfall.

Response: Shown on Sheets C-4A and 4B for each lot

   iii. Show the footing drain network from the house/sump pump to the outfall.

Response: Shown on Sheets C-4A and 4B for each lot

   iv. Show top and bottom elevations for all retaining walls and stone fences.

Response: Shown on Sheets C-4A and 4B for each lot

   v. Show all catch basins/yard drains/drain inlets with the following in the callout:

      1. Grate elevation.
      2. Filter insert name and model # (if applicable).
      3. Invert elevation of each pipe.
      4. Pipe location in structure (n, s, e, w, etc.).
      5. Pipe size.
      6. Sump elevation.

Response: Shown on Sheets C-4A and 4B for each lot

   vi. Show all manholes/junction boxes with the following in the callout:

      1. Cover elevation.
      2. Invert elevation of each pipe.
      3. Pipe location in structure (n, s, e, w, etc.).
      4. Pipe size.
      5. Bottom of structure elevation.

Response: Shown on Sheets C-4A and 4B for each lot
vii. Show all control structures with the following in the callout:
1. Cover/grate elevation.
2. Invert elevation of each pipe.
3. Control structure type and size (orifice, rectangular weir, v-notch weir, etc.).
4. Pipe location in structure (n, s, e, w, etc.).
5. Pipe size.

Response: Shown on Sheets C-4A and 4B for each lot

viii. Show all pipes with the following in the callout:
1. Pipe size.
2. Pipe material.
3. Pipe slope.

Response: Shown on Sheets C-4A and 4B for each lot

ix. Show all level spreaders/scour holes/riprap aprons with the following in the callout:
1. Dimensions (length and width).
2. Depth of stone.
3. Pipe/stone elevation.
4. Pipe size.
5. Pipe material.

Response: Shown on Sheets C-4A and 4B for each lot

x. Show all bioretention (rain gardens) with contours (1/2 foot if needed) and include the following in the callout:
1. Top of berm elevation and surface area.
2. Top of mulch/sod elevation and surface area.
3. Top of bioretention soil mix elevation and surface area.
4. Bottom of bioretention soil mix elevation and surface area.
5. Bottom of stone elevation and surface area.
6. Overflow/weir elevation and dimensions.
7. Underdrain/outlet pipe sizes, material, and invert elevations.

Response: Shown on Sheets C-4A and 4B for each lot. Note: Construction Details are shown on Sheet C-8B and Soil Mix Shown on Sheet C-9A

xi. Show all infiltrators (culverts, concrete dry wells, rainstores, etc.) with the following in the callout:
1. The model # of infiltrator units.
2. The number of infiltrator units.
3. Top of stone elevation above infiltrators.
4. Bottom elevation of infiltrator units.
5. Bottom of stone elevation below infiltrator units.
6. All pipe sizes, material, and invert elevations in and out of infiltrator units including header pipe.

Response: Shown on Sheets C-4A and 4B for each lot. Note: Construction Details are shown on Sheet C-8A

xii. Show all permeable pavements with the following in the callout:
1. Permeable surface type (unilock eco-pavers, porous asphalt, gravel pave 2, etc.).
2. Permeable Pavement surface thickness.
3. Permeable Pavement surface area.
4. Bottom of no. 8 stone elevation.
5. Bottom of no.57 stone elevation.
6. Bottom of no.2 stone elevation.
7. Underdrain/outlet pipe sizes, material, and invert elevations.

Response: Shown on Sheets C-4A and 4B for each lot. Note: Construction Details are shown on Sheet C-8A, further noting thickness of materials are shown, but their elevations will vary with the finished grade as profiled and per site grading.
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION
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xiii. Show all wet and dry water quality swales with contours (1/2 foot if needed) and include the following in the callout:
   1. Top of swale elevation and width.
   2. Bottom of swale elevation and width.
   3. Top of check dam elevation and width.
   4. Length between check dams.
   5. Outlet pipe sizes, material, and invert Elevations.

Response: Does not apply

c. Driveway Profile & Sight Distance Sheet
   i. The proposed driveway for Lot 1 requires the removal of vegetation in both directions to meet the required 150-foot sight distance. Revise the plans showing the minimum required 150-foot sight distance and callout all the vegetation and trees that need to be removed. A letter from the Tree Warden for the removal of all the vegetation and trees within the 150-foot sight line must be submitted prior to final subdivision approval from P&Z.

Response: The sightlines have been revised as noted by Ochman Associates, who have contacted the Tree Warden to schedule a site visit. See revised Sheet 7 of 8 in Appendix A.

   ii. The proposed driveway for Lot 2 requires the removal of vegetation in both directions to meet the required 150-foot sight distance. Revise the plans showing the minimum required 150-foot sight distance and callout all the vegetation and trees that need to be removed. A letter from the Tree Warden for the removal of all the vegetation and trees within the 150-foot sight line must be submitted prior to final subdivision approval from P&Z.

Response: The sightlines have been revised as noted by Ochman Associates, who have contacted the Tree Warden to schedule a site visit. See revised Sheet 8 of 8 in Appendix A.

   iii. Show width of driveways at property line.
Response: Shown on Sheets C-4A and 4B for each lot. 12 feet wide

   iv. Show width of driveways at edge of road.
Response: Shown on Sheets C-4A and 4B for each lot. 30 feet wide

   v. The profile for the driveway on Lot 2 must be from the edge of road to turn around and also to the garage. The profile shall include slopes, spot elevations and if porous pavement is used the entire porous pavement section to the bottom of stone shall be included with elevations.
Response: Plan and Profile Shown on Sheets C-7 and grading shown on C-4B. Sugrade and limits for Porous Pavement shown on C-7. Note: Construction Details are shown on Sheet C-8A for Porous Pavement.

   vi. A profile for the driveway on Lot 1 from edge of road to garage must be submitted. The profile shall include slopes, spot elevations and if porous pavement is used the entire porous pavement section to the bottom of stone shall be included with elevations.
Response: Plan and Profile Shown on Sheets C-7 and grading shown on Sheet C-4A. Sugrade and limits for Porous Pavement shown on C-7. Note: Construction Details are shown on Sheet C-8A for Porous Pavement.

   vii. Show slope of driveways for first five feet on profile (required minimum slope is +3% to 6%).
Response: Plan and Profiles Shown on Sheets C-7 for each lot with grades. We comply.

   viii. Show slope of driveways for next twenty feet on profile (required maximum slope is 4% when remaining slope ≥ 10%).
Response: Plan and Profiles Shown on Sheets C-7 for each lot with grades. We comply.

   ix. Show slope of driveways for the remaining distance to garage on profile (required maximum slope is 8% for commercial, 12% residential (two or more family), and 15% for residential).
Response: Plan and Profiles Shown on Sheets C-7 for each lot with grades. We comply.
d. Construction Details Sheets
   i. Need to discuss the Permeable Paver System Detail with the Engineering Division. A copy of the specification for ASTM #9 stone must be submitted. Response required form engineering
   Response: Removed ASTM #9 stone from the detail
   ii. Need to discuss the Type ‘A’ and ‘B’ Rain Garden Details. The bioretention soil specification must be on the plans. The bioretention soil mix must be the specification listed in Appendix G of the Town of Greenwich Drainage Manual February 2012 as amended. All residential rain gardens must have a minimum 18-inches of bioretention soil used.
   Response: Removed ASTM #9 stone from the detail. Amended details on Sheet C-8B to include a depth of 18 inches of bioretention soil for both rain garden details.

   e. Building/House Section or Elevation Sheet (required prior to zoning/building permit sign-off)
      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.
   Response: OK

5. The Operations and Maintenance Plan Report must be a separate document for each lot and include the following:
   Response: OK

   b. Exhibit A: Long-term Maintenance Plan that prescribes those activities that must be carried out to maintain compliance with this Declaration. A maintenance log form must also be included. A draft must be completed prior to Final Site Plan Approval. The final version must be submitted with the request for Certificate of Occupancy.
   Response: OK

   c. Exhibit B: Improvement Location Survey showing a location of the Property and an accurate location of each stormwater management practice affected by this Declaration. This must be submitted prior to the issuance of the Certificate of Occupancy.
   Response: OK

   d. The Maintenance Declaration will need 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.
   Response: OK

**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).
   Response: OK

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

3. All revisions must be accompanied by a point-by-point written response to the Engineering Division’s comments.
   Response: OK
Standard Conditions of Approval

AGREE

1. The Operations and Maintenance Plan Report must include the following for the Certificate of Occupancy:
   b. The 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).

\dymarfs\F:\00445\Applications\DPW\Engineering, 20-4(5) 836 Lake Avenue 07-22-20, PLPZ 2020 00192 (1) DYM 8-24-20 response.docx
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  

Engineer of Record Certification

Project Name: Aquarion Water Company - 4 Lot Subdivision  
Project Address: Lake Avenue and Cherry Valley Road  
Engineer's Name: Terrance Gallagher, P.E.  
Engineering Firm's Name: Luchs Consulting Engineers

Street Address: 89 Colony Street  
City: Meriden  
State: CT  
Zip: 06451  
Phone: (203) 379-0320 x242  
Fax:  
Email: tgallagher@luchs.com

The undersigned Registered Professional Engineer of Record certifies that the Stormwater Management Report and Plans submitted herewith entitled:

Stormwater Management Report; 4 Lot Residential Subdivision, Lake Ave & Cherry Valley Road,

Prepared for Aquarion Water Company & Dymar Corp.

Stormwater Management Report Last Revision Date: 
August 20, 2020

Number of Plan Sheets: 
Last Revision Date:


Engineer's Signature: 

Date: 

Engineer's Seal:

Form SC-100

February 2014
DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA) CERTIFICATION
PRE-CONSTRUCTION

Property Address: Lot #2 - Cherry Valley Road Tax Account No.: TBD

Building Permit No.: ________________

PLANS & DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm: DYMAR Corp. (Plans); Luchs Consulting Engineers (Drainage Report)

Design Plans Date: 8-24-2020 Drainage Report Date: 8-20-2020

PROPERTY INFORMATION FOR DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA)

<table>
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<tr>
<th>Total Property Area (SF)</th>
<th>Total Proposed Site Disturbance Area (SF)</th>
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<tbody>
<tr>
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<td>90,311</td>
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<th>Total Impervious Area Under Existing Conditions (SF)</th>
<th>Total Impervious Area Under Proposed Conditions (SF)</th>
<th>Total Disconnected Impervious Area Under Proposed Conditions (SF)</th>
<th>Total Directly Connected Impervious Area Under Proposed Conditions (SF)</th>
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<td>0</td>
<td>26,537</td>
<td>16,555</td>
<td>9,802</td>
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1 The entire property area (i.e. parcel/lot area) based on property address and tax account number.

2 The entire area being disturbed for the proposed construction activity (foundations, buildings, houses, stormwater systems, septic systems, pools, patios, accessory structures, vegetative soil cover modifications, etc.). The project disturbance area (delineated with construction/silt fence) shall be depicted on the design, construction, and mitigation plans, and shall be installed on-site prior to commencing land disturbance activities.

3 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.

4 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).

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

Engineer’s Signature __________________________ Date 08/14/20

Engineer’s Seal
DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA) CERTIFICATION
PRE-CONSTRUCTION

Property Address: Lot #1 - Cherry Valley Road  Tax Account No.: TBD

Building Permit No.:  

PLANS & DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm: DYMAR Corp. (Plans); Luchs Consulting Engineers (Drainage Report)

Design Plans Date: 8-24-2020  Drainage Report Date: 8-20-2020  

PROPERTY INFORMATION FOR DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA)

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<th>Total Property Area (SF)(^1)</th>
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<th>Total Disconnected Impervious Area Under Proposed Conditions (SF)(^4)</th>
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<td>0</td>
<td>12,940</td>
<td>12,535</td>
<td>405</td>
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</table>

\(^1\) The entire property area (i.e. parcel/lot area) based on property address and tax account number.

\(^2\) The entire area being disturbed for the proposed construction activity (foundations, buildings, houses, stormwater systems, septic systems, pools, patios, accessory structures, vegetative soil cover modifications, etc.). The project disturbance area (delineated with construction/silt fence) shall be depicted on the design, construction, and mitigation plans, and shall be installed on-site prior to commencing land disturbance activities.

\(^3\) Impervious surfaces include but are not limited to roofs (including green roofs), buildings, houses, walls, 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.

\(^4\) 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).

\(^5\) Subtract the Total Disconnected Impervious Area Under Proposed Conditions (SF) from the Total Impervious Area Under Proposed Conditions (SF).

Engineer's Signature

[Signature]

Date 8/24/20

Engineer’s Seal
Engineer of Record Certification

Project Name: Aquarion Water Company - 4 Lot Subdivision
Project Address: Lake Avenue and Cgerry Valley Road
Engineer's Name: Mark E. Lancor, P.E.
Engineering Firm’s Name: DYMAR Corp
Street Address: 800 Main Street South, City: Southbury, State: CT, Zip: 06488
Phone: 203-267-1046, Fax: 203-267-1547, Email: melancor@dymarinc.com

The undersigned Registered Professional Engineer of Record certifies that the Stormwater Management Report and Plans submitted herewith entitled:

Plans - 4 Lot Residential Sudivision, Lake Avenue and Cherry Valley Road
Greenwich, Connecticut

Stormwater Management Report Last Revision Date:
Number of Plan Sheets: 19, Last Revision Date: 8-24-2020


Engineer's Signature: [Signature]
Date: 8-24-2020

[Engineer's Seal]
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Appendix A: Plans
Appendix B: Soils Data
Appendix C: Hydrology
Appendix D: Stormwater and Low Impact Development Analysis
Appendix E: Stormwater Management Standards Narrative

In Pocket: DA-1 & DA-2 Drainage Basins – full size
Engineer of Record Certification

Project Name: Aquarion Water Company - 4 Lot Subdivision

Project Address: Lake Avenue and Cherry Valley Road

Engineer's Name: Terrance Gallagher, P.E.

Engineering Firm's Name: Luchs Consulting Engineers

Street Address: 89 Colony Street City: Meriden State: CT Zip: 06451

Phone: (203) 379-0320 x242 Fax: Email: tgallagher@luchs.com

The undersigned Registered Professional Engineer of Record certifies that the Stormwater Management Report and Plans submitted herewith entitled:

Stormwater Management Report; 4 Lot Residential Subdivision, Lake Ave & Cherry Valley Road,

Prepared for Aquarion Water Company & Dymer Corp.

Stormwater Management Report Last Revision Date: August 20, 2020

Number of Plan Sheets: Last Revision Date:


Engineer's Signature: Terrance Gallagher Date: 8/20/20

Engineer's Seal

Form SC-100 February 2014
The following is a response to the Greenwich Department of Public Works review of the subdivision dated 7/24/20 by Scott Marucci – Senior Civil Engineer. The original review memo is attached.

1. The following notes shall be added to the subdivision map:
   a. Upon approval of this subdivision plan, the owners agree with the Town that unless otherwise specified hereon, the areas within at least ten (10) feet of the centerline of any drainage facility (20 feet total), ditch or stream shown hereon are dedicated for drainage, that no building or other structure shall be located thereon and that the Town shall not be under any obligation to maintain, clean, enclose or otherwise alter or improve, such drainage facility. However, any drainage line, ditch, or stream, whether or not depicted hereon and not within an established easement, may be relocated by owner with prior approval of the Inland Wetlands & Watercourses Agency.

Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note 12A, in Appendix A.

b. The grantee of any parcel having a watercourse agrees to maintain the watercourse so as to permit the free flowing of water therein, after obtaining approval for the required work from the Inland Wetlands & Watercourses Agency. If any grantee fails to maintain the watercourse the Town of Greenwich shall have the privilege of entering upon the property to perform the required work and the cost thereof shall be paid by the owner of the parcel in default.

Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note 12B, in Appendix A.

c. The drainage design for each parcel shall meet the standards of the Town of Greenwich Drainage Manual in effect at the time a building permit application is submitted. The full standards of the Town of Greenwich Drainage Manual shall be met. No waivers or exceptions will be granted for any of the standards.

Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note 12C, in Appendix A.
d. Construction Plans for review by Planning and Zoning and DPW-Engineering Division prior to issuance of a building permit.

Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note 12D, in Appendix A.

e. If the runoff from any of the site’s cause an icing condition on the road, modifications to the site’s stormwater BMPs and stormwater/groundwater controls will be required to correct the icing condition.

Response: A note was added to the Subdivision Map prepared by Ochman Associates. See Sheet 1 of 8, Note 12E, in Appendix A.

1. A revised Form SC-100 needs to be submitted.

Response: A revised Form SC-100 from Luchs is attached. A revised Form SC-100 from Dyman is under separate cover.

2. Form SC-107 needs to be submitted for each lot.

Response: Agreed. See separate Form SC-107’s by Dyman under separate cover.

3. The Drainage Summary Report needs the following revisions and additional information submitted:
   a. The comparison table must include the existing and proposed peak flow (cfs), volumes (acres or cubic feet), and the difference and percent difference for the 1, 2, 5, 10, 25, 50, and 100-year storms for each point of concern.

Response: Additional summary tables have been provided for each discharge point as requested.


Response: The LID Credit Forms have been added to the report – see Appendix D.

   c. The Custom Soils Resource Report needs to include a table that includes the Soil Group (A, B, C, D).

Response: The NRCS Custom Soils Report has been revised with Hydrologic Soils Groups and is in Appendix B.

d. The existing conditions watersheds need to include the following:
   i. Three points of concern must be included in the analysis.
      1. Lot 1 – Watershed 1 at the property line with the open space parcel.
      2. Lot 2 – Watershed 2S at the property line with Lot 1.
      3. Lot 2 – Watershed 2N at the property line with the open space parcel.
      4. The watershed map must callout the three points of concern.
   ii. The watershed map must show the Tc path for each of the watersheds.
   iii. The property lines for Lot 1 and Lot 2 must be shown.

Response: The Existing Drainage Basins Plan DA-1 has been revised as requested. The three discharge points are called out and labeled. The Time of Concentration paths are shown. The overall watershed boundaries have been off-set slightly from the property lines so they are visible. The overall watershed boundaries were drawn along the property lines for the two lots.

e. The proposed conditions with no BMPs need to include the following:
   i. This analysis is not required but can be included.
   ii. Three points of concern must be included in the analysis.
      1. Lot 1 – Watershed 1 at the property line with the open space parcel.
      2. Lot 2 – Watershed 2SA at the property line with Lot 1.
3. Lot 2 – Watershed 2SB should be broken into two watersheds one to same point of concern as 2SA and one to the same as 2NA.
4. Lot 2 – Watershed 2NA at the property line with the open space parcel.
5. Lot 2 – Watershed 2NB at the property line with the open space parcel.
6. The watershed map must callout the three points of concern.
   iii. The watershed map must show the Tc path for each of the watersheds.
   iv. The property lines for Lot 1 and Lot 2 must be shown.

Response: The Proposed Conditions with no BMP’s HydroCAD model has been omitted for brevity.

f. The proposed conditions with BMPs need to include the following:
   i. A detailed watershed map for Lot 1 and Lot 2 needs to be included.
   ii. Each watershed boundary for the area directed to each BMP must be included (must include other areas that drain onto or into the BMP).
   iii. Three points of concern must be included in the analysis.
      1. Lot 1 – The property line with the open space parcel.
      2. Lot 2 – The property line with Lot 1.
      3. Lot 2 – The property line with the open space parcel.
      4. The watershed map must callout the three points of concern.
   iv. The watershed map must show the Tc path for each of the watersheds (Tc path not needed for watersheds with short direct discharges to BMPs).
   v. The property lines for Lot 1 and Lot 2 must be shown.

Response: The Proposed Drainage Basins Plan DA-2 has been updated similar to the Existing Conditions plan.

g. The HydroCad analysis needs to be revised to include the three points of concern.

Response: The HydroCAD analysis has been revised to include the three points of concerns (labeled DP-1, DP-2, and DP-3) and matches the revised Drainage Basin Plans.

h. The HydroCad analysis must use a minimum time span of 0-24 Hrs. for existing and proposed conditions.

Response: The HydroCAD analysis was revised for a 0-30 Hour time span for all files for comparison purposes.

i. The HydroCad analysis uses a curve number of 92 for a wooded wetland. How was this curve number determined?

Response: The CN=92 for wetlands is an average between forested woodlands with Type D soil (CN=82), and open water (CN=100). This average has been found to work well when comparing flows to historic flooding because at some times of the year a wooded swamp may have standing water, and at other times it may be very dry.

j. The HydroCad analysis shall use a maximum sheet flow length of 100-feet.

Response: The maximum sheet flow length for Time of Concentrations was adjusted to 100 feet for existing and proposed conditions.

k. The HydroCad analysis must use square feet for areas and cubic feet for volumes.

Response: The units used in the HydroCAD output reports were adjusted as requested. Some of the input charts still list the drainage areas in acres.

l. The HydroCad analysis must include the Stage-Area-Storage Tables for each of the BMP’s. This is required to verify the storage provided at the outlet elevation of each BMP.
Response: Proposed Stage-Area-Storage Tables for each BMP are enclosed in addition to the HydroCAD results – see Appendix C.

m. The use of an exfiltration rate within the HydroCad analysis must follow the requirements of Appendix B in Town of Greenwich Drainage Manual February 2012. Please contact the Engineering Division to discuss what is required. To use an exfiltration rate in the analysis a saturated hydraulic conductivity test must be completed in the proposed location of each BMP.

Response: The initial design used the Static Method as outlined in Appendix B of the Drainage Manual. Following discussions with DPW the use of infiltration as an outlet device was omitted for existing and proposed HydroCAD models. The depth of crushed stone or other storage areas was increased to account for this Static condition, which is a conservative analysis. Final design of the houses may wish to revisit this aspect of design with possible additional field tests, for a less conservative design.

n. Need to discuss the rain garden storage tables.
   i. A minimum 3” mulch layer needs to be in the analysis (10% void ratio can be used).
   ii. The bioretention soil must be a minimum of 18-inches (30% void ratio can be used).
   iii. A stone storage layer below the bioretention soil can be included.
   iv. Any design with an underdrain can only be considered a filtration BMP and no credit for infiltration can be taken.

Response: The rain garden storage tables were updated as requested for Type B soils; a maximum ponding depth of 9” was used for Water Quality Volumes, a 3” mulch layer was added with 18” of sandy soil storage, as noted. No stone storage layers were provided. The need for an underdrain should be reviewed in the field during construction, if necessary. The current design calculations assumes that the three rain gardens on Lot #2 are not infiltrating anything to groundwater, which is a conservative assumption.

o. The WQV computations must include the entire area that is directed to each BMP. Review and revise the WQV computations for each watershed area as needed.

Response: The Water Quality Volumes have been revised from a per-lot basis to an individual BMP basis as requested. Tributary runoff from lawn areas onto individual BMP’s, such as porous pavers, were revised as requested. The WQV calculations have been updated in Appendix D.

p. The WQV must be calculated for each area directed to a BMP. All impervious areas must be directed to a BMP.

Response: The Water Quality Volumes calculations have been updated as requested. All impervious area drain toward some type of Best Management Practice.

q. The RRV computations must use the values generated in the detailed HydroCad analysis and not the proposed HydroCad with no BMPs.
   i. Proposed RRV for Lot 1: 1A + 1B + 1C + 1D + 1E = .112 + .018 + .010 + .010 + .018 = .168 AC-
      FT = 7,318 CF and not .126 AC-FT.
   ii. Proposed RRV for Lot 2: 2NA + 2NA1 +2NA2 + 2NA3 + 2NA4 + 2NB + 2NB1 + 2NB2 + 2SA
      + 2SA2 + 2SB + 2SB2 + 2SB3 = .045 + .002 + .007 + .029 + .020 + .015 + .018 + .006 + .025
      + .013 + .024 + .016 + .002 = .222 AC-FT = 9,760 CF and not .159 AC-FT.
   iii. Lot 1 required RRV is 7,318 – 4,051 = 3,267 CF. This must be provided in the BMPs during the 1-
      year storm.
   iv. Lot 2 required RRV is 9,670 – 5,663 = 4,007 CF. This must be provided in the BMPs during the 1-
      year storm.

Response: The RRV computations have been updated, and exceed Town requirements for the 1 Year Storm – see Appendix D.

r. Review and revise all other computations as needed.
Response: The other calculations were updated as noted.

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

Response: The driveway culvert analysis has been added to Appendix D.

4. The construction plan set was not reviewed in detail at this time. The following information must be added to the plans:

Response: The plan set has been updated. See separate response by Dymar for details.

a. Existing Conditions Survey Sheet
   i. Show a note certifying the survey A-2.
   ii. Show a note certifying the survey T-2.
   iii. Show one (1) permanent benchmark on the site within one hundred feet of the proposed construction.

b. Site Plan Sheets (Submitted Lot 1 and Lot 2 Grading, Drainage & Utility)
   i. Show excavation and fill quantities in a table.
   ii. Show the entire pipe network from the starting point (roof leaders, catch basin, etc.) to the outfall.
   iii. Show the footing drain network from the house/sump pump to the outfall.
   iv. Show top and bottom elevations for all retaining walls and stone fences.
   v. Show all catch basins/yard drains/drain inlets with the following in the callout:
      1. Grate elevation.
      2. Filter insert name and model # (if applicable).
      3. Invert elevation of each pipe.
      4. Pipe location in structure (n, s, e, w, etc.).
      5. Pipe size.
      6. Sump elevation.
   vi. Show all manholes/junction boxes with the following in the callout:
      1. Cover elevation.
      2. Invert elevation of each pipe.
      3. Pipe location in structure (n, s, e, w, etc.).
      4. Pipe size.
      5. Bottom of structure elevation.
   vii. Show all control structures with the following in the callout:
      1. Cover/grate elevation.
      2. Invert elevation of each pipe.
      3. Control structure type and size (orifice, rectangular weir, v-notch weir, etc.).
      4. Pipe location in structure (n, s, e, w, etc.).
5. Pipe size.

viii. Show all pipes with the following in the callout:
1. Pipe size.
2. Pipe material.
3. Pipe slope.

ix. Show all level spreaders/scour holes/riprap aprons with the following in the callout:
1. Dimensions (length and width).
2. Depth of stone.
3. Pipe/stone elevation.
4. Pipe size.
5. Pipe material.

x. Show all bioretention (rain gardens) with contours (1/2 foot if needed) and include the following in the callout:
1. Top of berm elevation and surface area.
2. Top of mulch/sod elevation and surface area.
3. Top of bioretention soil mix elevation and surface area.
4. Bottom of bioretention soil mix elevation and surface area.
5. Bottom of stone elevation and surface area.
6. Overflow/weir elevation and dimensions.
7. Underdrain/outlet pipe sizes, material, and invert elevations.

xi. Show all infiltrators (culverts, concrete dry wells, rainstores, etc.) with the following in the callout:
1. The model # of infiltrator units.
2. The number of infiltrator units.
3. Top of stone elevation above infiltrators.
4. Bottom elevation of infiltrator units.
5. Bottom of stone elevation below infiltrator units.
6. All pipe sizes, material, and invert elevations in and out of infiltrator units including header pipe.

xii. Show all permeable pavements with the following in the callout:
1. Permeable surface type (unlock eco-pavers, porous asphalt, gravel pave 2, etc.).
2. Permeable Pavement surface thickness.
3. Permeable Pavement surface area.
4. Bottom of no. 8 stone elevation.
5. Bottom of no.57 stone elevation.
6. Bottom of no.2 stone elevation.
7. Underdrain/outlet pipe sizes, material, and invert elevations.

xiii. Show all wet and dry water quality swales with contours (1/2 foot if needed) and include the following in the callout:
1. Top of swale elevation and width.
2. Bottom of swale elevation and width.
3. Top of check dam elevation and width.
4. Length between check dams.
5. Outlet pipe sizes, material, and invert Elevations.

c. Driveway Profile & Sight Distance Sheet

i. The proposed driveway for Lot 1 requires the removal of vegetation in both directions to meet the required 150-foot sight distance. Revise the plans showing the minimum required 150-foot sight distance and callout all the vegetation and trees that need to be removed. A letter from the Tree Warden for the removal of all the vegetation and trees within the 150-foot sight line must be submitted prior to final subdivision approval from P&Z.

Response: The sightlines have been revised as noted by Ochman Associates, who have contacted the Tree Warden to schedule a site visit. See revised Sheet 7 of 8 in Appendix A.
ii. The proposed driveway for Lot 2 requires the removal of vegetation in both directions to meet the required 150-foot sight distance. Revise the plans showing the minimum required 150-foot sight distance and callout all the vegetation and trees that need to be removed. A letter from the Tree Warden for the removal of all the vegetation and trees within the 150-foot sight line must be submitted prior to final subdivision approval from P&Z.

Response: The sightlines have been revised as noted by Ochman Associates, who have contacted the Tree Warden to schedule a site visit. See revised Sheet 8 of 8 in Appendix A.

iii. Show width of driveways at property line.

Response: The width of the driveways at the gutter is shown on the two plans listed above.
iv. Show width of driveways at edge of road.

v. The profile for the driveway on Lot 2 must be from the edge of road to turn around and also to the garage. The profile shall include slopes, spot elevations and if porous pavement is used the entire porous pavement section to the bottom of stone shall be included with elevations.

vi. A profile for the driveway on Lot 1 from edge of road to garage must be submitted. The profile shall include slopes, spot elevations and if porous pavement is used the entire porous pavement section to the bottom of stone shall be included with elevations.

vii. Show slope of driveways for first five feet on profile (required minimum slope is +3% to 6%).

viii. Show slope of driveways for next twenty feet on profile (required maximum slope is 4% when remaining slope ≥ 10%).

ix. Show slope of driveways for the remaining distance to garage on profile (required maximum slope is 8% for commercial, 12% residential (two or more family), and 15% for residential).

d. Construction Details Sheets

i. Need to discuss the Permeable Paver System Detail with the Engineering Division. A copy of the specification for ASTM #9 stone must be submitted.

ii. Need to discuss the Type ‘A’ and ‘B’ Rain Garden Details. The bioretention soil specification must be on the plans. The bioretention soil mix must be the specification listed in Appendix G of the Town of Greenwich Drainage Manual February 2012 as amended. All residential rain gardens must have a minimum 18-inches of bioretention soil used.

e. Building/House Section or Elevation Sheet (required prior to zoning/building permit sign-off)

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. The Operations and Maintenance Plan Report must be a separate document for each lot and include the following:

Response: These documents will be submitted as part of Final Design of the individual lots.


b. Exhibit A: Long-term Maintenance Plan that prescribes those activities that must be carried out to maintain compliance with this Declaration. A maintenance log form must also be included. A draft must be completed prior to Final Site Plan Approval. The final version must be submitted with the request for Certificate of Occupancy.

c. Exhibit B: Improvement Location Survey showing a location of the Property and an accurate location of each stormwater management practice affected by this Declaration. This must be submitted prior to the issuance of the Certificate of Occupancy.

d. The Maintenance Declaration will need 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.

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.

Response: Agreed.
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

Response: Agreed.
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).

Response: Agreed.
DEPARTMENT OF PUBLIC WORKS – ENGINEERING DIVISION
SITE DEVELOPMENT REVIEW

Engineering Project No. 20-8(21)    Department Project No. 2020-076    Submittal Received Date: 7/20/2020
Submittal Reviewed For:              Traffic Review Requested: No     Review Type: Final Subdivision
Inland Wetlands and Watercourses Agency

PLAN SET INFORMATION

Plan Title: 4 Lot Residential Subdivision       Project Address: 836 Lake Avenue
Engineering Firm: Dymar Corp.                  Original Plan Date: 6/19/2020
                                                  Latest Plan Revision Date: 6/24/2020

DRAINAGE SUMMARY REPORT INFORMATION

Engineering Firm:                           Original Report Date: 6/24/2020
Luchs Consulting Engineers                Latest Report Revision Date:____

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

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

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

Reviewed and Approved by: _______________________________     Date: __________
Scott Marucci - Senior Civil Engineer

COMMENTS AND CONDITIONS OF APPROVAL:   Resubmit Prior to Final Subdivision Approval

1. The following notes shall be added to the subdivision map:
   a. Upon approval of this subdivision plan, the owners agree with the Town that unless otherwise specified hereon, the areas within at least ten (10) feet of the centerline of any drainage facility (20 feet total), ditch or stream shown hereon are dedicated for drainage, that no building or other structure shall be located thereon and that the Town shall not be under any obligation to maintain, clean, enclose or otherwise alter or improve, such drainage facility.
      However, any drainage line, ditch, or stream, whether or not depicted hereon and not within an established easement, may be relocated by owner with prior approval of the Inland Wetlands & Watercourses Agency.
   b. The grantee of any parcel having a watercourse agrees to maintain the watercourse so as to permit the free flowing of water therein, after obtaining approval for the required work from the Inland Wetlands & Watercourses Agency. If any grantee fails to maintain the watercourse the Town of Greenwich shall have the privilege of entering upon the property to perform the required work and the cost thereof shall be paid by the owner of the parcel in default.
   c. The drainage design for each parcel shall meet the standards of the Town of Greenwich Drainage Manual in effect at the time a building permit application is submitted. The full standards of the Town of Greenwich Drainage Manual shall be met. No waivers or exceptions will be granted for any of the standards.
d. Development of each parcel shall require submission of a Drainage Summary Report along with Construction Plans for review by Planning and Zoning and DPW-Engineering Division prior to issuance of a building permit.

e. If the runoff from any of the site’s cause an icing condition on the road, modifications to the site’s stormwater BMPs and stormwater/groundwater controls will be required to correct the icing condition.

1. A revised Form SC-100 needs to be submitted.
2. Form SC-107 needs to be submitted for each lot.
3. The Drainage Summary Report needs the following revisions and additional information submitted:
   a. The comparison table must include the existing and proposed peak flow (cfs), volumes (acres or cubic feet), and the difference and percent difference for the 1, 2, 5, 10, 25, 50, and 100-year storms for each point of concern.
   c. The Custom Soils Resource Report needs to include a table that includes the Soil Group (A, B, C, D).
   d. The existing conditions watersheds need to include the following:
      i. Three points of concern must be included in the analysis.
         1. Lot 1 – Watershed 1 at the property line with the open space parcel.
         2. Lot 2 – Watershed 2S at the property line with Lot 1.
         3. Lot 2 – Watershed 2N at the property line with the open space parcel.
         4. The watershed map must callout the three points of concern.
      ii. The watershed map must show the Tc path for each of the watersheds.
      iii. The property lines for Lot 1 and Lot 2 must be shown.
   e. The proposed conditions with no BMPs need to include the following:
      i. This analysis is not required but can be included.
      ii. Three points of concern must be included in the analysis.
         1. Lot 1 – Watershed 1 at the property line with the open space parcel.
         2. Lot 2 – Watershed 2SA at the property line with Lot 1.
         3. Lot 2 – Watershed 2SB should be broken into two watersheds one to same point of concern as 2SA and one to the same as 2NA.
         4. Lot 2 – Watershed 2NA at the property line with the open space parcel.
         5. Lot 2 – Watershed 2NB at the property line with the open space parcel.
         6. The watershed map must callout the three points of concern.
      iii. The watershed map must show the Tc path for each of the watersheds.
      iv. The property lines for Lot 1 and Lot 2 must be shown.
   f. The proposed conditions with BMPs need to include the following:
      i. A detailed watershed map for Lot 1 and Lot 2 needs to be included.
      ii. Each watershed boundary for the area directed to each BMP must be included (must include other areas that drain onto or into the BMP).
      iii. Three points of concern must be included in the analysis.
         1. Lot 1 – The property line with the open space parcel.
         2. Lot 2 – The property line with Lot 1.
         3. Lot 2 – The property line with the open space parcel.
         4. The watershed map must callout the three points of concern.
      iv. The watershed map must show the Tc path for each of the watersheds (Tc path not needed for watersheds with short direct discharges to BMPs).
      v. The property lines for Lot 1 and Lot 2 must be shown.
   g. The HydroCad analysis needs to be revised to include the three points of concern.
   h. The HydroCad analysis must use a minimum time span of 0-24 Hrs. for existing and proposed conditions.
   i. The HydroCad analysis uses a curve number of 92 for a wooded wetland. How was this curve number determined?
   j. The HydroCad analysis shall use a maximum sheet flow length of 100-feet.
   k. The HydroCad analysis must use square feet for areas and cubic feet for volumes.
   l. The HydroCad analysis must include the Stage-Area-Storage Tables for each of the BMP’s. This is required to verify the storage provided at the outlet elevation of each BMP.
   m. The use of an exfiltration rate within the HydroCad analysis must follow the requirements of Appendix B in Town of Greenwich Drainage Manual February 2012. Please contact the Engineering Division to discuss
what is required. To use an exfiltration rate in the analysis a saturated hydraulic conductivity test must be completed in the proposed location of each BMP.

n. Need to discuss the rain garden storage tables.
   i. A minimum 3" mulch layer needs to be in the analysis (10% void ratio can be used).
   ii. The bioretention soil must be a minimum of 18-inches (30% void ratio can be used).
   iii. A stone storage layer below the bioretention soil can be included.
   iv. Any design with an underdrain can only be considered a filtration BMP and no credit for infiltration can be taken.

o. The WQV computations must include the entire area that is directed to each BMP. Review and revise the WQV computations for each watershed area as needed.

p. The WQV must be calculated for each area directed to a BMP. All imperious areas must be directed to a BMP.

q. The RRV computations must use the values generated in the detailed HydroCad analysis and not the proposed HydroCad with no BMPs.
   i. Proposed RRV for Lot 1: 1A + 1B + 1C + 1D + 1E = .112 + .018 + .010 + .010 + .018 = .168 AC-FT = 7,318 CF and not .126 AC-FT.
   ii. Proposed RRV for Lot 2: 2NA + 2NA1 +2NA2 + 2NA3 + 2NA4 + 2NB + 2NB1 + 2NB2 + 2SA + 2SA2 + 2SB + 2SB2 + 2SB3 = .045 + .002 + .007 + .029 + .020 + .015 + .018 + .006 + .025 + .013 + .024 + .016 + .002 = .222 AC-FT = 9,760 CF and not .159 AC-FT.
   iii. Lot 1 required RRV is 7,318 – 4,051 = 3,267 CF. This must be provided in the BMPs during the 1-year storm.
   iv. Lot 2 required RRV is 9,670 – 5,663 = 4,007 CF. This must be provided in the BMPs during the 1-year storm.

r. Review and revise all other computations as needed.

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

4. The construction plan set was not reviewed in detail at this time. The following information must be added to the plans:

a. Existing Conditions Survey Sheet
   i. Show a note certifying the survey A-2.
   ii. Show a note certifying the survey T-2.
   iii. Show one (1) permanent benchmark on the site within one hundred feet of the proposed construction.

b. Site Plan Sheets (Submitted Lot 1 and Lot 2 Grading, Drainage & Utility)
   i. Show excavation and fill quantities in a table.
   ii. Show the entire pipe network from the starting point (roof leaders, catch basin, etc.) to the outfall.
   iii. Show the footing drain network from the house/sump pump to the outfall.
   iv. Show top and bottom elevations for all retaining walls and stone fences.
   v. Show all catch basins/yard drains/drain inlets with the following in the callout:
      1. Grate elevation.
      2. Filter insert name and model # (if applicable).
      3. Invert elevation of each pipe.
      4. Pipe location in structure (n, s, e, w, etc.).
      5. Pipe size.
      6. Sump elevation.
   vi. Show all manholes/junction boxes with the following in the callout:
      1. Cover elevation.
      2. Invert elevation of each pipe.
      3. Pipe location in structure (n, s, e, w, etc.).
      4. Pipe size.
      5. Bottom of structure elevation.
   vii. Show all control structures with the following in the callout:
      1. Cover/grate elevation.
      2. Invert elevation of each pipe.
      3. Control structure type and size (orifice, rectangular weir, v-notch weir, etc.).
      4. Pipe location in structure (n, s, e, w, etc.).
5. Pipe size.

viii. Show all pipes with the following in the callout:
   1. Pipe size.
   2. Pipe material.
   3. Pipe slope.

ix. Show all level spreaders/scour holes’/riprap aprons with the following in the callout:
   1. Dimensions (length and width).
   2. Depth of stone.
   3. Pipe/stone elevation.
   4. Pipe size.
   5. Pipe material.

x. Show all bioretention (rain gardens) with contours (1/2 foot if needed) and include the following in the callout:
   1. Top of berm elevation and surface area.
   2. Top of mulch/sod elevation and surface area.
   3. Top of bioretention soil mix elevation and surface area.
   4. Bottom of bioretention soil mix elevation and surface area.
   5. Bottom of stone elevation and surface area.
   6. Overflow/weir elevation and dimensions.
   7. Underdrain/outlet pipe sizes, material, and invert elevations.

xi. Show all infiltrators (culverts, concrete dry wells, rainstores, etc.) with the following in the callout:
   1. The model # of infiltrator units.
   2. The number of infiltrator units.
   3. Top of stone elevation above infiltrators.
   4. Bottom elevation of infiltrator units.
   5. Bottom of stone elevation below infiltrator units.
   6. All pipe sizes, material, and invert elevations in and out of infiltrator units including header pipe.

xii. Show all permeable pavements with the following in the callout:
   1. Permeable surface type (unlock eco-pavers, porous asphalt, gravel pave 2, etc.).
   2. Permeable Pavement surface thickness.
   3. Permeable Pavement surface area.
   4. Bottom of no. 8 stone elevation.
   5. Bottom of no.57 stone elevation.
   6. Bottom of no.2 stone elevation.
   7. Underdrain/outlet pipe sizes, material, and invert elevations.

xiii. Show all wet and dry water quality swales with contours (1/2 foot if needed) and include the following in the callout:
   1. Top of swale elevation and width.
   2. Bottom of swale elevation and width.
   3. Top of check dam elevation and width.
   4. Length between check dams.
   5. Outlet pipe sizes, material, and invert Elevations.

C. Driveway Profile & Sight Distance Sheet
   i. The proposed driveway for Lot 1 requires the removal of vegetation in both directions to meet the required 150-foot sight distance. Revise the plans showing the minimum required 150-foot sight distance and callout all the vegetation and trees that need to be removed. A letter from the Tree Warden for the removal of all the vegetation and trees within the 150-foot sight line must be submitted prior to final subdivision approval from P&Z.

   ii. The proposed driveway for Lot 2 requires the removal of vegetation in both directions to meet the required 150-foot sight distance. Revise the plans showing the minimum required 150-foot sight distance and callout all the vegetation and trees that need to be removed. A letter from the Tree Warden for the removal of all the vegetation and trees within the 150-foot sight line must be submitted prior to final subdivision approval from P&Z.

   iii. Show width of driveways at property line.
iv. Show width of driveways at edge of road.

v. The profile for the driveway on Lot 2 must be from the edge of road to turn around and also to the garage. The profile shall include slopes, spot elevations and if porous pavement is used the entire porous pavement section to the bottom of stone shall be included with elevations.

vi. A profile for the driveway on Lot 1 from edge of road to garage must be submitted. The profile shall include slopes, spot elevations and if porous pavement is used the entire porous pavement section to the bottom of stone shall be included with elevations.

vii. Show slope of driveways for first five feet on profile (required minimum slope is +3% to 6%).

viii. Show slope of driveways for next twenty feet on profile (required maximum slope is 4% when remaining slope ≥ 10%).

ix. Show slope of driveways for the remaining distance to garage on profile (required maximum slope is 8% for commercial, 12% residential (two or more family), and 15% for residential).

d. Construction Details Sheets

i. Need to discuss the Permeable Paver System Detail with the Engineering Division. A copy of the specification for ASTM #9 stone must be submitted.

ii. Need to discuss the Type ‘A’ and ‘B’ Rain Garden Details. The bioretention soil specification must be on the plans. The bioretention soil mix must be the specification listed in Appendix G of the Town of Greenwich Drainage Manual February 2012 as amended. All residential rain gardens must have a minimum 18-inches of bioretention soil used.

e. Building/House Section or Elevation Sheet (required prior to zoning/building permit sign-off)

i. Show one section or elevation of the building/house.

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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. The Operations and Maintenance Plan Report must be a separate document for each lot and include the following:


b. Exhibit A: Long-term Maintenance Plan that prescribes those activities that must be carried out to maintain compliance with this Declaration. A maintenance log form must also be included. A draft must be completed prior to Final Site Plan Approval. The final version must be submitted with the request for Certificate of Occupancy.

c. Exhibit B: Improvement Location Survey showing a location of the Property and an accurate location of each stormwater management practice affected by this Declaration. This must be submitted prior to the issuance of the Certificate of Occupancy.

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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).
1.0 PROJECT NARRATIVE

1.1 Project Overview

Aquarion Water Company (AWC) is subdividing an 80.271 ac. parcel of Class III watershed land in Greenwich, Connecticut. An additional 18+ acre parcel of Class I and II lands will be retained by AWC. The parcel is located north of the Merritt Parkway and is bounded by Lake Avenue on the east, Old Mill Road North on the south side, and Cherry Valley Road on the west. The property lies within the watershed for Converse Pond Brook.

The majority of the Class III property (approx 72.3 acres) is being conveyed to the Greenwich Land Trust with a conservation easement in favor of the Town of Greenwich for long-term open space preservation. Aquarion is subdividing out two – 4 acre building lots in the southwest corner of the parcel for residential use. The property is zoned RA-4. Access is from proposed driveways off Cherry Valley Road. The lots will be served by on-site wells and subsurface sewage disposal systems.

The property contains a number of inland wetlands that were delineated by William Kenney Associates and surveyed by Ochman Associates, Inc.. Refer to the Plan Set prepared by DyMar Corp. dated June 18, 2020 for additional information.

This report analyzes the drainage impacts from the two proposed lots, and documents compliance with Greenwich Low Impact Development (LID) and Stormwater Management Manual.

The project received an Inland Wetlands Approval with conditions at the Greenwich IWWA meeting on July 27, 2020. Comments were received from the Greenwich DPW dated 6/24/20, and the design has been revised to address those comments. A response to comments is included in the front of this revised report. A Planning and Zoning hearing is scheduled for September 9, 2020.

Subdivision maps prepared by Ochman Associates are contained in Appendix A.

1.2 Stormwater Management Standards Narrative
Low Impact Development (LID) methods have been used in preparing the proposed plans in keeping with Town of Greenwich requirements.

1.3 Protection of Natural Hydrology

Most of the property is being preserved as open space along Converse Pond Brook and the associated wetlands. The areas that are being developed for two lots are primarily wooded uplands along Cherry Valley Road. Grading and drainage on both lots maintains existing drainage patterns. The access driveway on Lot #2 has 3 culverts conveying runoff where existing wetlands are being crossed to maintain the existing drainage patterns. Development plans contain a variety of stormwater Best Management Practices that are designed to promote infiltration, and distribute runoff to the downhill wetlands in a diffuse pattern that mirrors existing conditions.

1.4 Stormwater Best Management Practices:

The residential project has designed using Low Impact Development (LID) methods in keeping with Town of Greenwich and Connecticut Department of Energy and Environmental Protection guidelines. Some of the BMP’s used on this application include:

1.4.1 Land Preservation:

Preservation of most of the property (72.3 ac.) as open space that is being conveyed to the Greenwich Land Trust with a permanent conservation easement in favor of the to the Town of Greenwich.

1.4.2 Lot 1:

- Maintaining existing drainage patterns.
- Limited clearing and grading.
- Porous Paver Driveway for groundwater recharge.
- Porous Patio around swimming pool. A porous concrete patio with a crushed stone base was assumed for design.
- Porous walks are used
- Pervious Decks are used around rear of house.
- Detention Galleries for groundwater recharge from building roof and other areas.
- Level Spreader at the stormwater outlet to diffuse point discharges and avoid erosion.
- Existing stone walls being maintained.
• Tree protection measures incorporated into sediment and erosion controls.
• Amended soils are being used.

1.4.3 Lot 2:

• Maintaining existing drainage patterns.
• Crushed Stone Infiltration Trenches along driveway to infiltrate runoff. No curbs are proposed for most of driveway.
• Grass swales to direct runoff along driveway.
• Porous Pavers used for Driveway and Parking near house.
• Porous Patio around swimming pool. A porous concrete patio with a crushed stone base was assumed for design.
• Pervious Decks are used around rear of house
• Rain Gardens (3) are proposed to collect runoff from house, parking and drives.
• Detention Galleries for groundwater recharge from building roof and other areas.
• Level Spreader at the stormwater outlet to diffuse point discharges and avoid erosion.
• Stone walls are being rebuilt to match existing drainage patterns.
• Tree protection measures incorporated into sediment and erosion controls.
• Amended Soils are being used.

1.5 Credits for LID BMP’s

The project is applying for use of LID BMP’s noted above. All of the developed areas on both lots drain through one or more of the various LID BMP’s. Refer to drawings C10A & C10B Low Impact Development Plans by DyMar for location of the various BMPs. The Credit for LID BMP’s checklist is contained in Appendix D.
2.0 Stormwater Management Plans and Analysis

2.1 Existing vs. Proposed Hydrology Summary

Discharge points were identified for both lots in response to comments from the Greenwich DPW. The lots were analyzed for the 1-100 Year storm events. There is no increase in peak runoff rates from both lots. There is a net decrease in peak runoff volumes due to the LID BMP’s being used. All impervious areas drain to some BMP. All BMP’s were designed ignoring infiltration to groundwater per discussions with the DPW. This is a conservative analysis given the use of LID BMP’s used.

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<td>-7,588</td>
</tr>
<tr>
<td>% Change</td>
<td>-12.1%</td>
<td>-12.4%</td>
<td>-12.5%</td>
<td>-11.2%</td>
<td>-8.9%</td>
<td>-10.0%</td>
<td>-5.9%</td>
</tr>
<tr>
<td>Condition</td>
<td>Q1 Yr. Storm (cfs)</td>
<td>Q2 Yr. Storm (cfs)</td>
<td>Q5 Yr. Storm (cfs)</td>
<td>Q10 Yr. Storm (cfs)</td>
<td>Q25 Yr. Storm (cfs)</td>
<td>Q50 Yr. Storm (cfs)</td>
<td>Q100 Yr. Storm (cfs)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Rainfall (inches)</td>
<td>2.90</td>
<td>3.40</td>
<td>4.30</td>
<td>5.10</td>
<td>6.40</td>
<td>7.60</td>
<td>9.10</td>
</tr>
<tr>
<td>Existing</td>
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<td>1.12</td>
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<td>6.46</td>
<td>9.10</td>
<td>12.63</td>
</tr>
<tr>
<td>Proposed with LID BMP’s</td>
<td>0.60</td>
<td>1.15</td>
<td>2.43</td>
<td>3.79</td>
<td>6.27</td>
<td>8.88</td>
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<tr>
<td>% Change</td>
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<td>-2.9%</td>
<td>-2.4%</td>
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</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Vol1 Yr. Storm (c.f.)</th>
<th>Vol2 Yr. Storm (c.f.)</th>
<th>Vol5 Yr. Storm (c.f.)</th>
<th>Vol10 Yr. Storm (c.f.)</th>
<th>Vol25 Yr. Storm (c.f.)</th>
<th>Vol50 Yr. Storm (c.f.)</th>
<th>Vol100 Yr. Storm (c.f.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>4,762</td>
<td>7,674</td>
<td>14,078</td>
<td>20,757</td>
<td>33,073</td>
<td>45,632</td>
<td>62,487</td>
</tr>
<tr>
<td>Proposed with LID BMP’s</td>
<td>4,676</td>
<td>7,424</td>
<td>13,414</td>
<td>19,618</td>
<td>31,492</td>
<td>44,312</td>
<td>61,644</td>
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<tr>
<td>Change</td>
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<td>-250</td>
<td>-664</td>
<td>-1,139</td>
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<td>-1,320</td>
<td>-843</td>
</tr>
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<td>-1.8%</td>
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<td>-4.7%</td>
<td>-5.5%</td>
<td>-4.8%</td>
<td>-2.9%</td>
<td>-1.3%</td>
</tr>
</tbody>
</table>
### TABLE 3: Stormwater Summary – Existing vs. Proposed Conditions
Discharge Point 2 (DP-2) Lot 2; South Side at Lot 1 (1.37 acres)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Q1 Yr. Storm (cfs)</th>
<th>Q2 Yr. Storm (cfs)</th>
<th>Q5 Yr. Storm (cfs)</th>
<th>Q10 Yr. Storm (cfs)</th>
<th>Q25 Yr. Storm (cfs)</th>
<th>Q50 Yr. Storm (cfs)</th>
<th>Q100 Yr. Storm (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall (inches)</td>
<td>2.90</td>
<td>3.40</td>
<td>4.30</td>
<td>5.10</td>
<td>6.40</td>
<td>7.60</td>
<td>9.10</td>
</tr>
<tr>
<td>Existing</td>
<td>0.41</td>
<td>0.69</td>
<td>1.29</td>
<td>1.90</td>
<td>2.99</td>
<td>4.06</td>
<td>5.46</td>
</tr>
<tr>
<td>Proposed with LID BMP’s</td>
<td>0.35</td>
<td>0.60</td>
<td>1.13</td>
<td>1.84</td>
<td>2.84</td>
<td>4.06</td>
<td>5.39</td>
</tr>
<tr>
<td>Change</td>
<td>-0.06</td>
<td>-0.09</td>
<td>-0.16</td>
<td>-0.06</td>
<td>-0.15</td>
<td>0.0</td>
<td>-0.07</td>
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<tr>
<td>% Change</td>
<td>-14.6%</td>
<td>-13.0%</td>
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<td>-5.0%</td>
<td>0%</td>
<td>-1.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Vol1 Yr. Storm (c.f.)</th>
<th>Vol2 Yr. Storm (c.f.)</th>
<th>Vol5 Yr. Storm (c.f.)</th>
<th>Vol10 Yr. Storm (c.f.)</th>
<th>Vol25 Yr. Storm (c.f.)</th>
<th>Vol50 Yr. Storm (c.f.)</th>
<th>Vol100 Yr. Storm (c.f.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>2,476</td>
<td>3,713</td>
<td>6,313</td>
<td>8,932</td>
<td>13,696</td>
<td>18,312</td>
<td>24,495</td>
</tr>
<tr>
<td>Proposed with LID BMP’s</td>
<td>2,108</td>
<td>3,317</td>
<td>5,855</td>
<td>8,549</td>
<td>13,283</td>
<td>17,979</td>
<td>24,122</td>
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<tr>
<td>Change</td>
<td>-368</td>
<td>-396</td>
<td>-458</td>
<td>-385</td>
<td>-413</td>
<td>-333</td>
<td>-373</td>
</tr>
<tr>
<td>% Change</td>
<td>-14.9%</td>
<td>-10.7%</td>
<td>-7.3%</td>
<td>-4.3%</td>
<td>-3.0%</td>
<td>-2.5%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Condition</td>
<td>Q1 Yr. Storm (cfs)</td>
<td>Q2 Yr. Storm (cfs)</td>
<td>Q5 Yr. Storm (cfs)</td>
<td>Q10 Yr. Storm (cfs)</td>
<td>Q25 Yr. Storm (cfs)</td>
<td>Q50 Yr. Storm (cfs)</td>
<td>Q100 Yr. Storm (cfs)</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>---------------------</td>
<td>---------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Rainfall (inches)</td>
<td>2.90</td>
<td>3.40</td>
<td>4.30</td>
<td>5.10</td>
<td>6.40</td>
<td>7.60</td>
<td>9.10</td>
</tr>
<tr>
<td>Existing</td>
<td>0.42</td>
<td>0.80</td>
<td>1.67</td>
<td>2.58</td>
<td>4.26</td>
<td>5.96</td>
<td>8.22</td>
</tr>
<tr>
<td>Proposed with LID BMP’s</td>
<td>0.41</td>
<td>0.75</td>
<td>1.51</td>
<td>2.29</td>
<td>3.69</td>
<td>5.10</td>
<td>7.46</td>
</tr>
<tr>
<td>Change</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.16</td>
<td>-0.29</td>
<td>-0.57</td>
<td>-0.86</td>
<td>-0.76</td>
</tr>
<tr>
<td>% Change</td>
<td>-2.4%</td>
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<td>-9.6%</td>
<td>-11.1%</td>
<td>-13.4%</td>
<td>-14.4%</td>
<td>-9.3%</td>
</tr>
<tr>
<td>Vol1 Yr. Storm (c.f.)</td>
<td>3,429</td>
<td>5,435</td>
<td>9,804</td>
<td>14,325</td>
<td>22,612</td>
<td>31,023</td>
<td>42,271</td>
</tr>
<tr>
<td>Vol2 Yr. Storm (c.f.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vol5 Yr. Storm (c.f.)</td>
<td>9,804</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vol10 Yr. Storm (c.f.)</td>
<td>14,325</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vol25 Yr. Storm (c.f.)</td>
<td>22,612</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vol50 Yr. Storm (c.f.)</td>
<td>31,023</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vol100 Yr. Storm (c.f.)</td>
<td>42,271</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing</td>
<td>2,596</td>
<td>4,003</td>
<td>7,159</td>
<td>10,921</td>
<td>18,395</td>
<td>25,855</td>
<td>35,898</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change</td>
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<td>-2,645</td>
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<td>-4,217</td>
<td>-5,168</td>
<td>-6,373</td>
</tr>
<tr>
<td>% Change</td>
<td>-24.3%</td>
<td>-26.4%</td>
<td>-27.0%</td>
<td>-23.8%</td>
<td>-18.6%</td>
<td>-16.7%</td>
<td>-15.1%</td>
</tr>
</tbody>
</table>
### TABLE 5: Stormwater Summary – Existing vs. Proposed Conditions
Lot 2 Total – (4.0 acres)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Q1 Yr.</th>
<th>Q2 Yr.</th>
<th>Q5 Yr.</th>
<th>Q10 Yr.</th>
<th>Q25 Yr.</th>
<th>Q50 Yr.</th>
<th>Q100 Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storm (cfs)</td>
<td>Storm (cfs)</td>
<td>Storm (cfs)</td>
<td>Storm (cfs)</td>
<td>Storm (cfs)</td>
<td>Storm (cfs)</td>
<td>Storm (cfs)</td>
<td>Storm (cfs)</td>
</tr>
<tr>
<td>Rainfall (inches)</td>
<td>2.90</td>
<td>3.40</td>
<td>4.30</td>
<td>5.10</td>
<td>6.40</td>
<td>7.60</td>
<td>9.10</td>
</tr>
<tr>
<td>Existing</td>
<td>0.78</td>
<td>1.41</td>
<td>2.84</td>
<td>4.32</td>
<td>7.01</td>
<td>9.72</td>
<td>13.28</td>
</tr>
<tr>
<td>Proposed with LID BMP’s</td>
<td>0.77</td>
<td>1.35</td>
<td>2.62</td>
<td>4.11</td>
<td>6.52</td>
<td>9.14</td>
<td>12.79</td>
</tr>
<tr>
<td>Change</td>
<td>-0.01</td>
<td>-0.06</td>
<td>-0.22</td>
<td>-0.21</td>
<td>-0.49</td>
<td>-0.58</td>
<td>-0.49</td>
</tr>
<tr>
<td>% Change</td>
<td>-1.3%</td>
<td>-4.3%</td>
<td>-7.8%</td>
<td>-4.9%</td>
<td>-7.0%</td>
<td>-6.0%</td>
<td>-3.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Storm (c.f.)</td>
<td>Storm (c.f.)</td>
<td>Storm (c.f.)</td>
<td>Storm (c.f.)</td>
<td>Storm (c.f.)</td>
<td>Storm (c.f.)</td>
<td>Storm (c.f.)</td>
<td>Storm (c.f.)</td>
</tr>
<tr>
<td>Existing</td>
<td>5,905</td>
<td>9,148</td>
<td>16,117</td>
<td>23,257</td>
<td>36,241</td>
<td>49,336</td>
<td>66,766</td>
</tr>
<tr>
<td>Proposed with LID BMP’s</td>
<td>4,705</td>
<td>7,321</td>
<td>13,014</td>
<td>19,469</td>
<td>31,678</td>
<td>43,834</td>
<td>60,020</td>
</tr>
<tr>
<td>Change</td>
<td>-1,200</td>
<td>-1,827</td>
<td>-3,103</td>
<td>-3,788</td>
<td>-4,563</td>
<td>-5,502</td>
<td>-6,746</td>
</tr>
<tr>
<td>% Change</td>
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<td>-20.0%</td>
<td>-19.3%</td>
<td>-16.3%</td>
<td>-12.6%</td>
<td>-11.1%</td>
<td>-10.1%</td>
</tr>
</tbody>
</table>

The existing conditions model (19037 Dymar EX-1R.hcp) analyzed both lots and the total to the eastern property line of the proposed development.

Refer to Drawing DA-1 Existing Drainage Basins in Appendix A for locations.

The proposed conditions HydroCAD model (19037 Dymar PR-2.hcp) incorporating all the LID BMP’s and recharge galleries. That analysis demonstrates that there is no increase in peak runoff rates from the proposed development. See Table 1 above and Appendix B for additional information.

Refer to Drawing DA-2 Proposed Drainage Basins in Appendix A for tributary watersheds.

LID Design calculations are enclosed in Appendix D.
2.2 **Hydrology Methods**

The site was analyzed using HydroCAD Computer Program, which is based on using the U.S. National Resource Conservation Service Hydrology Methods (formerly TR-20). The pre and post development analysis was prepared for:

- TR-20 analysis using HydroCAD ver. 10 Hydrology Program by HydroCAD Software Solutions, LLC
  - Q = flow (cfs)
  - A = area (ac.)
  - CN = curve number
- 24 Hour Duration Storms using NOAA Atlas 14 Rainfall Data
- Antecedent Moisture Condition (AMC) = 2 (moist)
- The 1, 2, 5, 10, 25, 50 and 100 Year Storms were analyzed using the rainfall amounts listed in the Greenwich Stormwater Manual
- 0-30 Hour Time Span was used for existing and proposed Hydrograph volumes.
- Time of Concentration: via NRCS Method
  - 8 min. minimum - all areas
  - 15 min. minimum - areas that were primarily treed or landscaped
  - Max. 100’ distance was used for sheet flow per DPW comments.

The Existing Conditions analyzed were for the current property conditions. The soils are primarily Hydrologic Soil Group B as identified by the NRCS study and confirmed by William Kenney Associates. Refer to Appendix B: Soils for additional information.

The Proposed Conditions analysis with BMP's (19037 Dymar PR-2R.hcp) performs a reservoir routing of all the LID BMP’s to verify reductions of peak runoff rates. Appendix C contains summary tables of all the Areas and Curve Numbers for the various LID BMP areas.

2.3 **Land Use Regulations**

The project has been developed in accordance with the Greenwich Drainage Manual as part of a Greenwich Inland Wetlands application.

The project will also be seeking a subdivision approval from the Greenwich Planning & Zoning Commission, which will have a staff
reports from the Greenwich Engineering Department, Conservation Commission, and the Greenwich Health Department.

2.4 **Site Inventory and Evaluation**

Refer to Drawings C-2 & C-3 of the plan set for existing natural resource information and potential impact analysis. The tree survey and FEMA Flood Lines can be also found on plans prepared by Ochman Associates, Inc. sheets C-2 and C-3A, respectively. Plans are included in Appendix A.

2.5 **Define Development Envelope**

Refer to Drawings C4A & C4B for lot development and grading. These plans show the location of the stormwater systems. Other plans in the drawing set show the tree preservation and construction staging areas.

The upland soils on both lots are Hydrologic Class B; Charlton-Chatfield Soils, and are noted on Drawing C-2. Additional soils information is included in Appendix B: Soils.

2.6 **LID Control Strategies**

Various LID BMP’s have been incorporated into both lots, as noted previously.

Existing and Proposed hydrology calculations are included in Appendix C: Hydrology.

LID analysis calculations are included in Appendix D.

The two lots contain LID BMP’s in a treatment train approach using the “Static” design method to size stormwater volumes for proposed designs. Where possible, all directly connected impervious areas discharge to some infiltration BMP, such as a rain garden or recharge gallery prior to overflow. Infiltration was ignored as an outlet device on all BMPs during storm routings, which is a conservative assumption. Vegetated BMP’s such as grass swales and rain gardens were used, where possible to hydrologically disconnect runoff from impervious areas and maintain existing drainage patterns.

Lot 1 is a more compact layout than Lot 2 due to the location near Cherry Valley Road. Lot 2 contains a variety of BMP’s along the access.
drive; no curb, infiltration trenches, grass swales, rain gardens, as well as BMP’s around the house site for control of runoff from all impervious areas.

2.7 **Structural BMP’s**

2.7.1 **Water Quality Volume and TSS Removal**

<table>
<thead>
<tr>
<th>Location</th>
<th>WQV ( \text{req'd} ) (cf)</th>
<th>WQV ( \text{prv'd} ) (cf)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot 1</td>
<td>1,732</td>
<td>4,658</td>
<td>OK</td>
</tr>
<tr>
<td>Lot 2</td>
<td>4,075</td>
<td>11,495</td>
<td>OK</td>
</tr>
</tbody>
</table>

The proposed Water Quality Volumes exceed required amounts based on the “Static” design method. Refer to Appendix D for calculations.

This analysis is conservative because no exfiltration was assumed for all the BMP’s. This required that some of the crushed stone reservoirs under porous pavement and infiltration galleries had to be increased to provide storage to contain proposed runoff. Final design of the lots and houses may be able to adjust these designs based on future infiltration tests.

The porous concrete patios around the pools assumed a 6" thick crushed stone base. Refer to Appendix D: LID Analysis for additional information.

The BMP’s storage capacity would exceed that required for the 80% Total Suspended Solids (TSS) removal outlined in the Drainage Manual. Refer to Appendix C for calculations.
2.7.2 Runoff Reduction Volume

The volume of a 1 Year, 24 Hour Storm was compared for each lot, from Existing Conditions HydroCAD analysis (EX-1R) and Proposed Conditions with BMP’s HydroCAD model (PR-2R).

<table>
<thead>
<tr>
<th>Location</th>
<th>Existing Volume (cf)</th>
<th>Proposed Volume (cf)</th>
<th>RRV (cf)</th>
<th>Vol. Provided (cf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot 1</td>
<td>4,762</td>
<td>4,676</td>
<td>0</td>
<td>-86</td>
</tr>
<tr>
<td>Lot 2</td>
<td>5,905</td>
<td>4,705</td>
<td>0</td>
<td>-1,200</td>
</tr>
</tbody>
</table>

The proposed runoff volume was determined using the static storage volume of all the LID BMP’s’, and is less than the existing runoff volume for the 1 Year storm. Refer to Appendix D for calculations.

Rain Gardens were assumed to have 9” of ponding depth (PD) and 3” of mulch with 18” of sandy soil depth (SD). The void ratio of mulch was 0.10, and sandy soil was 0.30. Surface ponding above the 9” Ponding Depth that was used for Water Quality Volumes was included in HydroCAD modeling. All rain gardens are equipped with overflow weirs or yard drains to prevent erosion in very large storms.

2.7.3 Groundwater Recharge Volume

The groundwater recharge volume requirement is also being met by the storage volumes in the LID BMP’s.

<table>
<thead>
<tr>
<th>Location</th>
<th>GRV ( \text{req}'d ) (cf)</th>
<th>GRV ( \text{prov}'d ) (cf)</th>
<th>Vol. Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot 1</td>
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<td>OK</td>
</tr>
<tr>
<td>Lot 2</td>
<td>368</td>
<td>11,495</td>
<td>OK</td>
</tr>
</tbody>
</table>

Refer to Appendix D for calculations.

2.7.4 Peak Flow Control

Both lots are equipped with underground detention galleries in addition to the other LID BMP’s. The galleries are equipped with orifices.
designed to restrict peak flow rates. The proposed conditions HydroCAD model (19037 Dymar PR-2R.hcp) incorporates all the LID BMP’s.

Refer to Appendix D for additional information on LID compliance.

3.0 Conclusion

The development of the proposed two new building lots will result in maintaining existing drainage patterns toward Converse Pond Brook. A series of LID BMP’s is proposed for those two lots, and those BMP’s reduce the rates of peak runoff and runoff volume to the Brook and downstream properties below existing runoff levels. No diversions of runoff patterns are proposed, and a large amount of open space (72.1 acres) will be permanently preserved by Aquarion Water Company, the Town, and The Greenwich Land Trust as part of this subdivision.

The proposed development will meet the requirements of the Town of Greenwich’s Drainage Manual, specifically for: Groundwater Recharge, Runoff Reduction, TSS Removal, Water Quality Volumes, Peak Flow Rate, Peak Velocities, and Sediment and Erosion Controls during construction.

Refer to Appendix E for compliance with the elements of the “Stormwater Management Standards Narrative.”
DESIGN STANDARDS & REFERENCES

The following standards and references were used in preparation of the proposed plans and Stormwater Report:

- Soil & Erosion Control Guidelines, Connecticut Council on Environmental Quality, 2002, with LID Addendum
4 LOT RESIDENTIAL SUBDIVISION
LAKE AVENUE AND CHERRY VALLEY ROAD
GREENWICH, CONNECTICUT

OWNER/APPLICANT:
Aquarion Water Company of CT
835 Main Street
Bridgeport, CT 06605

LAND USE ATTORNEY:
Jacqueline O. Kaufman
Carmony Torrance Sandak & Hennessy LLP
707 Summer Street
Stamford, CT 06901

DRAINAGE CONSULTANT:
DeCarlo & Doll, Inc./Luchs Consulting Engineers
89 Colony Street
Meriden, CT 06451

CIVIL ENGINEERS:
DYMAR

SOIL SCIENTIST & BIOLOGIST:
William Kenney Associates LLC
195 Tunxis Hill Road
Fairfield, CT 06825

LAND SURVEYOR:
Ochman Associates Inc.
P.O. Box 78
Easton, CT 06612

DRAWING PACKAGE:

SURVEY DRAWINGS BY GURMAN ASSOCIATES

CIVIL ENGINEERING DRAWINGS
C-1
C-2
C-3
C-4
C-5
C-6
C-7
C-8
C-9
C-10
C-11
C-12
C-13
C-14
C-15

NEW DRAWING

NEW DRAWING
Sequence of Construction

1. Layout center line lines, tag trees to be removed and install tree protection
2. Clear and grade to final rough for approx. 15 ft.
3. Install tracking pad, offshore, stream and wildlife by local contractors as directed
4. Strip topsoil from all cross sections, road and shoulders as directed
5. Install temporary damming pit and dirt bag at vicinity of T+500
6. Install cross drain pipe complete with joint and fitting (as directed)
7. Complete drive to subgrade, importing clean fill and amended fill material as required to stations T+500, including construction of all ditches as directed
8. Install temporary damming pit and dirt bag for road cutting as drive Station 10+00-11+75, install 750 ft. of both cross drain pipe and site protection
9. Complete drive to subgrade at Station 11+75-12+00, install utilities
10. Complete drainage in subgrade at Station 14+55-15, install utilities
11. Construct subgrade and complete light fees out of drive, remove tracking pad, install dirt and asphalt per letter to client
12. Grade grass seed and topsoil, seed and mulch as directed to limits of right-of-way, site removal locations or stipulated greater than 1%
13. Install asphalt/blend course for driveway
14. Prepare and complete form concrete (C6)
15. Class III Land

General Notes:

1. Reference is made to Sheet C6-4C for additional erosion and sedimentation control specifications and details.
2. Monitoring of sedimentation and erosion controls shall be done weekly by a certified design engineer or a professional engineer. Any storms over 3 inches per hour or required by the Town, at additional costs as required by engineer, shall be reported to the Town of Westfield. The plan approval by the Town shall be in writing and approved by the engineer.
3. In accordance with Section 24.1 of the Zoning and Building Code, a permit shall be obtained before construction begins. The plan approval by the Town shall be in writing and approved by the engineer.
4. Natural vegetation shall be maintained and protected as is reasonably possible.
5. Any additional costs of trees, shrub and gravel, top soil, storm water detention, etc., shall be in accordance with the letter of understanding.
6. Fill from case and provide additional import clean fill and amended fill for area of fillouts.
7. Complete house framing and weather tight construction of windows, roofing and siding
8. Complete grading of roads, curbs, drainage and all landscape trees, and site grading (C6)
9. Complete box culvert for drive and garage area to subgrade, complete installation of pier construction and culverts
10. Complete Hardscape and pool construction
11. Complete fine grading of the site, remove seed and mulch retention for lawn and garden areas
12. Remove temporary stabilization berms and complete construction restoration of road and site
13. Upon completion of site, remove all fence and any remaining erosion and sediment control materials
# Soil Erosion & Sediment Control Construction Standards

## 1. INTRODUCTION

The construction work on or in connection with the project may result in transient or permanent soil erosion and sedimentation in the drainage area and adjacent waterways. To protect the environment and ensure a safe and clean work area, the following standards should be followed on all construction projects. Moreover, the Standards for Soil Erosion Control and Sediment Control are stipulated in this section.

### 1.1 Site Preparation

- **Surface Preparation**: A compacted subgrade should be installed in areas where the subgrade is not already compacted. This may include the removal of vegetation, earthwork, and other materials that could impair the subgrade's integrity.
- **Roadway Layout**: All roads and other access routes should be laid out to minimize their impact on the surrounding environment.

### 1.2 Construction Practices

- **Temporary Sediment Control Measures**: Temporary measures such as silt fences and sediment basins should be installed to prevent sediment from entering the waterways during construction.
- **Material Storage**: All materials should be stored in a manner that minimizes the potential for erosion and sedimentation.

## 2. OPERATIONAL CONSIDERATIONS

### 2.1 Water Quality

- **Water Quality Monitoring**: Water quality should be monitored regularly to ensure that it remains within acceptable limits.
- **Waste Disposal**: All waste materials should be disposed of in an environmentally responsible manner.

### 2.2 Vegetation

- **Vegetation Control**: Vegetation around construction areas should be controlled to prevent the spread of invasive species.
- **Vegetation Mulching**: Mulching the soil around construction areas can help to prevent erosion.

### 2.3 Sedimentation

- **Sediment Basins**: Sediment basins should be installed to collect and hold sediment.
- **Silt Fences**: Silt fences should be installed around construction sites to prevent sediment from entering waterways.

## 3. SEDIMENT CONTROL

### 3.1 Sediment Control Measures

- **Silt Fences**: Silt fences should be installed along the perimeter of the construction site.
- **Sediment Basins**: Sediment basins should be installed to collect and hold sediment.

### 3.2 Sediment Control Devices

- **Sediment Traps**: Sediment traps should be installed to prevent sediment from entering waterways.
- **Silt Curtains**: Silt curtains should be installed to prevent erosion.

## 4. ENVIRONMENTAL REMEDIATION

- **Environmental Remediation Plan**: An Environmental Remediation Plan should be developed to address any environmental impacts resulting from construction activities.

## 5. CONSTRUCTION PLAN IMPLEMENTATION

### 5.1 Construction Plan Review

- **Construction Plan Review**: The construction plan should be reviewed and approved by the appropriate authorities.

### 5.2 Construction Plan Implementation

- **Construction Plan Implementation**: The construction plan should be implemented according to the approved plan.

## 6. PREVENTIVE MEASURES

- **Preventive Measures**: Preventive measures should be taken to minimize the potential for soil erosion and sedimentation.

### 6.1 Soil Erosion Control

- **Soil Erosion Control**: Soil erosion control measures should be implemented to minimize the potential for soil erosion.

### 6.2 Sediment Control

- **Sediment Control**: Sediment control measures should be implemented to minimize the potential for sedimentation.

## 7. CONCLUSION

The implementation of the Standards for Soil Erosion Control and Sediment Control will help to ensure a safe and clean work area, protect the environment, and comply with regulatory requirements.

### Table: Sediment Control Requirements

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<tr>
<td>Sediment Basins</td>
<td>Should be installed to collect and hold sediment.</td>
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<tr>
<td>Silt Curtains</td>
<td>Should be installed to prevent erosion.</td>
</tr>
<tr>
<td>Sediment Traps</td>
<td>Should be installed to prevent sediment from entering waterways.</td>
</tr>
</tbody>
</table>

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**Note**: The above table is a summary of the sediment control requirements and is subject to change based on the specific project requirements and regulatory guidelines.
August 25, 2020

Ms. Cheryl Rona Lacoff
881 Lake Avenue
Greenwich, CT

Re: Subdivision Application # PLPZ 2020 00192 Aquarion Water Company of Connecticut
836 Lake Avenue, Greenwich

Dear Ms. Lacoff:

I am in receipt of your letter to Ms. Margarita Alban, Chair, Planning and Zoning Commission, dated August 5, 2020. As you know, Aquarion intends to subdivide its Lake Avenue property into four parcels. Aquarion will retain a portion of the property (one of the four lots) for continued water company use. As explained below, this land will continue to be protected from development by the same laws and regulations that protect it today; therefore, Aquarion does not believe that it is necessary to impose additional restrictions on this land.

1. **Connecticut State Statute protects watershed land**: The land that Aquarion will retain is water company owned watershed land and is regulated by the Connecticut Department of Public Health under Section 25-32 of the Connecticut General Statues which states that no water company shall sell, lease, assign or otherwise dispose of, or change the use of, any watershed lands without a written permit from the Commissioner of Public Health. There are, therefore, restrictions on the future use of the parcel. This permit process includes a requirement for notification to the chief elected official in the Town of Greenwich.

2. **Existing Diversion and Source Abandonment Permits protect the Aquarion land**: The property that Aquarion will retain is used for the diversion of water from Converse Brook to the Putnam Reservoir in Greenwich. This diversion is independent of the referenced agreement with the Converse Lake owners that allows for use of water stored in the Lake during times of “threatened water shortage”. Aquarion has no intention now or in the foreseeable future to terminate use of this diversion. Furthermore, elimination of the diversion would require a source abandonment permit from the Department of Public Health. The source abandonment permit process has its own public notification and comment requirements thereby giving you and the Town of Greenwich ample
Ms. Cheryl Rona Lacoff  
August 25, 2020  
Page Two

opportunity for input on use of the parcel at that time. Aquarion’s Southwest Regional Pipeline (SWRP) diversion permit application referenced in your letter emphasizes the need for water in the region, and, therefore, the need for continued use of the Converse Brook diversion and therefore the improbability that a source abandonment permit would be submitted or approved for this diversion.

3. Any Future Development of Aquarion Land Would Be Minimal and Require Additional Town Approval: Additionally, of the Class I & Class II watershed land to be retained by Aquarion Water Company, there is only approximately 7.8 Acres of dry and developable land within the 18+/- acre parcel. Of that acreage, approximately 5.4 acres is located along Lake Avenue and approximately 2.4 acres is located on the northwest corner of the property and on the west side of Converse Pond Brook. Access to this area would require crossing of the brook and several hundred feet of wetlands. The 5.4 acre upland portion along Lake Avenue has both the underground pipe/channel and an intermittent water course running through it. In addition to the regulatory restrictions on future use of the parcel and the unlikelihood that the water source on the parcel will be abandoned in the future, there are physical characteristics of the property that provide additional regulatory and practical restrictions on its potential development.

In Summary, the future development of the Aquarion property is unlikely and not imminent. If at some point in the future, the development appears feasible, there are several permits required and opportunities for public participation at the state and local level. Therefore, Aquarion believes it is unnecessary to impose any additional conditions or restrictions than already exist over the remaining 18 acres at this time.

Sincerely,

[Signature]
Elizabeth Camerino-Schultz  
Real Estate Consultant

cc: Planning & Zoning Commission  
K. DeLuca  
P. LaRow  
P. Sesto  
J. Kaufman, Esq.
August 5, 2020

Ms. Maragrita Alban, Chair

Planning and Zoning Commission

Greenwich, CT

RE: Subdivision Application # PLPZ 2020 00192 Aquarion Water Company of Connecticut – 836 Lake Avenue, Greenwich

Dear Ms. Alban,

The above referenced Application for a 4 Lot Subdivision resulting in the dedication of 72 acres as permanently protected open space is a wonderful addition for all of Greenwich as well as to protect the environment.

I understand that there will be 2 lots developed as home sites, the 72 acre open space and Lot 3 which will remain for continued use by the Aquarion.

It appears that there is no restriction on the use or future use of that parcel.

That parcel is designated as Class I & II Watershed Land which at this point cannot be sold as the other Class III lands.

It is my understanding that this Class I&II designation is a result of a restriction that is in place due to the diversion structure, and related agreement with the Converse Lake owners, that allows water to be diverted, from Converse Lake and Converse Brook to the other Water Company reservoir on North Street when needed.

There is no guarantee that the agreement regarding the diversion could not be terminated and therefore that parcel would no longer be part of the public drinking water supply and become Class III land.

While that may seem unlikely and might require actions by various State agencies the idea is not farfetched.

Please see attached a legal notice from the Greenwich Time dated July 24, 2020 noticing a public hearing on a proposed diversion of up to 14.2 million gallons per day by Aquarion Water Company through the Southwest Regional Pipe Line. The future of water distribution is not set in stone.

The Planning and Zoning Commission may not be able to require such a restriction as will be imposed on the 72 acres, however Aquarion may make such an offer even if other reviews might be required by State agencies.

These 18 acres are very significant from an environmental perspective since they fall within Northern Long-Eared Bat Habitat Protection Zone (the inlet to the water tunnel from the diversion structure is located within Lot 3) as well as within the Critical Terrestrial Habitat Boundary for designated Vernal Pools 2 and 3 (see Ecological Assessment Report Figures 5 and 6 prepared by William Kenny Associates dated June 2020 and note that the hatched area on Figure 6 should be extended onto Lot 3).
It appears prudent that the status and fate of the 18 acres be resolved at this point as permanently protected open space and made part of the package deal and not left to an uncertain future.

Thank you for your consideration.

Sincerely,

Cheryl Rona Lacoff

881 Lake Avenue, Greenwich

Cc: Katie.Deluca@greenwichct.org
    Patrick.LaRow@greenwichct.org
NOTICE OF INFORMATIONAL MEETING
Aquarion Water Company Of Connecticut
Water Diversion Application No. 2020-0471
Southwest Regional Pipeline
Town: Stamford, Norwalk, Westport, Greenfield
The Department of Energy and Environmental Protection (DEEP) has received an application submitted by the Aquarion Water Company of Connecticut ("the applicant") under section 223-366 of the Connecticut General Statutes (CGS) for a permit to divert the waters of the state. The proposed activity includes the transfer of up to 14.2 million gallons per day (mgd) of water from the applicant's Greater Bridgeport System to its Southwest Fairfield County Region through what is known as the Southwest Regional Pipeline (SWRP). The SWRP has been in service for approximately 30 years and is currently permitted for up to 7.20 mgd. The proposed activity will take place at the location between the Town of Norwalk and the Town of New Canaan.

in response to public interest, the applicant has requested that DEEP hold an informational meeting regarding this application on Wednesday, August 26, 2020 at 6:00 PM by Zoom. A link to register for this meeting will be put on the DEEP Calendar of Events at www.ct.gov/deep/calendar. This meeting will provide an opportunity for the applicant to present its application and hear questions from the public. Questions will be heard after the applicant's presentation and will be received in the order in which members register for the meeting. A hearing officer from the DEEP Office of Adjudications will be present to facilitate the meeting and respond to any questions regarding administrative processes. DEEP will not formally receive any public comment at this meeting, but staff will be present to respond to any questions on the review process for the application. DEEP has made no final or tentative decision regarding this application. Once DEEP determines the application to be complete and finishes its review process, DEEP will issue a Notice of Tentative Determination, wherein an opportunity to formally receive comment will be provided.

Members of the public should check the DEEP Calendar of Events on the DEEP website for any additions to this meeting schedule, including additional meeting dates or cancellations.

Interested persons may obtain digital copies of the application from Jennifer L. Perry, Director, Water Planning and Management Division, Bureau of Water Protection and Land Use, DEEP.

ADA PUBLICATION STATEMENT
The Department of Energy and Environmental Protection is an Affirmative Action and Equal Opportunity Employer and is committed to requirements of the Americans with Disabilities Act. To request an accommodation, call 203-424-4192, or email deep.accommodations@ct.gov.

SITUATIONS WANTED
1 ABSOLUTELY BEST OF THE REST-HOUSE CLEANING, ANYTIME, DOES EVERYTHING.

WANTED TO BUY
CASH PAID FOR ALL JEWELRY Costume Jewelry, Furs, handbags, watches, coins, curiosities, antique, modern metalware, bric-a-brac.
ECOLOGICAL ASSESSMENT REPORT

FIGURE 6: NORTHERN LONG-EARED BAT HABITAT PROTECTION ZONE MAP

OWNER: AQUARIUM WATER COMPANY OF CONNECTICUT

LOCATION: LAKE AVENUE, GREENWICH, CONNECTICUT

DATE: JUNE 2020

SCALE: 100' 200' 400'

REF. NO. 4179

NOTES:
The limit of the northern long-eared bat habitat protection zone is taken from a map provided by CT DEEP regarding MoD determination No. 2019-1031. Northern long-eared bats are federally listed as threatened and state endangered.
ECOLOGICAL ASSESSMENT REPORT

FIGURE 5: VERNAL POOLS & PROPOSED DEVELOPMENT MAP

OWNER:
ACQUARIUM WATER COMPANY OF CONNECTICUT

LOCATION:
LAKE AVENUE
GREENWICH, CONNECTICUT

DATE:
JUNE 2000

SCALE:
1" = 100' 100'

REL. NO. 4178

NOTES:
VERNAL POOL BOUNDARY INFORMATION PROVIDED BY WILLIAM KENNY ASSOCIATES LLC. OTHER INFORMATION TAKEN FROM A DRAWING PREPARED BY ZYMAR.
July 23, 2020

VIA HAND DELIVERY

Ms. Patricia Sesto
Director, Inland Wetlands and Watercourses Agency
Town of Greenwich
101 Field Point Road, 2nd Floor
Greenwich, CT 06830

RE: Response to Staff Report
Subdivision of 836 Lake Avenue, Greenwich, Connecticut
Aquarian Water Company of Connecticut
Inland Wetlands and Watercourses Agency (“IWWA”) Permit Application for Activity Within and Proximate to Regulated Areas (the “IWWA Application”)

Dear Ms. Sesto:

I am writing today on behalf of Aquarian Water Company of Connecticut (the “Applicant”) and in response to the questions presented in the staff report dated, Friday, July 18, 2020.

[Staff] Comments / Questions / Recommendation

1. Overall, the plan is laudable in that it protects 72 acres of open space and proposes to disturb a little more than two acres of the eight acres that comprise the residential lots.

   We Concur.

2. The development of lot 2 necessitates crossing narrow portions of a hillside wetland. The alternatives evaluation considers three other development proposals with more residential lots. What the discussion does not include is consideration of locating the second lot elsewhere on the site that would eliminate the need for a wetland crossing. This discussion should include the feasibility of locating a building envelope that would not require a wetland crossing. If such is feasible, what are the probable consequences to the vernal pools, watercourses, and wetlands due to elimination of critical terrestrial habitat, increase in edge habitat, the introduction of residential landscape in the upland...
review area, and the potential for direct wetland impacts for driveway access, as applicable.

The attached Exhibit IW-1, entitled, “Lot #3 Alternate Layout Plan”, dated July 24, 2020, prepared by DYMAR, demonstrates the potential for a third lot off of Lake Avenue that does not result in any direct wetland disturbance or loss. However, this lot does have other wetland and ecological impacts. The lot has greater impacts to habitat for obligate vernal pool species and habitat for the endangered northern long-eared bat (see attached Exhibit 2) and other wildlife species. The lot is located in the heart of the property, in an area of mature forest, with little to no invasive vegetation. While this development would result in no direct wetland impacts, the proposed access drive is located very close to several wetland areas. The proposed development for this lot will be located within the core area of the Critical Terrestrial Habitat (CTH) of three vernal pools (VPs) (see attached Exhibit 3).

Whereas, the preferred development lot, the lot with proposed direct wetland impact, is located within the CTH of only one VP and it’s only within the periphery of the CTH, not the core. Being within the core will result in greater disruption of amphibians and reptiles as they migrate from the VPs and move between them. The alternate lot location would also likely become a vehicle for the introduction of invasive vegetation to an area of forest where little exists today. The increase in invasive vegetation likely would result from increased sunlight exposure from forest clearing and from seed dispersed from the development landscape.

3. The level spreader on lot 1 associated with the infiltrator overflow discharges to a 20% slope. What is the ground cover characteristic below the level spreader? At what size storm is the infiltrator expected to overflow? If the overflow occurs with more frequent storms, what is proposed to ensure the device stays level for the duration of its life.

Attached are the discharge flows for the Level Spreader in Lot #1. No discharge will occur for the smaller storms due to the upstream BMP’s, and the maximum velocity is about 0.5 ft per second for the 100 Yr. storm, which is non-erosive for the existing soil conditions. This velocity on the slope will not create rill erosion, as the velocity is well below published allowances of up to 2 feet per second for soils comprised of loam, and sandy loams. The devise has a rigid fixed metal edge that is to be level to maintain even flow. So long as the level spreader is not damaged, the metal weir will stay level as it is permanently secured into the ground. The metal is made of aluminum and not steel, so it will not corrode. Like any element, inspections to verify the level spreader remains level is always a good practice.
4. The culvert on lot 2 will alter the pattern of flow for the 30-50 foot sections of the wetlands. Discussion of how the dimensions of the riprap apron were determined to achieve a diffused flow would be helpful.

All the culverts on Lot 2 are pass thru’s to convey the existing concentrated intermittent watercourses draining a small watershed to the west. There are actually three cross culverts along the driveway for Lot #2. Each culvert was located at each wetland crossing to maintain existing drainage patterns for each wetland, which are seasonal watercourses. This avoids any diversion of surface runoff from one wetland corridor to the other. The rip rap pad at each culvert outfall was designed to match the existing wetland corridor to disperse the drainage flow at the culvert outlet. The USDA publication for Energy dissipation for a minimum tailwater condition, @ 3 cfs, suggests a minimum riprap apron of 5 feet long and 6 feet wide. We well exceed that threshold for lesser flows.

a. Culvert #1; the southern crossing: 68 lf 12” CPP @ 0.150 ft/ft – has a 5’ x 10’ natural stone level spreader pad at FE #2 upstream of Wetland Flag #205; the flow for the 25 year storm is under 1.5 cfs.

b. Culvert #2; the middle crossing: 50 lf 12” CPP @ 0.120 ft/ft – has a 13’ x 8’ natural stone level spreader pad at the End Wall spanning the width of the wetlands from WF #209 to #222; the flow for the 25 year storm is under 1.5 cfs.

c. Culvert #3; the northern crossing: 30 Lf 12” CPP @ 0.100 ft/ft – has a 10’ x 8’ natural stone splash pad at the End Wall spanning the width of the wetlands near WF #302. This wetland drains a portion of the subject property, plus some of our neighbor’s property resulting from an impoundment created by the stonewall spanning the area and seeps thru the wall. This seep occurs as a high-level overflow when water levels rise above a certain level draining to Culvert #2. This flow occurs predominantly in the wet season months.

5. The limit of rear yard shown on the DYMAR site plan for lot 1 aptly utilizes an existing stonewall as its boundary. The limit of rear yard for lot 1 on the William Kenny Associates LLC map shows the lawn extending pass the stonewall and further into the wetland buffer. The Kenny map should be revised to be consistent with the DYMAR map.

The Kenny map (“Wetland & Buffer Habitat Enhancement & Conservation Plan,” dated July 23, 2020; REV.1) has been revised to be consistent with the Dymar map.

6. Lot 2 likewise has a stonewall to the rear of the house. Notwithstanding the incongruity between the William Kenny plan and DYMAR’s plan regarding the limit of lawn, the DYMAR map shows the limit of lawn west of the stonewall to the rear of the house. Both plans depict the proposal to relocate this wall to the eastern property boundary. As experience has shown, homeowners have a strong tendency to clear vegetation in whole or in part to a natural boundary. In this case, the natural boundary is the stonewall.
will serve wetland protection better to leave the wall in its current location to protect the woodlands beyond it, or better yet, to relocate it westward to the limit of lawn as depicted on the DYMAR plan.

The stone wall on Lot 2 must be moved to allow for the septic system to be installed. The existing wall is closer than the 50 feet minimum to a down gradient stonewall. The septic system cannot be moved further west due to shallow bedrock.

7. More details are needed with regard to the notes on the Wetland & Buffer Habitat Enhancement plan. Areas adjacent to lot 2’s driveway are to be revegetated and naturalized “with the establishment of native grasses, ferns, and/or wildflowers.” Will this area be simply seeded or planted with established vegetation? If planted with established vegetation, how many, what size, and where? What is the specific planting plan for the rain garden?

Areas adjacent to the eastern portion of lot two’s driveway will be revegetated and naturalized by establishing native groundcover from seed. The seed mixes are specified on the “Native Ground Cover Seed Mix Notes” that are provided on the WKA Wetland & Buffer Habitat Enhancement & Conservation Plan drawing. Additional notes have been added to the drawing to make it easier for the user to be aware of the meadow seed mix information.

8. Lot 2 has two more rain gardens that are within the limit of lawn. Mancured grass is not as effective at achieving the goals of a rain garden. Consideration should be given to planting the rain garden in such a way as to maximize pollutant uptake and trapping.

We agree to plant the rain garden in such a way as to maximize pollutant uptake and trapping. The rain gardens will be vegetated with native ground covers via a meadow seeding. The Wetland & Buffer Habitat Enhancement & Conservation Plan has been revised to reflect this change.

9. The two-phase approach to lot 2 is beneficial to reducing the risk of short term impacts to the wetlands. Likewise, the construction sequence aptly includes provisions for marking trees to remain and to be cut. This is beneficial in reducing the risk of erroneous tree removal.

We Concur.

10. This staff report was prepared without the benefit of comments from DPW Engineering Division. Additional modifications to the plan may be warranted in light of that review.

The Applicant shall respond to DPW comments upon receipt.
Thank you for the opportunity to respond. We welcome an opportunity to speak with you in advance of the hearing regarding these responses and look forward to presenting before the IWWA next week.

Sincerely,

[Signature]

Jacqueline Kaufman

cc: Development Team
    P. Manges
NOTES:
VERNAL POOL BOUNDARY INFORMATION PROVIDED BY WILLIAM KENNY ASSOCIATES LLC. OTHER INFORMATION TAKEN FROM A DRAWING PREPARED BY DYNAR.

VERNAL POOL AREAS

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NO-WETLAND-DISTURBANCE ALTERNATE SITE PLAN
VERNAL POOLS & PROPOSED DEVELOPMENT MAP

OWNER: AQUARIUM WATER COMPANY OF CONNECTICUT
LOCATION: LAKE AVENUE, GREENWICH, CONNECTICUT
DATE: JULY 2010
SCALE: 0' | 100' | 400'

REF. NO. 4178
DYMAR Aquatic Subdivision, Greenwich
Inland Wetlands Staff Report

Question #3: Lot 1 Level Spreader - 20% Grades?

What are normal flows to Level Spreader?

19037 DYMAR PRZ, HPC - Proposed HydroCAD with BMP's
Appendix B - 6/24/20 Report
Structure 115 - Lot 1 Level Spreader

<table>
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<tr>
<th>Storm</th>
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<td>9.10</td>
<td>0.28</td>
<td>0.28</td>
<td></td>
</tr>
</tbody>
</table>

Level Spreader: L = 30' C. Elev, 324.00

Q = CLH^{3/2}

0.28 CFS = 3.2 (30' X H) ^{3/2}

\left( \frac{1.028 \text{ CFS}}{3.2 (30')} \right)^{3/2} = H = 0.02' 

A = 0.02' (30') = 0.61 sq ft

Q = AV \therefore \sqrt{\frac{Q}{A}} = \frac{0.28 \text{ CFS}}{0.61 \text{ sq ft}} = 0.46 \text{ ft/sec}

V = \frac{0.46 \text{ ft/sec} \leq 2 \text{ ft/sec}}{100 \text{ YR Storm}}

OK
DYNAMAR/AQUARION
Island Wetlands Staff Questions

Question # 4 - Lot #2 - 3 Culverts - impact on flow patterns?

Culverts were sited at 3 wetland crossings to avoid diverting flow from one wetland finger to another.

Culverts Maintain Flow Patterns

<table>
<thead>
<tr>
<th>Culvert</th>
<th>Basin</th>
<th>Area (AC)</th>
<th>Qmax (CFS)</th>
<th>Q2yr (CFS)</th>
<th>Q25yr (CFS)</th>
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<tbody>
<tr>
<td>#1</td>
<td>25A</td>
<td>0.62</td>
<td>0.35</td>
<td>0.93</td>
<td>1.44</td>
</tr>
<tr>
<td>#2</td>
<td>25B</td>
<td>0.30</td>
<td>0.31</td>
<td>0.90</td>
<td>1.43</td>
</tr>
<tr>
<td>#3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. Doesn't include little off-site corner of neighbor's lot
SUBDIVISION APPLICATION

Project Name: Subdivision of 836 Lake Avenue, Greenwich, CT
Project Address: 836 Lake Avenue, Greenwich, CT
Property Owner(s): Aquarion Water Company of Connecticut
Tax Account Number(s): 10-1255 Zone(s): RA-4 Lot Area: 98.271+/- acres

Please select all relevant items below:
☐ Preliminary
☐ Coastal
☑ Final

☑ Subdivision
☐ Resubdivision

No. of Lots:
Existing: 1
Proposed: 4 (2 residential & 2 non-buildable)
Total Area of Property (s.f. or acres): 98.271+/- acres *

Zone:
Existing: RA-4
Proposed: RA-4
Area of Land Reservation: 72.271+/- acres

☐ Property is within 500 feet of a Municipal Boundary of ____________ (for notification)
☑ 10 lots or 10 or more acres requires Environmental Assessment § 6-266 (19)

Reserved Land Area as Percent of Total Land Area: 73.5%

Previous SB #: N/A

GLR Map # of any previously filed subdivisions or surveys: N/A

Check as applicable: ☑ septic ☑ well ☐ sewer ☐ public water

Health Permit needed and received? TBD

IWWA Permit received? Pending IWWA Permit #: Pending

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

Application #: PZ Subdivision App 2018
Final Subdivision Application Checklist
(Per Section 6-267 through 6-272 of the Subdivision Regulations)

APPLICATION NAME: 836 Lake Avenue, Greenwich, CT

All requests for final subdivision review by the Planning and Zoning Commission shall include all information indicated on this checklist and confirmation that all modifications as specified in a Commission review of any preliminary plan have been resolved. Applications shall be submitted in a single submission, including a list of submitted plans and a project narrative. The subdivision plan record sheet and construction sheet(s) are to be prepared in accordance with the Town's subdivision regulations and Department of Public Works Roadway and Drainage Design Manuals. A complete application must be received a minimum of 30 days prior to the Commission meeting at which the applicant desires to be heard. Fifteen copies of the plans are to be submitted (up to 20 copies of the plans may be required if in Coastal Zone or including new roads). Plans must be folded to 9"x12".

Check Items Submitted:

1. Record Sheets: shall be drawn at a scale of 20, 40, 50 feet to 1 inch except that for tracts in the RA-1, RA-2 or RA-4 zones a scale of 100 feet to 1 inch may be used provided required data is clearly shown. An index is to be provided in the event multiple sheets are required.
   a. Title (Subdivision or Resubdivision) of the sheet including the name of the subdivider and/or contract purchaser, Town Project Number issued upon request by the Chief of the Engineering Division of the Department of Public Works and endorsement block for Commission signature in the lower right hand corner of the tracing. A graphic scale, north arrow, and drawing and revision date(s) are to be shown.
   b. The location and dimensions of all boundary lines (metes and bounds) of the property.
   c. The dimensions and areas of all existing and proposed lots.
   d. Information to show the location of the subdivision in relation to surrounding property and streets.
   e. The names of owners of adjacent land (including properties across the street) or names of adjacent subdivisions; and locations of structures, walls, and septics on adjacent properties within 100 feet of the proposed subdivision.
   f. The lines of existing and proposed streets within the subdivision and lines of existing or approved streets. Survey data shall be shown across all street intersections to relate accurately one block with another and one side of a street with the opposite side.
   g. Location and type of all proposed monuments.
   h. The names of existing and proposed streets. The names of proposed streets are to be unique within the Town and not easily confused with names of other accepted streets.
   i. The lines and purposes of existing and proposed easements immediately adjoining and within the subdivision.
   j. The location of all existing and proposed water bodies, streams and wetlands.
   k. The location and dimension of all property proposed to be set aside for park and playground use or other public or private reservations with designation of the purposes thereof.
   l. The location of any Town and zone boundary lines within and adjoining the tract; and yard dimensions in respect to existing buildings.
   m. Sufficient data acceptable to the Engineering Division, to determine readily the location, bearing and length of all street lines, and to reproduce such lines upon the ground. These should be tied to reference points previously established such as State Highway or Town lines, adjacent subdivision monuments, or Town or State established grid points, and shown on the map. Datum used shall also be indicated.
   n. Certification with date, signature and seal of a registered land surveyor that the drawing is substantially correct to an A-2 degree of accuracy and that the property is in a designated zone or zones under the zoning regulations and a statement as to whether or not the lots in the proposed subdivision comply with zoning regulations.
   o. The following note shall be placed on the record sheet for any subdivision with a defined drainage course, swale or structure: "Upon approval of this subdivision plan, the owner agrees with the Town that unless otherwise specified hereon, the areas within at least ten (10) feet of the center line of any drainage facility, ditch or stream shown hereon, are dedicated for drainage, that no building or other structure shall be located thereon and that the Town shall not be under any obligation to maintain, clean, enclose, or otherwise alter or improve, such drainage facility."
Final Subdivision Application Checklist

p. The endorsement block for Commission action required to appear on the record sheet shall be shown as follows:

"Approved by Resolution of the Planning and Zoning Commission, Town of Greenwich, Connecticut, dated

__________________________  __________________________
Signature of Chairman       Date

q. A note indicating the type of sewage disposal and water supply facilities to be provided.
r. The following information is to be shown on the record sheet as applicable: total area of the subdivision, area of land reservations, area of land reservations as a percentage of total area, area of conservation land reserved by easement.
s. The record sheet shall note the elevation and the extent of the 100 year flood boundary as shown on the current edition of the Flood Insurance Rate Maps; NGVD 1929 is to be used. Areas reserved for flooding, as per the drainage summary report, shall be indicated and the flood elevation noted. A note indicating the purposes of the reservation shall be shown.
t. All notes required for the preliminary layout not mentioned herein are required.
u. A note stating that all utilities shall be placed underground.

2. An affidavit certifying that all abutting property owners have been notified about the proposed subdivision (See Section 6-272 of the Subdivision Regulations). Owners of lots, or portions of lots, which are across a public or private street shall be deemed to be abutting property owners. A schedule of names, addresses, shown on a GIS map with lot lines indicating the location of the notified property owners.

3. Written authorization for the agent to act on behalf of the certified property owner(s).

☐ 4. Eight copies of 11 x 17 inch reduction.

☐ 5. A map at a scale of 1,000 feet to one inch showing the Lot Lines & Streets.

☐ 6. Two copies of declarations or easements relating to reservations for park and playground or conservation areas prepared in accordance with the Town's model documents.

☐ 7. Fee submitted at time of application: $_____________ (see fee schedule)

☐ 8. Eight copies of a completed application form.

9. All items from the Preliminary Subdivision checklist.

*=To be provided with hard copy of application materials.

☐ "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."

I certify that the application includes all of the above requirements as noted. Please explain reasons for any omissions: Additional materials to be provided with hard copy of application materials.

Owner name/ signature ___________________________  See Letter of Authority

Agent name / signature ___________________________  Date 7/6/2020

P&Z Staff Signature ____________________________________________

Applicant Comments: __________________________________________

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.
June 17, 2020

Katie DeLuca, AICP  
Director of Planning and Zoning  
Town Hall, Planning and Zoning Department  
101 Field Point Road, 2nd Floor  
Greenwich, CT 06830

Ms. Patricia Sesto  
Director of Environmental Affairs  
Town Hall  
101 Field Point Road, 2nd Floor  
Greenwich, CT 06830

RE: 836 Lake Avenue, Greenwich, Connecticut  
Aquarion Water Company of Connecticut  
Letter of Authority

Dear Ms. DeLuca:

On behalf of Aquarion Water Company of Connecticut, the owner of 836 Lake Avenue, Greenwich, CT (the “Property”), I hereby authorize the attorneys of Carmody Torrance Sandak & Hennessey, LLP, with offices located at 707 Summer Street, Stamford, Connecticut 06901, to act as agent for Aquarion Water Company of Connecticut in connection with the enclosed land use applications. Thank you for your acknowledgement of said authority.

Sincerely,

[Signature]

Elizabeth Camerino-Schultz  
Real Estate Consultant
STATE OF CONNECTICUT
COUNTY OF FAIRFIELD

ss: Stamford

AFFIDAVIT

I, Jason A. Klein, understand the obligations of an oath and swear that this statement is true to the best of my knowledge.

1. I am over eighteen (18) years of age and understand the obligations of an oath.

2. I submit this Affidavit pursuant to and in satisfaction of the requirements established by the Subdivision Regulations of the Town of Greenwich, CT;

3. Aquarion Water Company of Connecticut, Inc. has filed Preliminary and Final Subdivision Applications with the Planning and Zoning Commission of the Town of Greenwich seeking subdivision approval for 836 Lake Avenue, Greenwich, CT (the “Property”).

4. Notice of the filing of these applications was mailed to abutting property owners and owners of property across the street from the Property on July 2, 2020 via Certificate of Mailing.

5. A copy of the letter sent to neighboring property owners is attached hereto as Schedule A.

6. A copy of the Certificates of Mailing is attached hereto as Schedule B.

Dated at Stamford, Connecticut, this 2nd day of July, 2020.

Jason A. Klein

Subscribed and sworn to before me on this 2nd day of July, 2020.

Notary Public

BRIANNA D. REGENTZ
NOTARY PUBLIC
MY COMMISSION EXPIRES FEB. 28, 2025
Schedule A
July 2, 2020

**RE:** Subdivision of 836 Lake Avenue, Greenwich, Connecticut
Aquarion Water Company of Connecticut
Notice of Filing of Preliminary & Final Subdivision Applications

Dear Neighboring Property Owner:

Our firm represents Aquarion Water Company of Connecticut ("Aquarion"), owner of property known as 836 Lake Avenue, Greenwich, Connecticut (the "Property"). The Property is approximately 98.271+/- acres and is located in the RA-4 (4 Acre Residence) Zone.

I am writing to inform you that Aquarion has filed applications with the Town of Greenwich Planning and Zoning Commission seeking Preliminary and Final Subdivision Approvals (the "Applications") to subdivide the Property into four (4) lots. Lots 1 and 2 (the "Residential Lots") will contain approximately four (4) acres each and are designed for single-family residential use in accordance with the standards of the RA-4 Zone. The third lot is proposed to be 72.271+/- acres and will be preserved as open space. The last lot will be retained by Aquarion for continued use by Aquarion and contains 18+/- acres.

The Applications will facilitate the future construction of a single-family home and accessory residential improvements on both Residential Lots, which will be located in the southwest portion of the Property along Cherry Valley Road. A sketch showing the approximate location of the proposed lots, is enclosed for your reference.

Please feel free to contact me if you have any questions regarding this application, or Elizabeth Camerino-Shultz of Aquarion (203-336-7632). Alternatively, you may also contact the Planning and Zoning office at 203-622-7894 for information concerning this application.

Sincerely,

Jacqueline O. Kaufman

Jacqueline O. Kaufman
Proposed Four (4) Lot Subdivision
Illustrative Location Plan
6.19.2020
Schedule B
<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>City, State, Zip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edward Roby</td>
<td>857 Lake Avenue</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Cheryl Rocca</td>
<td>881 Lake Ave</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>George P. Tankovich</td>
<td>71 Old Mill Road North</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Tai Michael We-Kwan</td>
<td>9 Paddock Drive</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Lawrence Aurusa</td>
<td>835 Lake Avenue</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Lawrence Aurusa</td>
<td>839 Lake Ave</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>James &amp; Mary Anne Farrell</td>
<td>15 Paddock Drive</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Lake Ave Assoc.</td>
<td>165 Fifth Ave 46</td>
<td>New York, NY 10003</td>
</tr>
<tr>
<td>Louise Lehmann</td>
<td>63-A Cherry Valley Rd.</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>CT Light and Power</td>
<td>PO Box 270</td>
<td>Hartford, CT 06101</td>
</tr>
<tr>
<td>Old Mill Property LLC</td>
<td>PO Box 338</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Alyssa Stafford</td>
<td>101 Old Mill Rd</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Anup Bagaria &amp; Kilt</td>
<td>69 Old Mill Road North</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Connecticut Department of Transportation</td>
<td>2800 Berlin Turnpike PO Box 317566</td>
<td>Newington, CT 06111-7566</td>
</tr>
<tr>
<td>Old Mill Properties LLC</td>
<td>103 Old Mill Rd</td>
<td>Greenwich, CT 06831</td>
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<tr>
<td>Matthew R. Val, P.E.</td>
<td>Transportation Principal Engineer</td>
<td>2800 Berlin Turnpike PO Box 317566</td>
</tr>
<tr>
<td>Tom S Ward Jr Tr 70 Old Mill Road No 70 Old Mill Road North</td>
<td>Greenwich, CT 06831</td>
<td></td>
</tr>
<tr>
<td>John B. Eardley</td>
<td>49 Old Mill Road North</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Robert Saiz &amp; Dealers</td>
<td>49 Old Mill Road North</td>
<td>Greenwich, CT 06831</td>
</tr>
<tr>
<td>Cardinals Park &amp; Playgrounds</td>
<td>Lake Ave</td>
<td>Greenwich, CT 06831</td>
</tr>
</tbody>
</table>
Edward Rabyo & Yvonne
857 Lake Avenue
Greenwich, CT 06831

Old Mill Properties LLC
C/O Amida
16 Cherry Valley Rd
Greenwich, CT 06830

Town of Greenwich
Allison Property
101 Field Point Rd
Greenwich, CT 06830

John B Lomb & Ansa W/S
29 Cherry Valley Road
Greenwich, CT 06831

Delaura Castinno
881 Lake Avenue
Greenwich, CT 06831

Bayberry Park Corp
Bayberry Lane
Greenwich, CT 06830

Tong Wu & Kevin Wang
887 Lake Avenue
Greenwich, CT 06831

Boris Mitton Tr & Stracks
931 Lake Avenue
Greenwich, CT 06831

Sixteen Street Holdings LLC
51 Cherry Valley Road
Greenwich, CT 06831

Natalie Enriches
15 E Putnam Ave #53
Greenwich, CT 06830

Seth Rothman
95 Lake Avenue
Greenwich, CT 06831

Edward L Miltstein
45 Burying Hill Rd
Greenwich, CT 06831

Greenwich Lake Avenue
Properties
881 Lake Avenue
Greenwich, CT 06831

Aquamarine Water Company
600 Linsley Street
Bridgewater, CT 06006

Michele Epperson
900 Lake Avenue
Greenwich, CT 06831

Thomas E Henry & Patricia E W/S
11 Underwood Road
Forest Hills, NY 11375

Steven Basler & Debra
Eleno W/S
69 Old Mill Road
Greenwich, CT 06831-3047

Gilbert Van Hassel &
44 Cherry Valley Rd
Greenwich, CT 06831-0000

Anup Sagatia & Kilts W/S
68 Old Mill Road
Greenwich, CT 06831

Mark Santopadre
21 Cherry Valley Rd
Greenwich, CT 06860

Lawrence C Liebert
865 Lake Ave
Greenwich, CT 06830

Joel Schonbrun
41 Bayberry Lane
Greenwich, CT 06831

Milton Edward
9 Miltstein
335 Madison Avenue
New York, NY 10017

Sahani Diksh Atishband
897 Lake Ave
Greenwich, CT 06830

Grady Hampton III &
Lauren W/S
891 Lake Avenue
Greenwich, CT 06831

S. P. Carroll Tr
9 Bayberry Lane
Greenwich, CT 06831

849 Lake LLC
40 West Elm Street
Greenwich, CT 06830

Lawrence Aquilina &
Irma Aquilina W/S
839 Lake Ave
Greenwich, CT 06831

Ralph C Rose II & Stacy W
W/S
40 Cherry Valley Rd
Greenwich, CT 06831