

IMPACT STATEMENT & ENGINEER'S REPORT

November 13, 2018

1. GENERAL:

Project: **SPECIAL PERMIT & SITE PLAN PERMIT APPLICATION For PROPOSED COMERCIAL BUILDING ADDITION SITE PLAN**

Applicant: **Bridge Street Leasing LLC**
Attn: Thomas Green
PO Box 963; Niantic CT 06357
Tel. 860.961.8709 Email: tgreen70@frontier.com

Location: Parcel ID # 168914333728
70 Bridge Street; City of Groton; New London County, CT 06340

Zoning: GC General Commercial Zoning District

Site Area: 36,271 +/- SF (0.83 +/- acres)

Wetlands: No Regulated Freshwater Inland Wetlands or CTDEEP Wetlands are located within Site Limits

200' Upland Review Area: 23,500 +/- SF (0.54 +/- acres) – 65% of site
200' U.R.A. is associated with existing Storm Drainage Ditches regulated as Intermittent Watercourses.

Frontage:

- 180'+/- along Fairview Avenue (non-access)
- 30' wide Easement frontage over National Railroad Passenger Corp Property on Bridge Street
- Bridge Street is 2-lane; 2-way traffic 32'+/- wide paved road
- Bridge Street turns into Thames Street at Fairview Ave intersection
- No curbside parking in front of Project Site
- Curbside parking available on west side of Thames Street within 500' of parcel
- Posted Speed Limit – 25 mph;
- Regulated/Maintained by the City of Groton

Special Zones:

- Flood Hazard Zone “X” – Area of Minimal Flooding
- Not in Aquifer or Water Resource Protection Overlay Zone
- Located within Coastal Area Management (CAM) Zone

Services Available: - Municipal WPCA Sanitary Sewer (in Bridge Street)
- Domestic Water Service (in Bridge Street)
- Natural Gas Service: None Available

On-Site Ground Lease Use: The existing project site contains a fenced in 4200+/- sf Ground Lease area to Connecticut Municipal Electric Energy Cooperative (CMEEC) which contains (2) diesel fueled Electric Generators (Peaker Plant).

Adjacent Uses:

- *South:* Adjacent - Developed Commercial
- *West:* Across Fairview Avenue - Developed Commercial
- *North:* Adjacent – National Railroad Passenger Corp (Active Railroad)
- *East:* Adjacent: - National Railroad Passenger Corp (Previous Developed/ Disturbed; Vacant (no Buildings, no vegetation, partial pavement/gravel).

Character of Neighborhood: The vicinity of the project site along the north side of Bridge Street & West Side of Thames Street is previous & existing Commercial/Industrial type buildings & offices/garages. This area has historically been known for this type of use. The current use of the subject site fits well with the immediate surrounding adjacent property uses. The railroad actively runs along the north (Amtrak). On the south side of Bridge Street, there is a mix of Commercial uses. Church street begins the Single-Family Residential Uses. The closest Residential house to the site is approximately 260' away from the subject site and is located in the R-5.2 Zone on Church Street.

Traffic: Bridge Street is a heavily travelled road for all traffic running From US Route 1 & the northbound off-ramp of I-95 continuing down Thames Street and also onto Fairview avenue which is a connector to the US Subbase. Automobile and commercial truck traffic density are moderately high along this local thoroughfare. Available Sight Distance from the Project Site is in excess of 500'+ toward the westbound on-coming traffic along Bridge Street. Sight distance is approximately 240' toward the eastbound on-coming traffic from Thames Street.

A pedestrian walk system exists along both sides of Bridge Street & Thames Street, and was a part of the Thames Street Streetscape project. There are no provisions for safe/signalized/sign controlled pedestrian crossing of Bridge Street or Thames Street within close proximity. The sidewalk on the North side of Bridge Street runs continuous down the west side of Thames street with painted crosswalks. The Fairview Avenue/Bridge Street intersection has an existing painted pedestrian cross-walk and is controlled by a single stop sign for southbound Fairview Ave traffic.

The existing Business Office & Accessory Storage Use generates employee traffic only during peak AM & Peak PM times (Start/End of work day). There is no continuous transient traffic generated by the current/proposed uses. The proposed Storage Building addition on the subject site will not increase/alter the existing traffic in the area.

Historic Site Condition:

- The West side of the parcel along Fairview Avenue is sloped & vegetated with moderate brush & grass. The slope is retained by a concrete wall along the streetline.
- Subject project site area is flat sloped 1.5% avg. grade. It is relatively level with the adjacent railroad track ROW.
- The general site slopes downward from the south (Bridge Street) to the north (RR Tracks).
- The project site area is previously disturbed, filled & fully paved
- Existing wooded areas occur only along the Fairview Avenue frontage, outside of the project area, and consists of brush with some trees. This area will remain undisturbed.
- Existing storm drainage with the project limits consists of (2) drywells with recharge infiltration. No storm drainage outfalls or off-site discharges exist on the site.

Soil Conditions:

- NRCS #306 (Ud) Udorthents Urban Land Complex – Disturbed Land
- Site Project Area has been previously filled based on previous soil borings

2. PROJECT DESCRIPTION:

Exist Primary Use: Bldg “A”: Existing 1½ ST Slab-on-grade **4,668 Gross Floor Area Business Office Use**

Exist Accessory Use: Bldg “B”: Existing 1-ST Slab-on-grade **4,005 Gross Floor Area Storage Use Accessory to the Primary Business Office Use**

Exist Floor Area: *Total Existing Gross Floor Area: 8,673 +/- sf*

Exist Employees: *Total Existing Employees on-site daily basis: 14 Employees*

Existing Parking: *Total Existing On-Site Parking = 20 spaces*

Project Proposes: Construct 1-ST slab-on-grade metal building addition to Accessory Storage Bldg “B”. Additional Floor Area proposed = 3,803+/- sf.

Proposed Use: Storage Use Accessory to Primary Office Use.

Proposed New GFA: 8,673 sf + 3,803 sf = 12,476 New Gross Floor Area

Add'l Employees: None Proposed

Parking Required: Office Use: 4,668 sf x 4sp/1000 sf) = 18.6 ~ **19 Spaces Req'd**
(18) off-street proposed spaces located on-site
(1) on-street space on Thames Street within 500' of the site boundary
- Subject to Approval of Special Permit per ZR 7.1.C.1.c
(19) Total Spaces Proposed
- (includes one (1)ADA/HC Van Accessible space)

Parking Space Size: (18) Compact Size (8'W x 16'L) spaces proposed
- Subject to Approval of Special Permit per ZR 7.1.C.3.a

Loading Proposed: - (1) 12'W x 40'L x 14'H Loading Dock

- Grading:** - No Site filling or cuts outside of bldg. foundation is proposed.
 - No ledge demolition is anticipated
- Utilities:** - Exist Sanitary Sewer (Municipal) – No changes or extensions
 - Exist Dom. Water Service (Groton Utilities) – No changes or extensions
 - No Sprinklers/Fire Service required

Proposed Ground Cover:

	<u>Exist</u>	<u>Proposed</u>	<u>Net Change</u>
<i>Impervious Surface:</i>			
Roof Area:	9,670+/-sf	12,585 _/- sf	+ 2,912+/-sf (+30%)
Bit Pavement Area:	9,370+/- sf	7,400+/- sf	(-1,970+/-sf)(-21%)
Net Impervious Surface Change:			+ 942 +/- sf
Crushed Stone Area:	4,200+/- sf	4,200+/- sf	- 0 – No Change
<i>Grass/Planted Area:</i>	13,031+/- sf	13,031+/- sf	- 0 – No Change

4. STORM DRAINAGE ANALYSIS:

Existing storm drainage within the subject project limits contains both roof run-off and impervious pavement. All impervious surface storm run-off currently drains into (2) existing drywells within the paved area. Groundwater tables are estimated at 12’ below grade based on previous soil borings. No current site surface run-off from the paved portions of the project are discharged off the site.

The proposed storm drainage system will follow in the same manner. One of the existing drywells (within the proposed bldg. footprint) will be removed. One new drywell will be installed within the paved parking area. This drywell will accept the piped roof drainage from the new bldg. addition, the truck loading dock area and portions of the new re-paved parking lot. It will be interconnected to the existing drywell with an overflow pipe so that the storage can be shared. The drywell systems are designed to contain and infiltrate up to a 5-year storm event.

The surface grate inlets to the drywell systems shall be fitted with a filter system to capture TSS and any other suspended constituents that may flow into the drywell during first flush storms (initial 1” of run-off).

A Rational Method Hydrologic analysis was performed for the project site Sub-watershed to the Pond for Historic vs. Developed conditions. Rainfall intensities used were taken from the latest NOAA Atlas #14 rain fall database for this site-specific location:

Latitude: 41.3628 Longitude: -72.0824

The storms were routed through the drywell system using Hydro-Cad ® drainage routing software for inflow/outflow hydrographs. Assumptions were made for soil permeability and percolation rates of up to 10 min/inch. See Drainage Hydrograph Routing Report Attached.

5. 200' REGULATED UPLAND REVIEW AREA IMPACTS:

The permit application for this project requires the Conservation Commission approval of a Wetlands Permit for the following activities within the 200' U.R.A:

- Allow activities within approximately 1,160 +/- SF of Regulated 200' Upland Review Area to include the following activities:
 - Cut/Remove/Replace 1,160 +/- SF Bituminous Pavement

NO filling or encroachments into the regulated wetland area is proposed.

Reasons for Regulated 200' Upland Review Area Disturbance:

The existing parcel size (0.83 +/- Acres) is a relatively small area. The area of regulated 200' Upland Review Area comprise 23,500+/- SF (0.54 +/- acres) – 65% of site. All portions of this Upland Review Area have already been previously disturbed, filled and paved.

The installation of the bldg. addition fdn excavation, and the installation of the overflow interconnect drainage pipe between the two drywells requires most of the existing pavement to be removed and re-installed.

Impacts from Regulated 200' Upland Review Area Disturbance: Because the project site does not drain towards any of the regulated storm drainage ditches that is the regulated intermittent watercourse areas, there are no potential adverse impacts on the regulated wetland area resulting from this proposed development. The proposed project site plan provides for a sediment fence barrier and sediment sock around the entire disturbed surface area of the project limits. The drywell inlet grates will be protected with temporary sediment silt-sacks ® or equal. Final site stabilization will be with bituminous pavement. No erosion is anticipated. No adverse impacts to the regulated area are anticipated due to this project.

6. SPECIAL PERMIT NARRATIVE ADDRESSING THE CRITERIA OF ZR 9.4.D:

ZR 9.4.D.1: Zoning Purposes:

Whether the proposed use or activity is consistent with the purposes of the Regulations.

Project Conformance: The proposed expansion of the existing Accessory Storage Building meets all of the bulk zoning requirements of the GC Zone. There are no non-conforming uses or setbacks within the project site. The requested Permanent Parking Reductions as part of this Special Permit meet the criteria of and are in conformance with the City Zoning Regulations.

ZR 9.4.D.2: Environmental Protection and Conservation:

Whether appropriate consideration has been given to the protection, preservation, and/or enhancement of natural, scenic, historic, or unique resources including, where appropriate, the use of conservation restrictions to protect and permanently preserve natural, scenic, historic, or unique features which enhance the character and environment of the area.

Project Conformance: There are no natural, scenic, historic, or unique resources or features applicable to this project site. This site is not included in the shaded area the CTDEEP Natural Diversity Database map. All proposed site work is setback at least 175’ from any regulated open drainage ditches (intermittent watercourse). No surface flows from the site are directed toward any regulated areas. Although this site is listed as being within a “scenic” view area in the City POCD, it does not provide a scenic view from any public vantage. The current heights of the existing building are less than 25’. The proposed height of the building addition will be approximately 20’ and match the existing bldg. height.

ZR 9.4.D.3: Overall Neighborhood Compatibility:

Whether the proposed use will have a detrimental effect on neighboring properties or the development of the district.

Project Conformance: The proposed expansion of the existing Accessory Storage Building and the requested Permanent Parking Reductions as part of this Special Permit are in harmony with the adjacent similar commercial/industrial properties and will not have any detrimental effect on those properties.

ZR 9.4.D.4: Suitable Location for Use:

Whether the nature and intensity of the operations involved with the use or resulting from the proposed use and the location of the site are such that the use will be in harmony with the appropriate and orderly development in the district in which it is located.

Project Conformance: The proposed expansion of the existing Accessory Storage Building and the requested Permanent Parking Reductions as part of this Special Permit are in harmony with the GC Zoning District and will not adversely affect the orderly development of this district. The proposed on-site (18) parking spaces will be for exclusive use of the (14) employees who are on the site on a daily basis. There is no change in employee quantity proposed. The proposed compact size (8’x16’) parking spaces are suitable for non-transient parking. The site use sees very little in terms of non-employee transient parking (ie. No retail sales/patrons, etc). Therefore, the proposed on-site parking area quantity and size has been designed to meet the intent of the regulations providing adequate parking for the actual use of the site.

ZR 9.4.D.5: Appropriate Improvements:

Whether design elements of the proposed development (such as location, type, size & height of buildings and other structures, parking, access, landscaping, screening, lighting, signage, etc.)

will be suitable in relation to the site characteristics, the style of other buildings in the immediate area, and the desirable future character of the neighborhood in which the use is located.

Project Conformance: The proposed expansion of the existing Accessory Storage Building and the requested Permanent Parking Reductions as part of this Special Permit are similar to the adjacent GC Zoned properties and buildings/structures/parking areas. The location of the proposed building expansion and on-site parking area are setback and screened (with an island of mature evergreens) from the Bridge Street frontage. The Project Site will not generate any excess noise or light pollution beyond its property boundaries. Proposed site lighting has been developed to be Building Wall-Mounted LED Fixtures with minimal site illumination levels & full cut-off/adjustable glare shields for night safety and security purposes only. Light glare and/or illumination does not spill over the property boundaries.

ZR 9.4.D.6: Suitable Transportation Conditions:

Whether the streets and other rights of way are or will be of such size, condition & capacity (width, grade, alignment & visibility) to adequately accommodate the traffic to be generated by the particular proposed use and to not create traffic problems.

Project Conformance: Traffic generated by the proposed Accessory Use Bldg Addition will not increase any vehicle trips (traffic generation remains unchanged). Bridge Street has adequate paved width, turning radii and vehicle capacity to serve this project site. There is adequate public curb-side parking available along the west side of Thames Street within 500' of the project site with existing pedestrian public walkways and painted crosswalks within the City ROW for safe pedestrian access to those spaces from the site. The project proposes utilizing only (1) of these existing curb-side parking spaces in order to meet the parking density requirements of the Primary Office Use. The existing driveway entrance to the site from Bridge Street will be paint marked with a Stop Bar and egress stop sign for pedestrian safety crossing the sidewalk along the driveway frontage.

ZR 9.4.D.7: Adequate Public Utilities and Services:

Whether the provisions for water supply, sewage disposal, storm water drainage and emergency access conform to accepted engineering practices, comply with all standards of the appropriate regulatory authorities and will not unduly burden the capacity of such facilities.

Project Conformance: There is no change, extensions or additional average daily water demand/san sewer flows as the result of the proposed Accessory Storage Bldg Expansion. The existing water supply and sanitary sewer service sizes and capacities/volumes available are adequate for this project site. No new utility work is proposed as part of this project.

ZR 9.4.D.8: Long Term Viability:

Whether adequate provision has been made for the sustained maintenance of the proposed development (structures, streets, and other improvements).

Project Conformance: The project Owner is currently seeking negotiation with the adjacent National Railroad Passenger Corp for a long-term ground lease and/or purchase of certain portions of the adjacent Railroad property to ultimately be able to provide ALL zoning required parking on-site. The physical maintenance of all site improvements will be regularly and perpetually maintained by the owner for snow removal, sweeping/cleaning and repairs as needed. No maintenance of any items within the public ROW is required.

ZR 9.4.D.9: Nuisance Avoidance:

Whether the use, configuration, design and/or hours of operation are appropriate in order to control noise, light, odors, parking, visibility, unsightly appearance, erosion, water contamination, and storm run-off on the site and in relation to the surrounding area.

Project Conformance: The hours of operation for this site are approximately 7AM – 6PM Monday to Friday and remain unchanged. The Project Site will not generate any excess noise or light pollution beyond its property boundaries. The site is currently set back from the Bridge Street frontage by approximately 180’ (similar to a rear lot) and has adequate visual screening from the street ROW via an existing island planted with mature evergreen trees.

All disturbed areas of the site will be permanently stabilized with bituminous pavement, crushed stone or grass planted areas which will eliminate erosion potential. Storm drainage run-off generated by all new impervious surfaces will be contained within the site limits (no external point discharges) and will be infiltrated into the ground using a drywell system. All surface inlets of the storm drywell system will have a permanent filter system for removing TSS and any other first flush constituents to address the storm water quality prior to infiltration.

The current Primary Office Use and Accessory Storage Uses, including the expansion thereof, and any related parking components, will not generate, store, transfer, handle or otherwise create any hazardous waste or material as defined by the USEPA or by Section 3001 of the Resource Conservation and Recovery Act of the Connecticut Hazardous Waste Regulations, the Federal Toxic Substance Act, or the Toxic Substance Control Act. No liquid or solid wastes of any kind will be injected or deposited into the ground so as to protect the groundwater table from any contamination.

ZR 9.4.D.10: Plan of Conservation and Development:

Whether the proposed use or activity is in accordance with or facilitates achievement of one or more of the goals, objectives, policies, and recommendations of the Plan of Conservation and Development.

Project Conformance: This project addresses and is in conformance with the following goals,

objectives, policies, Municipal strategies & recommendations of the current POCD:

- a. Project to protect Natural Resources, Wetlands & drainage/watercourses & water quality.
- b. City to continue to promote and support economic development.
- c. City to continue to work with major employers to anticipate and help address their changing needs.

ZR 9.4.D.11: Mitigation:

Whether adequate provisions have been made to moderate or mitigate neighborhood impacts by limiting the intensity of the use of the property (including, without limitation, such considerations as the area devoted to the use, the number of people involved in the use, the number of events or activities proposed, the hours of operation, etc.) or by modifying the location or configuration of the proposed use.

Project Conformance: The project does not propose increasing any employee quantities, or vehicle trip generation, or extending/changing any hours of operation. The location of the proposed bldg. expansion is appropriate to the site and adjacent properties. The proposed re-configured parking area is in the same location on the site as the historic parking area (no expansions of this paved area are proposed). There are no adverse impacts to the overall neighborhood resulting from this project.

Prepared by:

Edward H. Wenke III, PE
CT PE #16771



Appendix: Storm Drainage Analysis

Natural Diversity Data Base Areas

GROTON, CT

December 2017

-  State and Federal Listed Species & Significant Natural Communities
-  Town Boundary

NOTE: This map shows general locations of State and Federal Listed Species and Significant Natural Communities. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDB) from a number of data sources. Exact locations of species have been buffered to produce the general locations. Exact locations of species and communities occur somewhere in the shaded areas, not necessarily in the center. A new mapping format is being employed that more accurately models important riparian and aquatic areas and eliminates the need for the upstream/downstream searches required in previous versions.

This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas. If the project is within a shaded area there may be a potential conflict with a listed species. For more information, complete a Request for Natural Diversity Data Base State Listed Species Review Form (DEP-APP-007), and submit it to the NDDB along with the required maps and information. More detailed instructions are provided with the request form on our website.

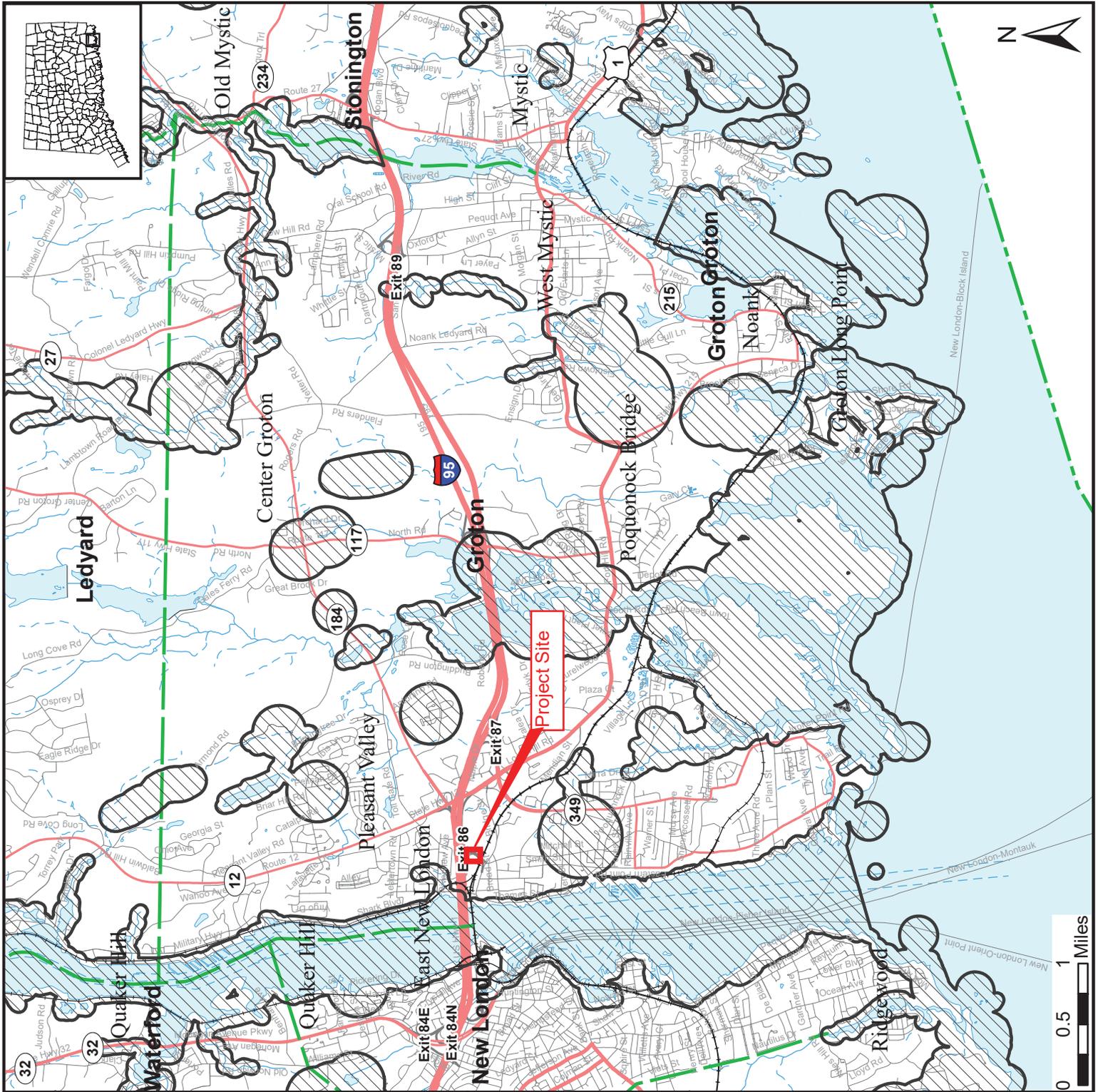
www.ct.gov/deep/nddbrequest

Use the CTECO Interactive Map Viewers at www.cteco.uconn.edu to more precisely search for and locate a site and to view aerial imagery with NDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)
79 Elm St., Hartford CT 06106
Phone (860) 424-3011



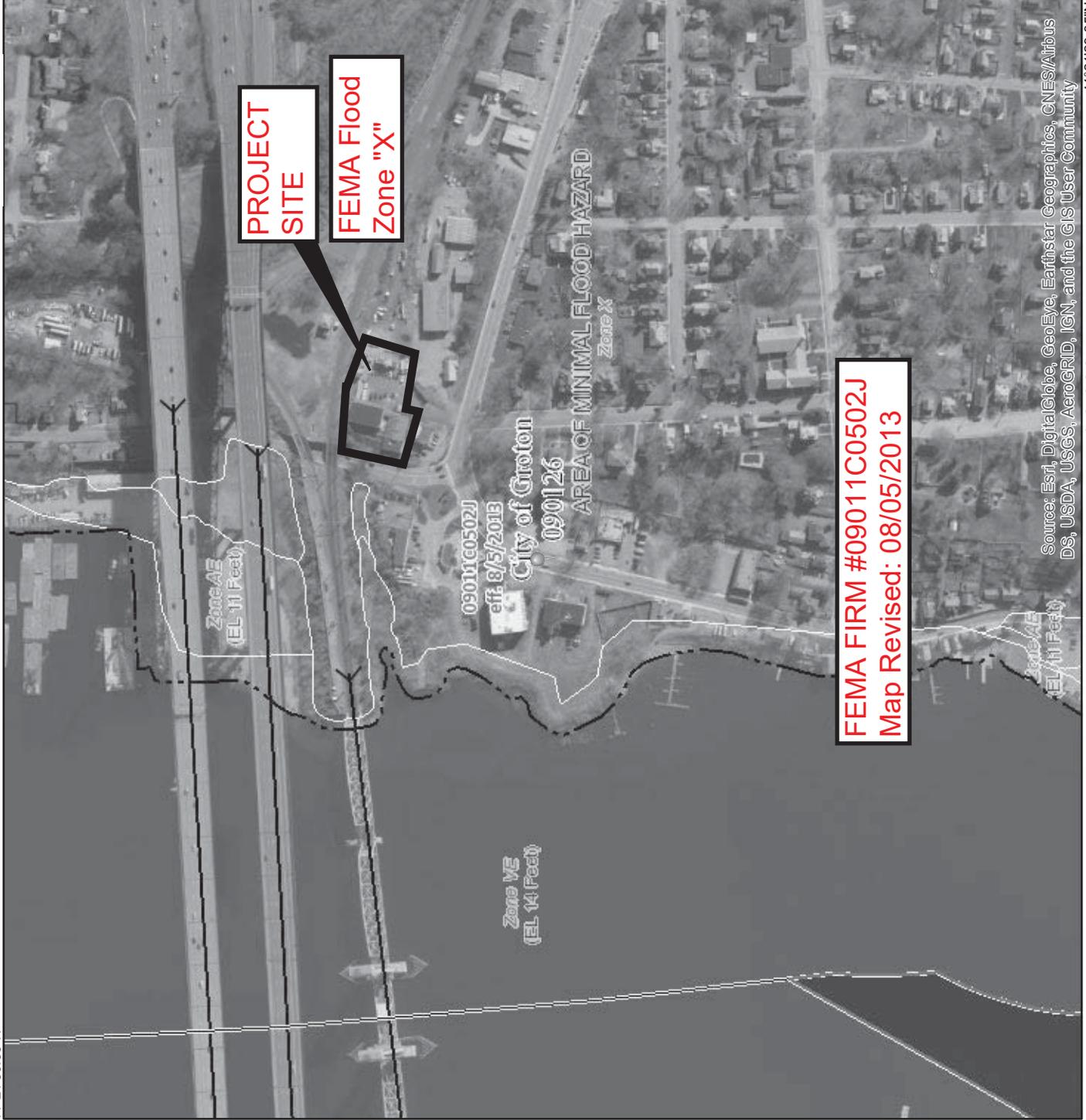
Connecticut Department of
Energy & Environmental Protection
Bureau of Natural Resources
Wildlife Division



National Flood Hazard Layer FIRMette



41°21'56.85"N
72°51'19.18"W



72°44'1.72"W

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)
Zone A, V, A99
- With BFE or Depth
- Regulatory Floodway *Zone AE, AO, AH, VE, AR*

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS OF FLOOD HAZARD

- NO SCREEN *Zone X*
- Effective LOMRS *Zone D*
- Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

OTHER AREAS

- Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall

GENERAL STRUCTURES

- 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
- 17.5 Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

OTHER FEATURES

- Digital Data Available
- No Digital Data Available
- Unmapped

MAP PANELS

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The base map shown complies with FEMA's base map accuracy standards

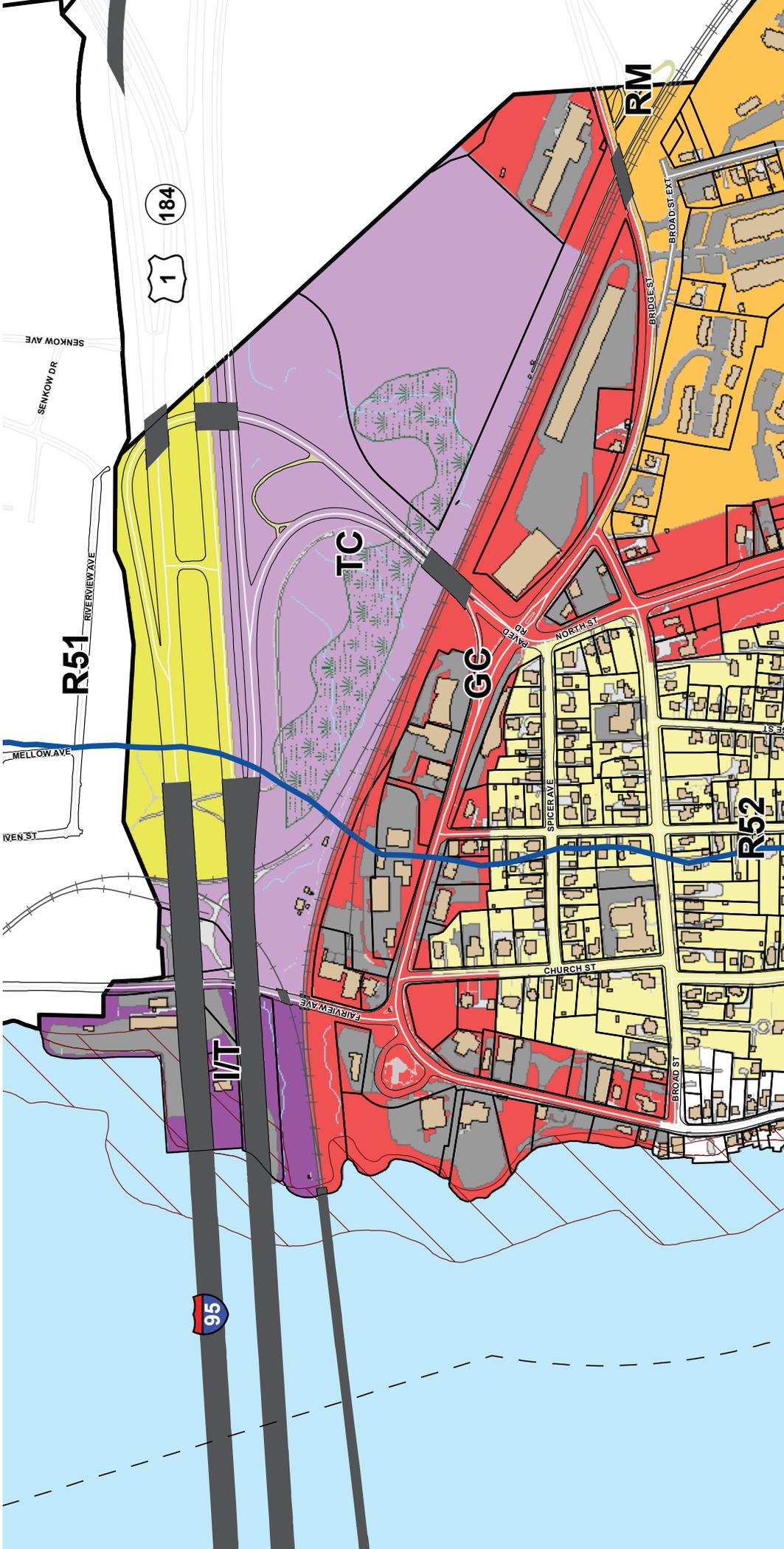
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/22/2018 at 8:24:51 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

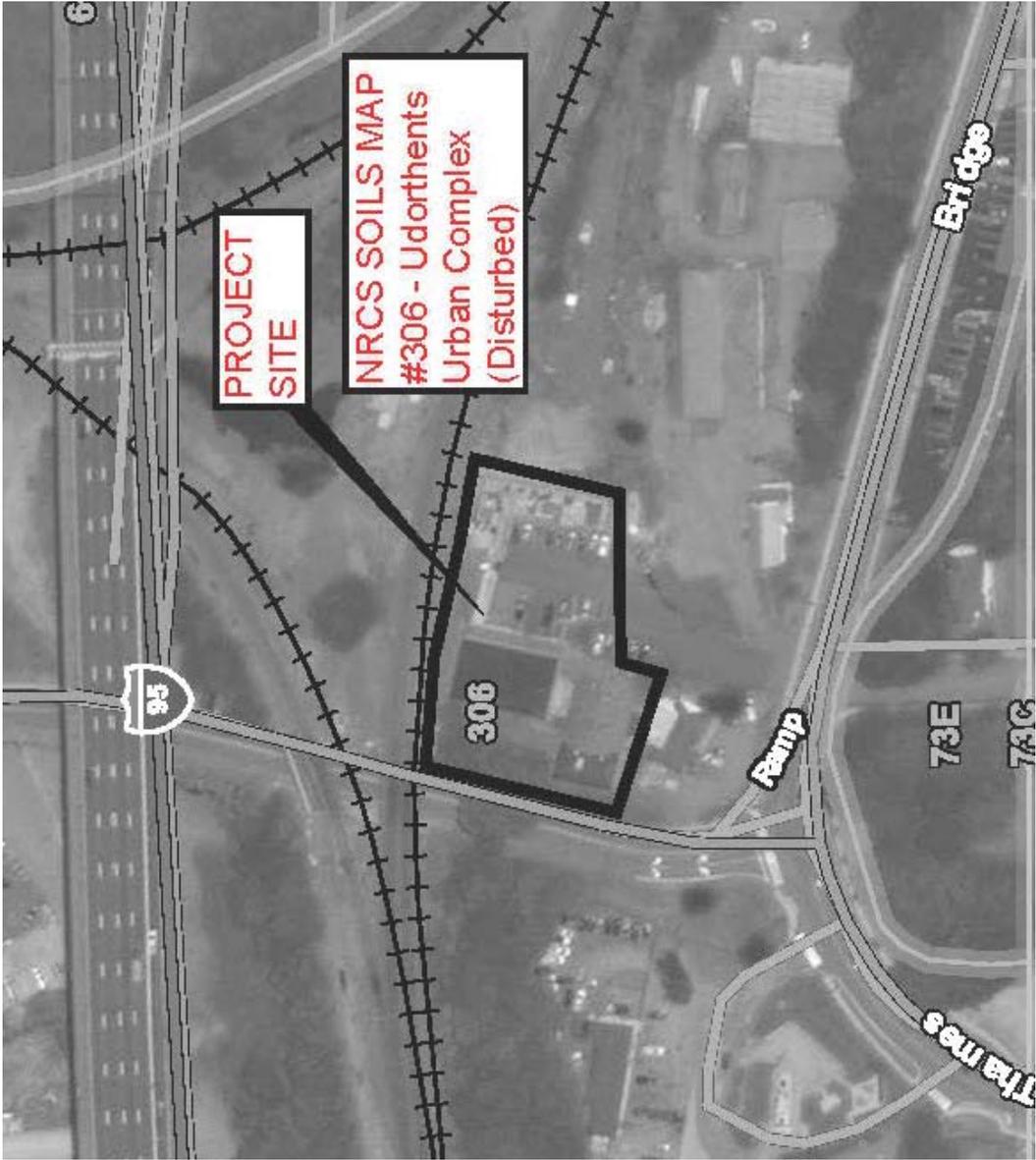
This map image is void if the one or more of the following map elements do not appear: base map imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

41°21'29.85"N





Design Storm IDF Curves Developed Based on
Type III Storm - NOAA Atlas #14

Prepared By:



A handwritten signature in blue ink, appearing to read "Edward H. Wenke III".

Edward H. Wenke III, PE
CT PE #16771



DEV WATERSHED

DEVELOPED WATERSHED Consists of
Existing 0.8+/- Ac On-Site & Off-Site Upland
Area, incl New Bldg Addition Roof;
No change in Watershed Area;
No Change in Impervious Surface

DRYWELLS

INFILTRATION SYSTEM

CONSISTS OF :

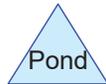
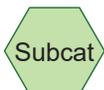
- (1) EXIST 8' DIA X 6'H DRYWELL PLUS
- (1) NEW 8' DIA X 6'H DRYWELL
INTERCONNECTED WITH NEW
8" HDPE OVERFLOW PIPE

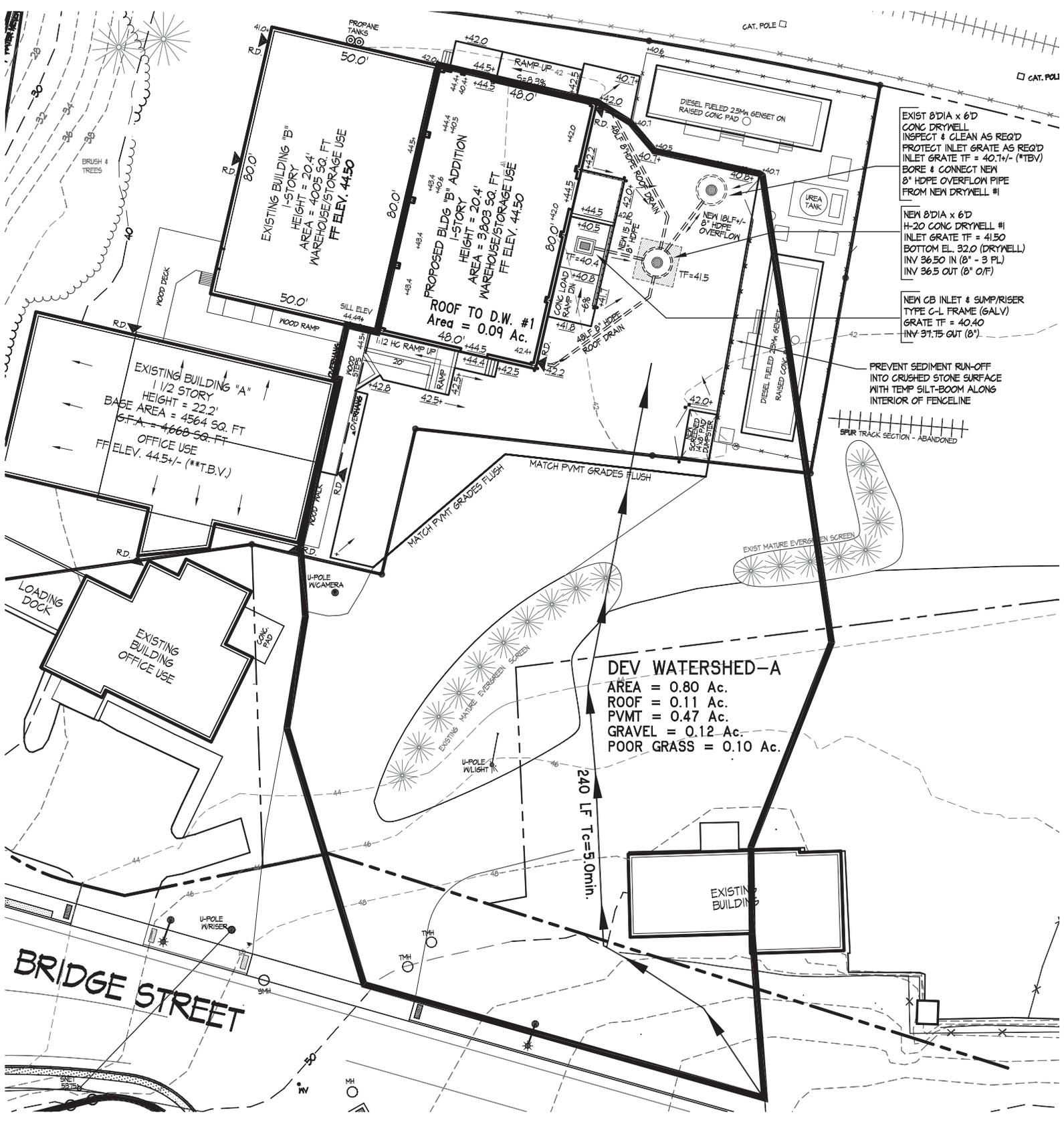
Note: Exist Drywell Size is Assumed; Condition
is Assumed as Good

Hydraulic Routing of Infiltration System is
based on 1 Year Thru 5-Year Storm Events

Site has No reported History of Storm Drainage Problems or
Flooding. Same Watershed area & Surface Conditions currently
drain into (2) Existing Drywells.

Exist Soil Data & GWT Elevations based on 2009 Geotech Report
See Appendix for Soil Boring Logs & descriptions





EXISTING BUILDING "B"
 1-STORY
 HEIGHT = 20.4'
 AREA = 4005 SQ. FT
 WAREHOUSE/STORAGE USE
 FF ELEV. 44.50

PROPOSED BLDG "B" ADDITION
 1-STORY
 HEIGHT = 20.4'
 AREA = 3803 SQ. FT
 WAREHOUSE/STORAGE USE
 FF ELEV. 44.50

ROOF TO D.W. #1
 Area = 0.09 Ac.
 48.0'

EXISTING BUILDING "A"
 1 1/2 STORY
 HEIGHT = 22.2'
 BASE AREA = 4564 SQ. FT
 S.F.A. = 4668 SQ. FT
 OFFICE USE
 FF ELEV. 44.5 +/- (**T.B.V.)

DEV WATERSHED-A
 AREA = 0.80 Ac.
 ROOF = 0.11 Ac.
 PVMT = 0.47 Ac.
 GRAVEL = 0.12 Ac.
 POOR GRASS = 0.10 Ac.

- EXIST 8'DIA x 6'D
 CONC DRYWELL
 INSPECT & CLEAN AS REQ'D
 PROTECT INLET GRATE AS REQ'D
 INLET GRATE TF = 40.1 +/- (*TBV)
 BORE & CONNECT NEW
 8" HDPE OVERFLOW PIPE
 FROM NEW DRYWELL #1
- NEW 8'DIA x 6'D
 H-20 CONC DRYWELL #1
 INLET GRATE TF = 41.50
 BOTTOM EL. 32.0 (DRYWELL)
 INV 36.50 IN (8" - 3 PL)
 INV 36.5 OUT (8" O/F)
- NEW 6" INLET & SUMP/RISER
 TYPE C-L FRAME (GALV)
 GRATE TF = 40.40
 INV 37.75 OUT (8")

PREVENT SEDIMENT RUN-OFF
 INTO CRUSHED STONE SURFACE
 WITH TEMP SILT-BOOM ALONG
 INTERIOR OF FENCELINE

BRIDGE STREET



BRIDGE ST-ROOF-DRYWELL-2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.100	77	Brush, Poor, HSG C (DEV-1)
0.120	89	Gravel roads, HSG C (DEV-1)
0.470	98	Paved parking, HSG C (DEV-1)
0.110	98	Roofs, HSG C (DEV-1)
0.800	94	TOTAL AREA

BRIDGE ST-ROOF-DRYWELL-2

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.100	0.000	0.000	0.100	Brush, Poor	DEV-1
0.000	0.000	0.120	0.000	0.000	0.120	Gravel roads	DEV-1
0.000	0.000	0.470	0.000	0.000	0.470	Paved parking	DEV-1
0.000	0.000	0.110	0.000	0.000	0.110	Roofs	DEV-1
0.000	0.000	0.800	0.000	0.000	0.800	TOTAL AREA	

BRIDGE ST-ROOF-DRYWELL-2

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70 BRIDGE ST - GROTON CITY
Type III 24-hr 1-Year Rainfall=2.80"

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Summary for Subcatchment DEV-1: DEV WATERSHED

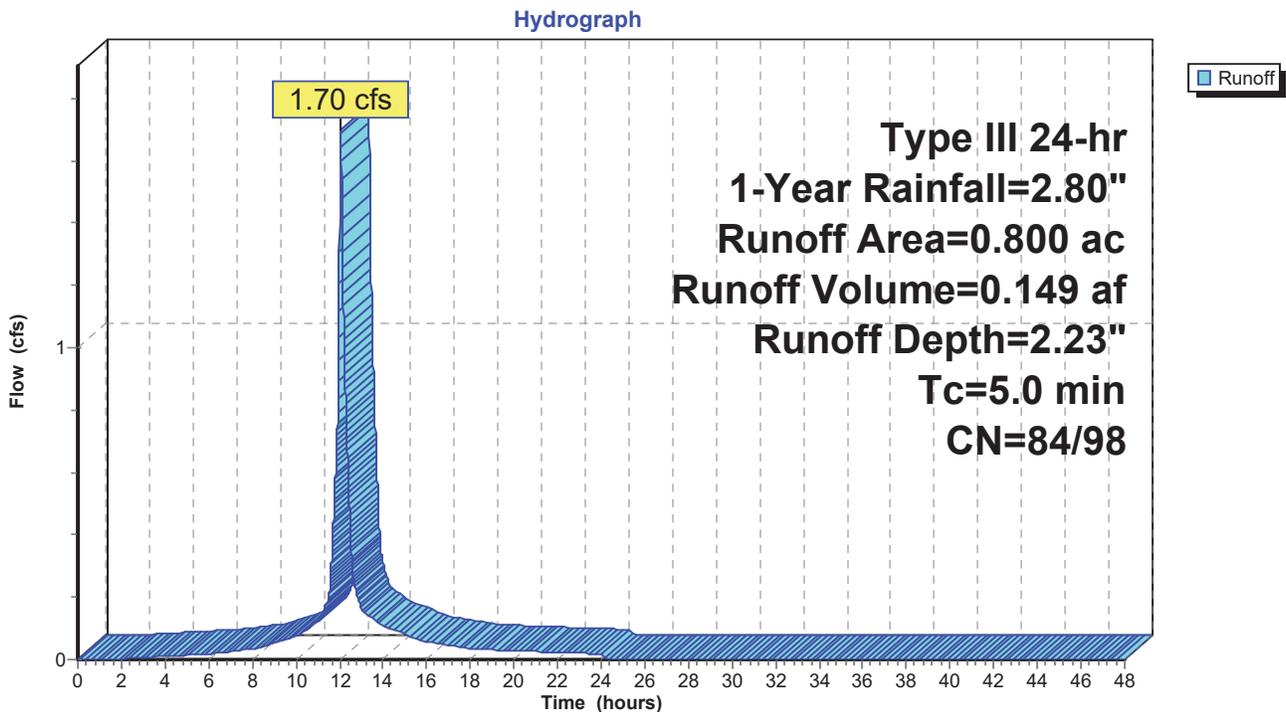
Runoff = 1.70 cfs @ 12.05 hrs, Volume= 0.149 af, Depth= 2.23"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.80"

Area (ac)	CN	Description
0.110	98	Roofs, HSG C
0.470	98	Paved parking, HSG C
0.120	89	Gravel roads, HSG C
0.100	77	Brush, Poor, HSG C
0.800	94	Weighted Average
0.220	84	27.50% Pervious Area
0.580	98	72.50% Impervious Area

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

Subcatchment DEV-1: DEV WATERSHED



BRIDGE ST-ROOF-DRYWELL-2

Prepared by THE WINTHROP GROUP
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Summary for Pond DW-1: DRYWELLS

Inflow Area = 0.800 ac, 72.50% Impervious, Inflow Depth = 2.23" for 1-Year event
 Inflow = 1.70 cfs @ 12.05 hrs, Volume= 0.149 af
 Outflow = 0.83 cfs @ 12.29 hrs, Volume= 0.149 af, Atten= 51%, Lag= 14.0 min
 Primary = 0.83 cfs @ 12.29 hrs, Volume= 0.149 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 5
 Peak Elev= 35.14' @ 12.29 hrs Surf.Area= 576 sf Storage= 1,136 cf
 Flood Elev= 40.50' Surf.Area= 576 sf Storage= 2,099 cf

Plug-Flow detention time= 13.2 min calculated for 0.149 af (100% of inflow)
 Center-of-Mass det. time= 13.2 min (785.0 - 771.8)

Volume	Invert	Avail.Storage	Storage Description
#1	31.00'	446 cf	STONE (Pyramidal) Listed below x 2 1,824 cf Overall - 708 cf Embedded = 1,116 cf x 40.0% Voids
#2	32.00'	603 cf	8.00'D x 6.00'H 8' DIA DRYWELL x 2 Inside #1 708 cf Overall - 4.0" Wall Thickness = 603 cf
1,050 cf x 2.00 = 2,099 cf			Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
31.00	0	0	0	0
32.00	144	48	48	146
33.00	144	144	192	194
34.00	144	144	336	242
35.00	144	144	480	290
36.00	144	144	624	338
37.00	144	144	768	386
38.00	144	144	912	434

Device	Routing	Invert	Outlet Devices
#1	Primary	31.00'	6.000 in/hr Exfiltration X 2.00 over Wetted area Conductivity to Groundwater Elevation = 30.00'

Primary OutFlow Max=0.83 cfs @ 12.29 hrs HW=35.14' (Free Discharge)
 ←1=Exfiltration (Controls 0.83 cfs)

BRIDGE ST-ROOF-DRYWELL-2

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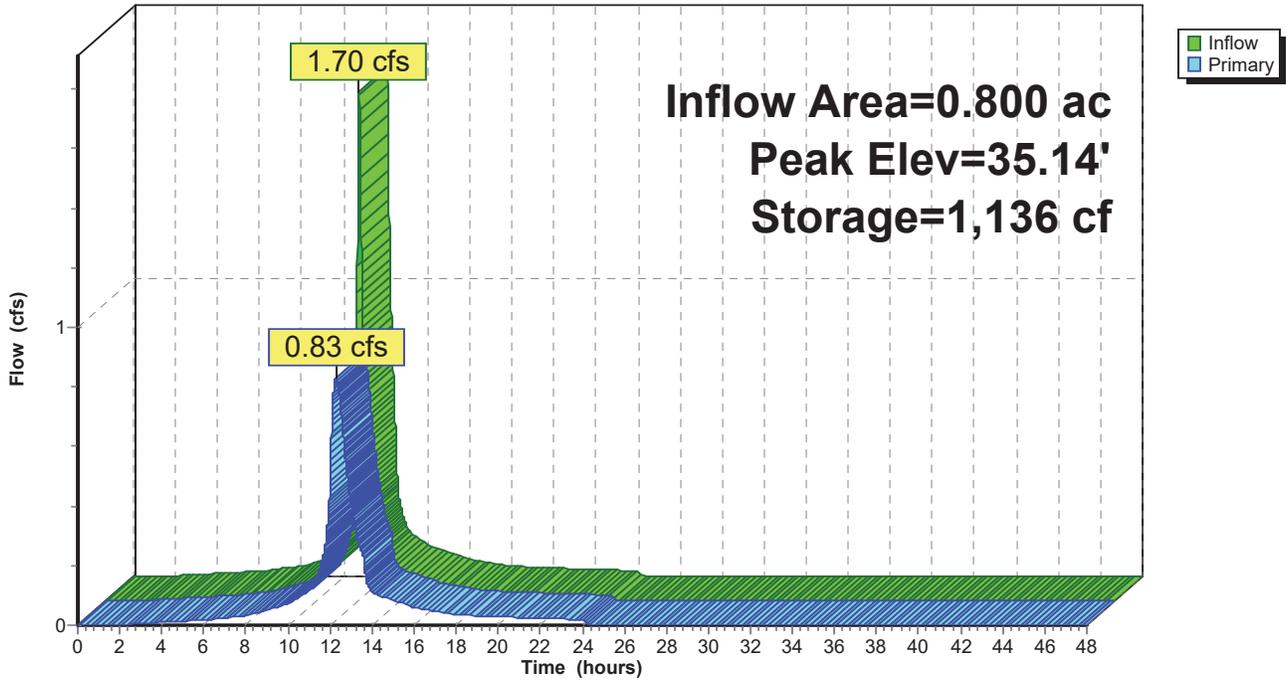
70 BRIDGE ST - GROTON CITY
Type III 24-hr 1-Year Rainfall=2.80"

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Pond DW-1: DRYWELLS

Hydrograph



BRIDGE ST-ROOF-DRYWELL-2

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70 BRIDGE ST - GROTON CITY
Type III 24-hr 2-Year Rainfall=3.35"

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Summary for Subcatchment DEV-1: DEV WATERSHED

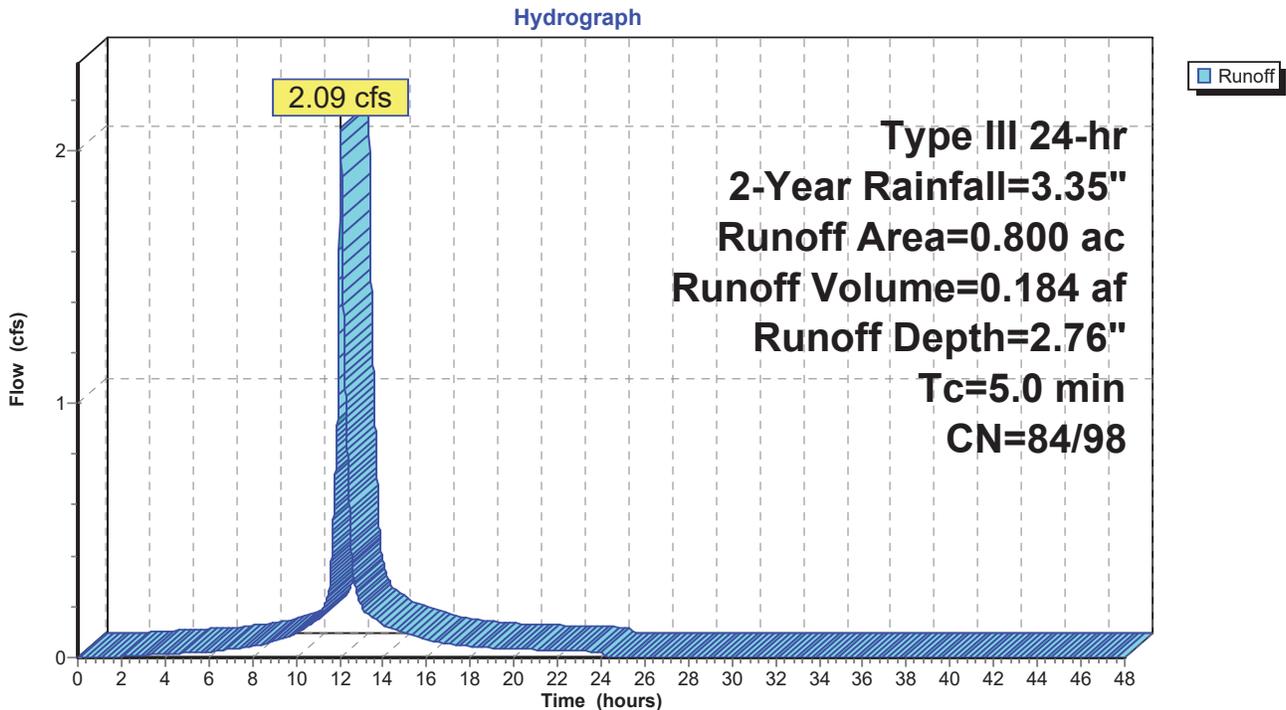
Runoff = 2.09 cfs @ 12.05 hrs, Volume= 0.184 af, Depth= 2.76"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.35"

Area (ac)	CN	Description
0.110	98	Roofs, HSG C
0.470	98	Paved parking, HSG C
0.120	89	Gravel roads, HSG C
0.100	77	Brush, Poor, HSG C
0.800	94	Weighted Average
0.220	84	27.50% Pervious Area
0.580	98	72.50% Impervious Area

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

Subcatchment DEV-1: DEV WATERSHED



BRIDGE ST-ROOF-DRYWELL-2

Prepared by THE WINTHROP GROUP
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Summary for Pond DW-1: DRYWELLS

Inflow Area = 0.800 ac, 72.50% Impervious, Inflow Depth = 2.76" for 2-Year event
 Inflow = 2.09 cfs @ 12.05 hrs, Volume= 0.184 af
 Outflow = 1.02 cfs @ 12.28 hrs, Volume= 0.184 af, Atten= 51%, Lag= 13.8 min
 Primary = 1.02 cfs @ 12.28 hrs, Volume= 0.184 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 5
 Peak Elev= 36.03' @ 12.28 hrs Surf.Area= 576 sf Storage= 1,436 cf
 Flood Elev= 40.50' Surf.Area= 576 sf Storage= 2,099 cf

Plug-Flow detention time= 13.9 min calculated for 0.184 af (100% of inflow)
 Center-of-Mass det. time= 13.9 min (782.1 - 768.2)

Volume	Invert	Avail.Storage	Storage Description
#1	31.00'	446 cf	STONE (Pyramidal) Listed below x 2 1,824 cf Overall - 708 cf Embedded = 1,116 cf x 40.0% Voids
#2	32.00'	603 cf	8.00'D x 6.00'H 8' DIA DRYWELL x 2 Inside #1 708 cf Overall - 4.0" Wall Thickness = 603 cf
1,050 cf x 2.00 = 2,099 cf			Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
31.00	0	0	0	0
32.00	144	48	48	146
33.00	144	144	192	194
34.00	144	144	336	242
35.00	144	144	480	290
36.00	144	144	624	338
37.00	144	144	768	386
38.00	144	144	912	434

Device	Routing	Invert	Outlet Devices
#1	Primary	31.00'	6.000 in/hr Exfiltration X 2.00 over Wetted area Conductivity to Groundwater Elevation = 30.00'

Primary OutFlow Max=1.02 cfs @ 12.28 hrs HW=36.03' (Free Discharge)
 ←1=Exfiltration (Controls 1.02 cfs)

BRIDGE ST-ROOF-DRYWELL-2

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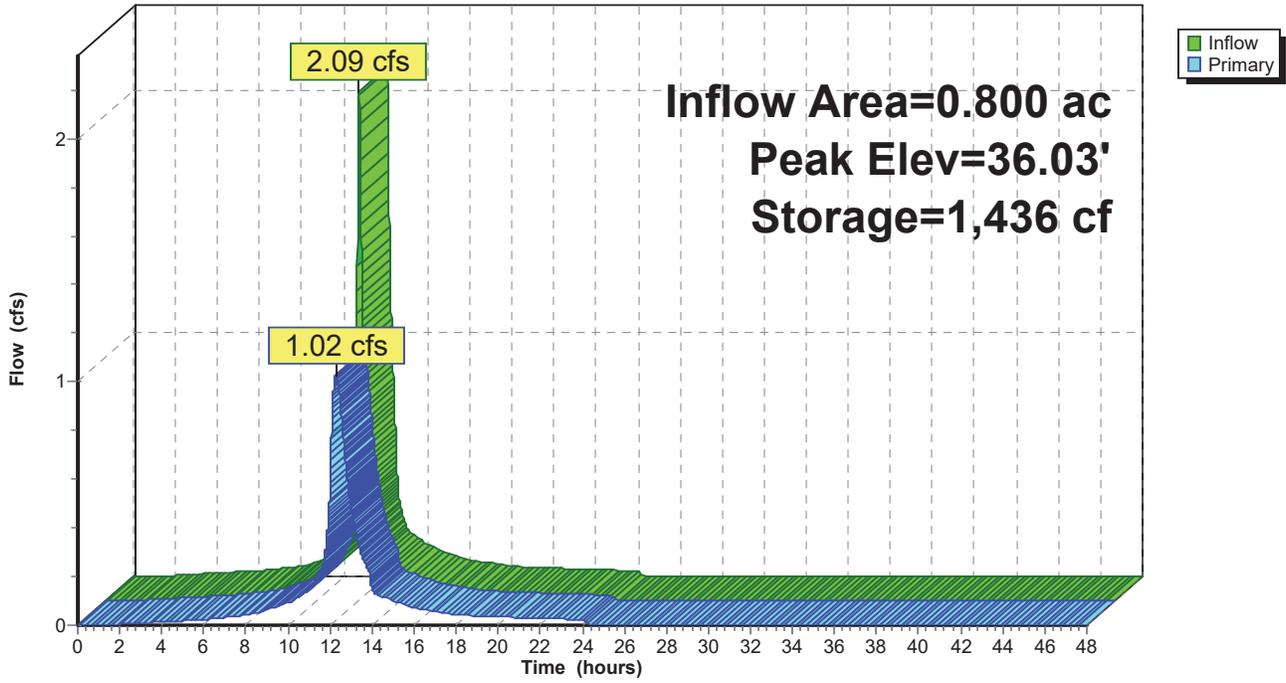
70 BRIDGE ST - GROTON CITY
Type III 24-hr 2-Year Rainfall=3.35"

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Pond DW-1: DRYWELLS

Hydrograph



BRIDGE ST-ROOF-DRYWELL-2

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70 BRIDGE ST - GROTON CITY
Type III 24-hr 5-Year Rainfall=4.14"

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Summary for Subcatchment DEV-1: DEV WATERSHED

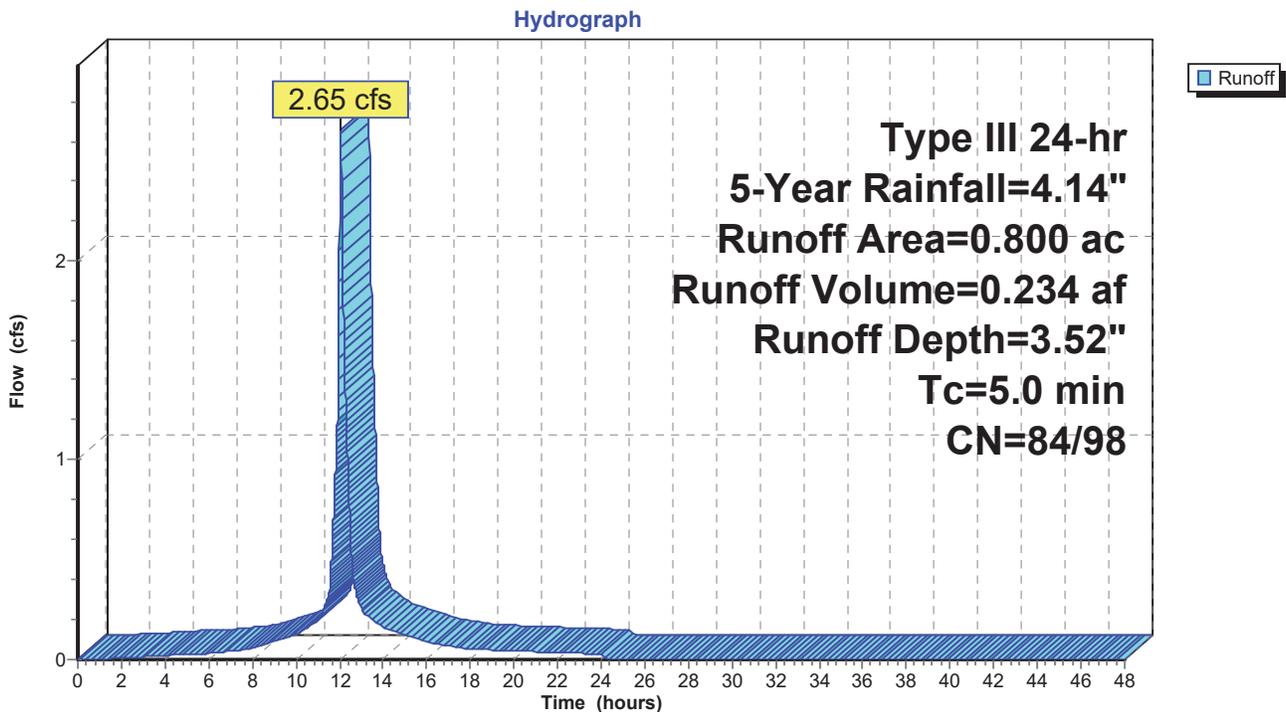
Runoff = 2.65 cfs @ 12.05 hrs, Volume= 0.234 af, Depth= 3.52"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 5-Year Rainfall=4.14"

Area (ac)	CN	Description
0.110	98	Roofs, HSG C
0.470	98	Paved parking, HSG C
0.120	89	Gravel roads, HSG C
0.100	77	Brush, Poor, HSG C
0.800	94	Weighted Average
0.220	84	27.50% Pervious Area
0.580	98	72.50% Impervious Area

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

Subcatchment DEV-1: DEV WATERSHED



BRIDGE ST-ROOF-DRYWELL-2

Prepared by THE WINTHROP GROUP
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Summary for Pond DW-1: DRYWELLS

Inflow Area = 0.800 ac, 72.50% Impervious, Inflow Depth = 3.52" for 5-Year event
 Inflow = 2.65 cfs @ 12.05 hrs, Volume= 0.234 af
 Outflow = 1.32 cfs @ 12.28 hrs, Volume= 0.234 af, Atten= 50%, Lag= 13.4 min
 Primary = 1.32 cfs @ 12.28 hrs, Volume= 0.234 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 5
 Peak Elev= 37.32' @ 12.28 hrs Surf.Area= 576 sf Storage= 1,869 cf
 Flood Elev= 40.50' Surf.Area= 576 sf Storage= 2,099 cf

Plug-Flow detention time= 14.6 min calculated for 0.234 af (100% of inflow)
 Center-of-Mass det. time= 14.6 min (778.7 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1	31.00'	446 cf	STONE (Pyramidal) Listed below x 2 1,824 cf Overall - 708 cf Embedded = 1,116 cf x 40.0% Voids
#2	32.00'	603 cf	8.00'D x 6.00'H 8' DIA DRYWELL x 2 Inside #1 708 cf Overall - 4.0" Wall Thickness = 603 cf
1,050 cf x 2.00 = 2,099 cf Total Available Storage			

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
31.00	0	0	0	0
32.00	144	48	48	146
33.00	144	144	192	194
34.00	144	144	336	242
35.00	144	144	480	290
36.00	144	144	624	338
37.00	144	144	768	386
38.00	144	144	912	434

Device	Routing	Invert	Outlet Devices
#1	Primary	31.00'	6.000 in/hr Exfiltration X 2.00 over Wetted area Conductivity to Groundwater Elevation = 30.00'

Primary OutFlow Max=1.32 cfs @ 12.28 hrs HW=37.32' (Free Discharge)
 ←1=Exfiltration (Controls 1.32 cfs)

BRIDGE ST-ROOF-DRYWELL-2

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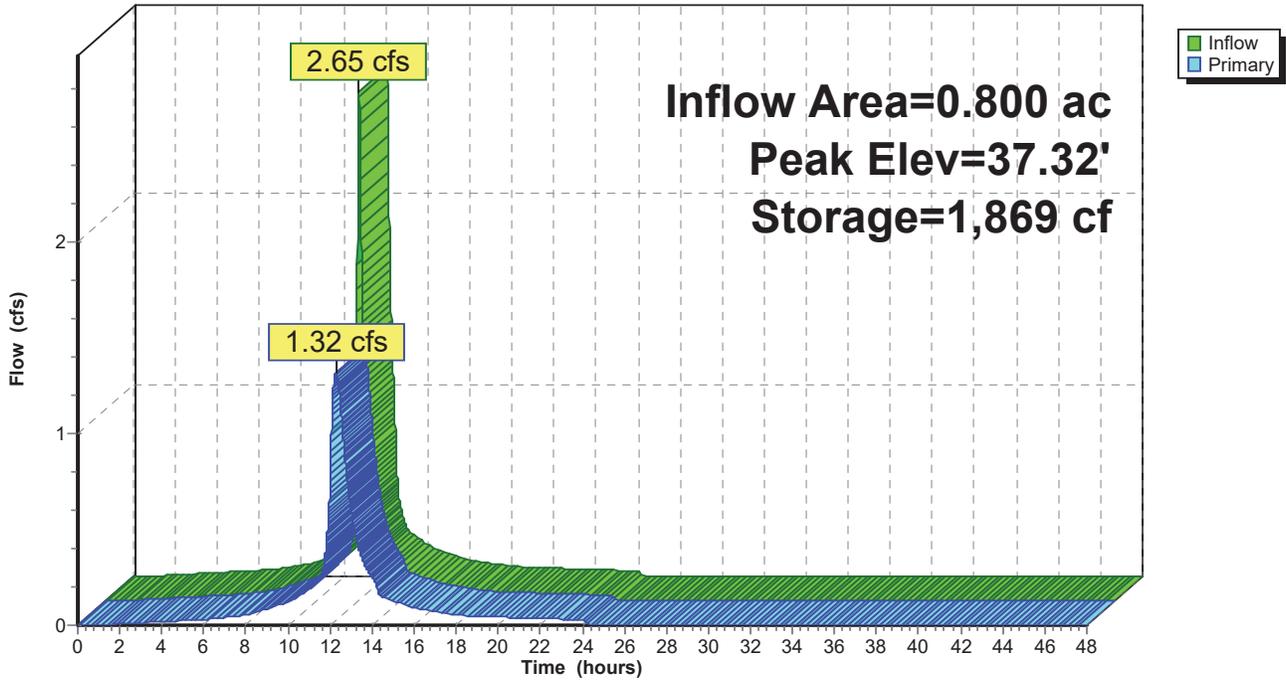
70 BRIDGE ST - GROTON CITY
Type III 24-hr 5-Year Rainfall=4.14"

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Pond DW-1: DRYWELLS

Hydrograph



DR. CLARENCE WELTI, P.E., P.C.

GEOTECHNICAL ENGINEERING

227 Williams Street • P.O. Box 397

Glastonbury, CT 06033

(860) 633-4623 / FAX (860) 657-2514

June 12, 2009

Mr. Gary W. Walter, P.E.
GW Engineering, LLC.
88 Howard Street - Suite B
New London, CT 06320

**Re: Foundations for Proposed New Generators, Groton Utilities Site
70 Bridge Street, Groton, CT; Geotechnical Study**

Dear Mr. Walter:

1.0 Herewith are the boring data pertaining to the above. Two borings were drilled to a depth of 26.5 feet. The borings locations are shown on the attached plan. *The borings were drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

1.1 Laboratory Testing on one soil sample taken from each of the borings included (1) grain size gradation tests, (2) tests to evaluate corrosion potential on one soil sample; including pH, chloride, sulfates and (3) chemical analysis; including volatile organic compounds (VOCs by 8260), semi volatile organic compounds (SVOCs by 8270), (CT ETPH), RCRA 8 metals (total) and Polychlorinated Biphenyls (PCBs by 8082).

2.0 The **Subject Project** will include the construction of foundations for new generators to be located in an open area to the rear of 70 Bridge Street in Groton, CT. The site is abutted on the north side by the AMTRAK railroad. The weight of the generators are reported to be on the order of 60 tons. It is understood that the generators will be on a skid with a footprint of about 10 ft by 60 ft. There will be an enclosure or structure over the generators which is part of the prefabricated skid. A site grading and layout plan was not available at the time of this report.

2.1 The **Assumed Criteria for Foundation Type and Loading** are as follows:

1. The maximum total settlement under static loading shall not exceed 1" and the maximum differential settlement shall not exceed ½ the maximum settlement.
2. The foundation type and structure must address the seismic requirements of the building code.

This above criteria have been arbitrarily applied to the performance of foundations at the subject structure. If the owner, the architect, the engineers find the criteria as unacceptable, the writer shall be informed to permit additional geotechnical input.

3.0 The Soils Cross Section from the borings is generally as follows:

FILL; fine to coarse SAND, little Silt and Gravel, trace to some Coal Ash, trace Asphalt and Bricks to 7 to 9 feet, loose to medium compact

FILL (see boring B-1); fine to coarse SAND, little Gravel, trace Silt to 16 feet, loose

At boring B-1; SILT and fine SAND, trace Organics to 18 feet, loose

At boring B-2; SILT, trace fine Sand to 15 feet, loose

Fine to coarse SAND, some Silt, little Gravel to 26.5+ feet, medium compact to dense

3.1 The Water Table was at 12 feet below grade the existing grades at the completion of the borings.

4.0 The Foundations for the proposed generators can be with spread footing/mat type foundations. The footings should be placed on the natural inorganic soils or on a controlled fill placed after the removal of any topsoil and existing fills to at least 3 feet below the finished grades. Controlled fills should conform to section 6.0 below and should extend outside the foundations for a distance equal to at least the depth of fill beneath foundations.

4.01 The sub grades for spread footings/mat foundations must address a requirement for frost protection. The maximum frost penetration in this area is generally about 24". For design purposes it is recommended that frost protection be to 36" below the finished grades. The building code requirement for 3.5 feet of frost protection would not apply to equipment foundation pads. The recommended subgrade preparation alternatives to address foundation loading and frost protection requirements are as follows:

1. Excavate to at least 18" below the mats/footings and to at least 36" below the finished grades. Place 3/8" crushed stone or material which conforms to section 6.0 below up to the bottom of the footing/mat foundation.

2. Place at least 3" of clean sand (i.e., masonry sand or similar), over the sub grade. If the sub grade is wet, place at least 6" of 3/8" crushed stone. Place 3" minimum thick sheet of polystyrene (Owens Corning Foamular 1000, or equal) with compressive strength of at least 100 psi. The polystyrene should extend to at least 2 feet outside the foundations. The concrete for footings/mats can be placed directly on the polystyrene.

4.1 The **Allowable Bearing Pressure** for shallow spread footings or mat foundations with preparation as cited in section 4.0 and 4.01 above can be 1.5 Tons/sf. These values can be increased by 1/3 for wind and seismic loading.

4.2 The following is a **Summary of Foundation Design Parameters** for mat foundations for equipment and for buildings with spread footing foundations:

Parameter	Value
Allowable Bearing Pressure for Footings/Mats with the sub grade preparation cited in sections 4.0 and 4.01 above	3,000 PSF
Soil Unit Weight	120 pcf
Angle of Internal Friction	34°
At rest coefficient	0.45
Active coefficient	0.28
Sliding Coefficient, concrete on natural soils or on controlled fill	0.60
IBC Seismic Site Soil Profile Classification	C
Mapped MCE Spectral Response Acceleration for short periods S_s	0.253
Mapped MCE Spectral Response Acceleration for 1 second periods S_1	0.077

5.0 Regarding **Controlled Fill beneath foundations**, the material shall conform to the following gradation or be 3/8" crushed stone:

Percent Passing	Sieve Size
100	3.5"
50 - 100	3/4"
25 - 85	No.4

The fraction passing the No.4 sieve, shall have less than 15% passing the No. 200 sieve.

All controlled fill and backfill must be compacted to at least 95% of modified optimum density in accordance with ASTM D-1557.

Based on the grain size gradation the on site existing fills will generally conform to the above gradation.

6.0 Regarding **Earthwork** the natural soils fall in OSHA Type C and unshored excavation, which exceed 5 feet in height, must be cut back to slopes less than 34° from the horizontal (1.5:1).

7.0 This report has been prepared for specific application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Dr. Clarence Welti, P.E., P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

Very truly yours,



Max Welti, P. E.

APPENDIX 1

**BORING LOCATION PLAN
+
TEST BORING LOGS**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT GW ENGINEERING	PROJECT NAME BRIDGE STREET GENERATOR SITE/GROTON UTILITIES LOCATION GROTON, CT.
---	-------------------------------------	--

TYPE	AUGER HSA	CASING	SAMPLER SS	CORE BAR.	OFFSET	SURFACE ELEV.	HOLE NO. B-1
SIZE I.D.	3.75"		1.375"		LINE & STA.	GROUND WATER OBSERVATIONS AT 12.0 FT. AFTER 0 HOURS AT FT. AFTER HOURS	START DATE 5/19/09
HAMMER WT.			140 lbs		N. COORDINATE		FINISH DATE 5/19/09
HAMMER FALL.			30"		E. COORDINATE		

DEPTH	SAMPLE			A	STRATUM DESCRIPTION + REMARKS	ELEV.
	NO.	BLOWS/6"	DEPTH			
0	1	2-7-11-8	0.00'-2.00'		BR./GREY FINE-CRS.SAND, LITTLE SILT & GRAVEL, TRACE ASPHALT - FILL	
	2	6-11-6-5	2.00'-4.00'			
5	3	3-3-4-4	4.00'-6.00'			
	4	3-4-3-3	6.00'-8.00'			
	5	3-3-4-4	8.00'-10.00'			
10	6	3-3-3-4	10.00'-12.00'			
15	7	1-9-4	15.00'-16.50'		DARK BR./BLACK ORGANIC SILT	16.0
					BR. FINE SAND AND SILT	16.1
					GREY FINE-CRS.SAND, SOME SILT, LITTLE GRAVEL	18.0
20	8	24-27-31	20.00'-21.50'			
25	9	9-14-12	25.00'-26.50'			
30						
35					BOTTOM OF BORING @ 26.5'	26.5

LEGEND: COL. A:RECOVERY " SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%	DRILLER: J. BREWER INSPECTOR: SHEET 1 OF 1 HOLE NO. B-1
--	--

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033		CLIENT		PROJECT NAME BRIDGE STREET GENERATOR SITE/GROTON UTILITIES	
		GW ENGINEERING		LOCATION GROTON, CT.	

TYPE	AUGER	CASING	SAMPLER	CORE BAR.	OFFSET	SURFACE ELEV.	HOLE NO.	B-2
SIZE I.D.	HSA		SS		LINE & STA.	GROUND WATER OBSERVATIONS		START DATE
HAMMER WT.	3.75"		1.375"		N. COORDINATE	AT 12.0 FT. AFTER 0 HOURS		5/19/09
HAMMER FALL			140 lbs		E. COORDINATE	AT FT. AFTER HOURS		FINISH DATE
			30"					5/19/09

DEPTH	SAMPLE			A	STRATUM DESCRIPTION REMARKS	ELEV.	
	NO.	BLOWS/6"	DEPTH				
0	1	11-16-6-5	0.00'-2.00'		BLACK FINE-CRS. SAND, SOME COAL ASH, LITTLE SILT & GRAVEL, TRACE BRICKS - FILL		
	2	4-3-3-2	2.00'-4.00'				
5	3	3-3-4-4	4.00'-6.00'				
	4	2-2-3-12	6.00'-8.00'				
						BR. FINE-CRS. SAND, SOME GRAVEL, TRACE SILT	7.0
10	5	2-3-3	10.00'-11.50'			GREY/BR. SILT, TRACE FINE SAND	9.5
15	6	16-23-23	15.00'-16.50'		GREY/BR. FINE-CRS. SAND, SOME SILT, LITTLE GRAVEL	15.0	
20	7	8-12-20	20.00'-21.50'				
25	8	9-13-15	25.00'-26.50'				
					BOTTOM OF BORING @ 26.5'	26.5	
30							
35							

LEGEND: COL. A:RECOVERY "		DRILLER: J. BREWER	
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON		INSPECTOR:	
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%		SHEET 1 OF 1	HOLE NO. B-2