Application for Wetland and Tree Cutting Permits

Town of Carmel Environmental Conservation Board

Filtration Avoidance Determination (FAD)-Related Stormwater Control
Drewville Road Water Quality Facility
Drewville Road, Town of Carmel, New York

Applicant

New York City Department of Environmental Protection (DEP)
Bureau of Water Supply
465 Columbus Avenue, Valhalla, New York 10595

April 2015

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Appendices

SECTION 1
APPLICATION FOR WETLAND PERMIT

TOWN OF CARMEL
ENVIRONMENTAL CONSERVATION BOARD

60 McAlpin Avenue
Mahopac, New York 10541
Tel. (845) 628-1500 - Ext. 190
www.carmelny.org

APPLICATION FOR WETLAND PERMIT OR LETTER OF PERMISSION

Name of Applicant: New York City Department of Environmental Protection Bureau of Water Supply
465 Columbus Avenue, Suite 270
Address of Applicant: Valhalla NY 10595 **Email:** mmandarino@dep.nyc.gov

Telephone# 914 742 2020 **Name and Address of Owner if different from Applicant:**

Property Address: Drewville Road, Town of Carmel **Tax Map #** S 66, Blk 2, Lot 53
Agency Submitting Application if Applicable: HDR Gannett Fleming Joint Venture
Location of Wetland: Northeast of proposed facility location
Size of Work Section & Specific Location: North of Drewville Road, 660' west of intersection with Stoneleigh Ave
Will Project Utilize State Owned Lands? If Yes, Specify: NYCDEP owns a portion of the work area

Type and extent of work (feet of new channel, yards of material to be removed, draining, dredging, filling, etc). A brief description of the regulated activity (attach supporting details).
See attached supporting documentation

Proposed Start Date: 12/6/2016 **Anticipated Completion Date:** 10/30/2017 **Fee Paid $** 1,000 (Check # 256329)

CERTIFICATION

I hereby affirm under penalty of perjury that information provided on this form is true to the best of my knowledge and belief, false statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. As a condition to the issuance of a permit, the applicant accepts full legal responsibility for all damage, direct or indirect, or whatever nature, and by whomever suffered, arising out of the project described here-in and agrees to indemnify and save harmless the Town of Carmel from suits, actions, damages and costs of every name and description resulting from the said project.

Maria J. Mandarino
SIGNATURE

4-10-15
DATE

SECTION 2

PROJECT NARRATIVE

FAD-Related Stormwater Control – Drewville Road Water Quality Facility

Project Narrative

INTRODUCTION

Description of Action

The New York City Department of Environmental Protection (DEP) is proposing to construct improvements for controlling stormwater erosion to the Croton Falls Reservoir within the City's East of Hudson watershed. In order to achieve this goal, the DEP is proposing to install a stormwater detention system that would consist of a forebay, a micropool, and diversion and riser boxes. Additional improvements include reconstruction and riprap lining of a roadside ditch and removal and replacement of an existing 24-inch culvert. The proposed project, "Filtration Avoidance Determination (FAD) Related Stormwater Control – Drewville Road" is located adjacent to the Croton Falls Reservoir, in the Town of Carmel, Putnam County, New York.

Purpose and Need

The purpose of this project is to reduce sediment and pollutant loading in the Croton Falls Reservoir. This project is part of the City's efforts to comply with the United States Environmental Protection Agency's (USEPA) 2007 FAD. For a drinking water system to qualify for a FAD, the system cannot be the source of a waterborne disease outbreak and must meet source water quality limits for coliform, turbidity, and total trihalomethane maximum contaminant levels. The FAD also requires that a watershed control program be implemented to minimize microbial contamination of the source water.

To maintain the FAD, the DEP seeks to reduce sediment, turbidity, and other pollutants loading into the Croton Falls Reservoir from Drewville Road by installing the proposed stormwater detention system.

Existing Conditions

The Drewville Road project is located within the East of Hudson Watershed, adjacent to the Croton Falls Reservoir, in the Town of Carmel, Putnam County, New York (Figure 1 in **Appendix A**). The project study area is 99,632 square feet (2.3 acres) in size and consists of forested land that is bounded by the Croton Falls Reservoir on the northern end and by Drewville Road (County Route 36) on the southern end (Figure 2 in **Appendix A**). The study area is

located on a DEP-owned parcel that is approximately 40 acres in size, and surrounding land use is comprised of properties with New York City Watershed and Residential zoning designations. The study area is primarily forested land, with some open space in the eastern portion. The Croton Falls Reservoir is immediately north and adjacent to the study area, while forest and residences are present to the west.

Stormwater runoff collects in a man-made roadside drainage ditch located along the north side of Drewville Road, within Putnam County's right-of-way. The man-made ditch is approximately 2.5 feet in width bank-to-bank, with shallow slopes and a bed comprised of sediments, coarse gravels, and sands. The runoff flows east-northeast through the southern section of the study area to a low point located approximately 660 feet west of the Drewville Road-Stoneleigh Avenue intersection (also known as Hopkins Corners). From there, the drainage ditch curves to the north, where it continues to flow approximately 130 feet, passing through a breached section of an adjacent rock wall in the forested property before dissipating to sheet flow (**Appendix B**). There are two unnamed streams immediately adjacent to the study area, and they are located to the east and west of the proposed project. Both streams flow to the Reservoir, emptying on the respective east and west sides of where the proposed stormwater detention system project will drain.

The study area is comprised of forested deciduous uplands and wetlands. The forested uplands comprise both mature growth trees interspersed with younger trees. The forest understory and herbaceous strata vary depending on elevation, proximity to the reservoir, and influence from off-site stormwater runoff, mainly originating from the roadside ditch along Drewville Road. There is an absence of understory trees and shrubs in the forest area at the southwestern portion of the study area; this area also has a sparse cover of perennial grasses and herbaceous plants. The southwestern portion of the study area is also higher in elevation and associated with a knoll. The existing slopes associated with the study area range from 3-10%. The topography of the site slopes to the northeast, with the low point occurring at or near the Croton Falls Reservoir's shoreline/bank.

Project Description

The proposed project is for the installation of a stormwater detention system that is designed to capture and treat the water quality volume (WQv) for the drainage area. Based on the United States Geological Survey (USGS) map, Lake Carmel quadrangle (2013), and on-site visits, it was determined that the project has a drainage area of approximately 15.17 acres. The drainage area consists of approximately 12.17 acres of woods and grasslands and 3.0 acres of paved impervious cover, as depicted in Figure 3 of **Appendix A**.

The New York State Department of Environmental Conservation (NYSDEC) defines WQv as the volume of runoff generated from the entire 90th percentile rain event (commonly known as a 10-year storm). The WQv calculated for the study area is an estimated 0.378 acre-feet (1.3 inches) of rainfall. Flow that exceeds the water quality volume would be diverted to a riprap-lined bypass channel that flows around the detention ponds before discharging into the Croton Falls Reservoir. The bypassing features included in this project would be sized to accommodate the 100-year stormwater event flows. The project design is provided in **Appendix B**.

The flow schematic of the project is as follows:

- Stormwater runoff from the drainage area enters the roadside ditch and flows to the diversion box.
- The diversion box outlets the water quality volume flows to the forebay and sends all additional flows to the bypass channel.
- Once the forebay is filled with stormwater, water enters a riprap lined channel that flows to the micropool.
- The micropool is equipped with an aquatic bench, riser box outlet, and emergency spillway. Once the micropool fills with between 3 and 5.5 feet of water, it enters the outlet pipe through the riser box and is transported to an effluent channel. In the event that water level in the micropool exceeds 5.5 feet, stormwater flow would enter the micropool's emergency spillway and discharge to the bypass channel containing excess water from the diversion box. The micropool would be planted with various zones containing: softstem and hardstem bulrush, pickerelweed, white lily, common three-square, lesser bur-reed, sweetflag, blue flag iris, tussock sedge, elderberry, red-osier dogwood, and winterberry.
- Effluent from the micropool then combines with any untreated flows from the bypass channel. The treated and untreated discharge flows overland through a riprap channel prior to entering the Croton Falls Reservoir.

Roadside Ditch

As part of the project, the roadside ditch will be lined with approximately 370 linear feet of riprap and reshaped into a trapezoidal ditch with a bottom width of 1 foot, top width of 7.5 feet, and depth of 1.5 feet. The lining of the ditch will reduce run-off velocities, erosion occurring within the ditch, and the amount of suspended solids entering the stormwater detention system. The NYSDEC *New York Standards and Specifications for Erosion and Sediment Controls* blue book was used to size the riprap in the ditch to accommodate the 100-year storm velocity.

Forebay

The forebay will be a 4.5-foot deep by 60-foot diameter excavation that is lined with a 40-mil, high-density polyethylene (HDPE) liner and equipped with an outlet spillway. The forebay will be located above the groundwater elevation, and the HDPE liner would be used to ensure that there is no migration of water between the subsurface and forebay.

The forebay will store a minimum of 10 percent of the water quality volume (0.0378 acre-feet) and provides the initial hydraulic detention of the stormwater. Once the forebay is completely filled, stormwater would enter an outlet channel that is cut within the embankment of the forebay. The outlet channel will be 30 feet long by approximately 16 feet wide, riprap-lined, designed to handle the expected 100-year storm event, and located between the forebay and micropool.

Micropool

The micropool will be a 7-foot deep by 90-foot diameter excavation equipped with an aquatic bench, riser box outlet, and emergency spillway. It will be lined with a 40-mil HDPE liner. The micropool will be located above the groundwater elevation, and the HDPE liner would be used to ensure that there is no migration of water between the subsurface and micropool.

The micropool will be sized to store 90 percent of the water quality volume (0.340 acre-feet) and provide the final detention of sediments prior to the stormwater being discharged to the Croton Falls Reservoir. The primary outlet of the micropool would consist of a riser box located within the pond's embankment. The riser box would be hydraulically connected to a 12-inch outlet pipe that discharges to the Croton Falls inlet channel. Once the depth within the micropool reaches 4 feet, stormwater will begin to enter the riser box and flow through the outlet pipe to the Croton Falls inlet channel. The micropool will also have a secondary outlet, a riprap lined spillway channel that leads to a bypass channel. Although the hydraulic stormwater model indicates that the micropool is adequately sized to handle the 100-year storm event, the spillway channel has been provided as an additional precaution. The micropool would also have a 10-foot-wide aquatic bench around the circumference of the micropool to provide additional treatment through nutrient uptake by the aquatic plants.

Bypass Structures

The bypassing aspect of the project consists of a ten-foot by ten-foot diversion box and an eight-foot-wide bypass channel that are designed to convey the 100-year storm event flows. Stormwater flows from the roadside ditch will pass through the diversion box before entering the forebay. Flows in excess of the water quality volume will be diverted away from the forebay into

the bypass channel. Bypassing the majority of flows above the water quality volume is critical because it will reduce/prevent washout of the forebay and micropool.

Micropool Spillway, Inlet, Bypass & Effluent Channels

The various channels that are included in the project will be lined with riprap to reduce flow velocities and prevent scouring and soil erosion. The NYSDEC *New York Standards and Specifications for Erosion and Sediment Controls* blue book was used to size the riprap in the various channels to accommodate the 100-year storm velocity.

Gravel Access Roadway

Authorized personnel will enter the project site through an access gate located on the north side of Drewville Road, in the southwest section of the project study area. Travelling in a northeastern direction from the project site access gate, a 12-foot-wide gravel maintenance access road will extend to the forebay and micropool. The gravel road will be a total of 12 inches thick, with a 6-inch sub-base course and a 6-inch surface course. The purpose of this road is to provide a means of vehicular access to the detention ponds for maintenance and repair purposes. The gravel road will be constructed approximately 85 feet inside the existing woods line and set back approximately 100 feet from Drewville Road.

CONCLUSIONS AND MITIGATION COMMITMENTS

Upon completion, the proposed project will result in improved water quality within the New York City watershed by reducing the amount of pollutants and sediment entering the Croton Falls Reservoir. The rural character of the project area in Carmel, New York, will be maintained by the strategic placement of the stormwater detention system with an increased setback from Drewville Road, as well as the implementation of an extensive reforestation plan. Once completed, the site will not need to be frequently accessed, so the proposed project will not permanently impact area traffic.

Extensive analysis was performed to examine the impact of the proposed project's impact on natural resources. Terrestrial habitats (vegetation, soils) will be impacted, resulting in both permanent and temporary disturbances. Mitigation in the form of extensive reforestation plantings will provide for reestablishment of a forest community and stabilization of the disturbed land. There will be direct freshwater wetland impacts associated with the project. Impacts to the freshwater wetland and wetland-adjacent areas will be both temporary and permanent in nature. Effects on disturbance areas will be mitigated through an extensive landscaping plan that will provide a significant diversity of plantings. The objective of the plantings is to restore the ecological functions and values that will be impacted by the proposed

wetland disturbance. Success of the reforestation planting will be evaluated through implementation of a monitoring schedule that will include maintenance and replacements as needed. See **Appendix D** and **Appendix F** for additional information about the proposed reforestation plan.

It is anticipated that project construction activities within the Drewville Road right-of-way will impact the westbound lane of the road for a period. DEP will consult with hospital and local emergency service providers during final design to plan for the effective maintenance of traffic during construction. Prior to and during construction activities, the contractor will be required to maintain formal communications with emergency service providers and the Putnam Hospital to ensure the proper dissemination of information and alerts regarding any incidents or changes in access.

Traffic and noise levels will increase temporarily during a limited portion of the construction phase, but there will be no significant adverse impacts on the surrounding area. The majority of the 12-month construction phase will involve 5 to 10 on-site workers.

Activities associated with the proposed project will not substantially or adversely change existing air quality. There are no anticipated adverse or substantial increases in erosion, flooding, or leaching as a result of the proposed project. The project will not interfere with the natural hydrologic conditions of the watershed. It is not anticipated that the quality or quantity of groundwater or surface water will be significantly impacted by the proposed project. Upon a thorough review, it is determined that the proposed project will serve an environmentally beneficial purpose and does not pose any significant adverse impact.

SECTION 3

APPLICATION FOR A TREE CUTTING PERMIT

TOWN OF CARMEL
ENVIRONMENTAL CONSERVATION BOARD

60 McAlpin Avenue
Mahopac, New York 10541
Tel. (845) 628-1500 - Ext. 190
www.ci.carmel.ny.us

APPLICATION FOR A TREE CUTTING PERMIT

Name of Applicant: New York City Department of Environmental Protection Bureau of Water Supply

Address: 465 Columbus Avenue, Suite 270, Valhalla, NY 10595 Tel. No. (914) 742-2020

Owner of Property: S/A/A

Address: Drewille Rd Tel. No. 66.-2-53

Tax Map Number: S 66, Blk 2, Lot 53 Total Land Area Involved: 99,632 square feet

Number of trees of each species to be cut: 159 Range, in inches, of diameter, measured 4 & ½ feet above the ground of the trees to be cut: 6 to 38 (see attached table)

Total Board Foot Volume for each species to be cut: 17,130 board feet (see attached table)

A Sketch Map drawn to scale must be attached showing: See next page

1. Boundaries of Property.
2. Access Roads into property and proposed roads and skid trails in the property.
3. Area within the property where cutting will occur.
4. Location and size of product loading areas.
5. Any area of the property defined as a wetland by the Town of Carmel Wetland Law.
6. If tree cutting operation is to be conducted in stages, each stage shall be shown on the sketch map.
7. Scale of map.

A written statement must be attached stating that each tree to be removed has been designated with paint or other distinctive means at two points so as to be readily visible. One point shall be low enough on the tree so as to be visible on the stump after the tree is removed.

Permit Fee is: - Up to 25 acres - $300.00 - Over 25 acres - $400.00 + $50.00 an acre.

Maria L Mondorm
SIGNATURE OF OWNER 4-10-15

SIGNATURE OF APPLICANT

All property owners within 500 feet of the subject property must be notified by U.S. Mail prior to commencement of the operation.

FAD-Related Stormwater Control – Drewville Road Water Quality Facility

Application for a Tree Cutting Permit

SKETCH MAP REQUIREMENTS

1. The project area depicted in Appendix A of this application package falls entirely within the boundaries of the parcel; as such, the parcel boundaries are not visible on project plans.
2. The locations of access roads are provided in Appendix F of this application package.
3. Tree removal information is provided in Appendix E of this application package.
4. The Construction Staging Area is depicted in Appendix F of this application package.
5. Town of Carmel wetland boundaries are included in Appendices E, F, and G of this application package.
6. The tree cutting operation is not to be conducted in stages.
7. Each drawing depicts the appropriate map scale.

REQUIRED WRITTEN STATEMENT

As described within Appendix D of this application package, each tree proposed for removal will be clearly marked at two readily-visible points. One point will be low enough on the tree to remain visible on the stump after removal.

Board Foot Volume Calculations			
Tree	Diameter at Breast Height (inches)	Number of Trees to be Removed	Board Foot Volume[2,3] (board feet)
Birch	6[1]	3	120
	10[1]	3	120
	12	4	240
	14	2	160
	16	1	100
	18	1	140
	24	1	250
Maple	6[1]	17	680
	8[1]	12	480
	10[1]	18	720
	12	28	1,680
	14	12	960
	16	8	800
	18	4	560
	22	2	420
	24	1	250
	28[2]	3	1,800
	36[2]	1	1,010
	38[2]	1	1,130
Oak	6[1]	3	120
	10[1]	1	40
	12	4	240
	14	1	80
	22	1	210
	24	1	250
	34[2]	1	900
Ash	8[1]	4	160
	12	4	240
	18	2	280
	20	1	170
	26[2]	1	300
	32[2]	1	790
Cherry	14	1	80
Hemlock	28[2]	1	600
Pine	14	1	80
	16	2	200
	18	1	140
Hickory	12	3	180
	18	2	280
	20	1	170
Total	n/a	159	17,130

[1] Board feet volume for trees smaller than 12" dbh was assumed to be 40 board feet

[2] For board feet volume calculations, trees smaller than 25" dbh were assumed to be 16 feet tall (one 16-foot log); trees larger than 25" dbh were assumed to be 32 feet tall (two 16-foot logs)

[3] The attached International Tree Scale table was used to calculate these board feet volumes (USDA Forest Service Reference Handbook for Foresters, 1999)

REFERENCE HANDBOOK FOR FORESTERS

U.S. Department of Agriculture
Forest Service
State and Private Forestry
Northeastern Area

NA-FR-15

September 1999
Revised for the internet, October 2001

Prepared by

Burl S. Ashley

Field Representative, Resources Management

Northeastern Area, State and Private Forestry

Morgantown, West Virginia

September 1989

This Handbook revises and supersedes NA-FR-2

"Field Reference Handbook for Service Foresters."

Revised for the internet by Arlyn Perkey, Helen Butalla, and Barb Morgan
October 2001

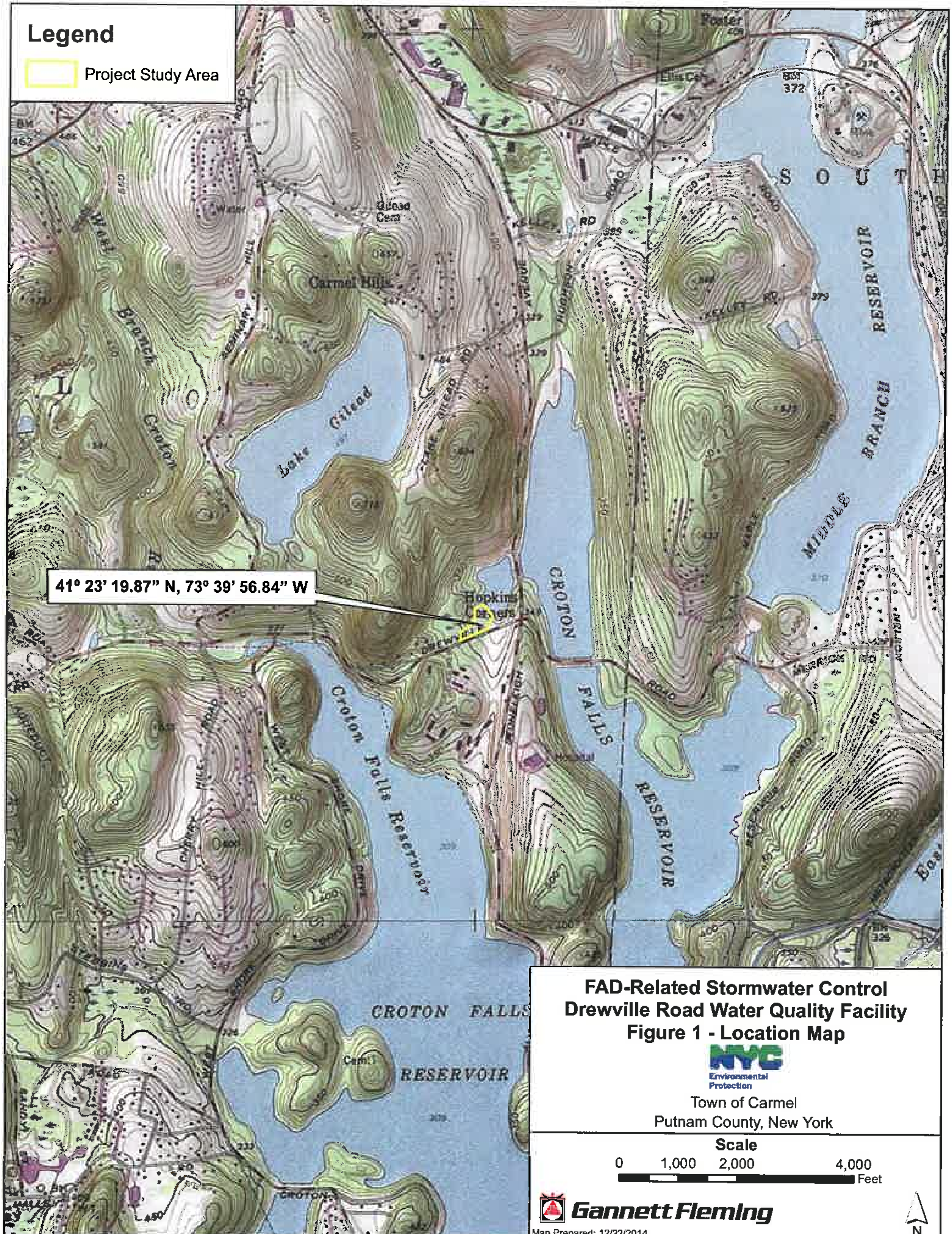
For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402

TREE SCALE

(International 1/4 Inch)

DBH (in.)	Number of 16-Foot Logs							
	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4
	Contents in Board Feet							
12	30	60	80	100	120			
14	40	80	110	140	160	180		
16	60	100	150	180	210	250	280	310
18	70	140	190	240	280	320	360	400
20	90	170	240	300	350	400	450	500
22	110	210	290	360	430	490	560	610
24	130	250	350	430	510	590	660	740
26	160	300	410	510	600	700	790	880
28	190	350	480	600	700	810	920	1020
30	220	410	550	690	810	930	1060	1180
32	260	470	640	790	940	1080	1220	1360
34	290	530	730	900	1060	1220	1380	1540
36	330	600	820	1010	1200	1380	1560	1740
38	370	670	910	1130	1340	1540	1740	1940
40	420	740	1010	1250	1480	1700	1920	2160
42	460	820	1100	1360	1610	1870	2120	2360

APPENDIX A
FIGURES



Source: USGS Topographic Map provided by ESRI through ArcGIS Online webservice.

FAD-Related Stormwater Control
Drewville Road Water Quality Facility
Figure 2 - Aerial Imagery Map

NYC Environmental Protection

Town of Carmel
Putnam County, New York

Scale
0 250 500 1,000 Feet

Gannett Fleming

Map Prepared: 12/22/2014

N

0 150
Scale In Feet

DREWVILLE ROAD CONTRACT CRO-420
FIGURE 3 - DRAINAGE AREA MAP

APPENDIX B
PROJECT PLANS

NOTES:

1. SITE PLANS BASED ON TOPOGRAPHIC SURVEY PREPARED BY WSP-SELLS DATED MARCH 3, 2009. STORM WATER AND OVERHEAD ELECTRIC UTILITIES ARE ALSO BASED ON THIS SURVEY.
2. VERTICAL DATUM IS NAVD 1988. HORIZONTAL DATUM IS PROJECTED COORDINATE SYSTEM NAD 1983 STATE PLANE NEW YORK.
3. SEE SHEET C-12 FOR TREE REMOVAL SCHEDULE.
4. DREWVILLE ROAD IS ASPHALT. AREAS ADJACENT TO DREWVILLE ROAD IN THE AREA OF WORK ARE GRASS AND LIGHT BRUSH.
5. GEOTECHNICAL BORING DATA FOR BORINGS GB-1 AND GB-2 ARE PROVIDED IN SPECIFICATION APPENDIX A FOR REFERENCE ONLY.
6. PROPERTY OWNERS ARE BASED ON A PROPERTY LOCATION MAP PROVIDED BY NYCDEP.
7. SANITARY FORCE MAIN AND GAS SERVICE UTILITIES ARE BASED ON J. ROBERT FOLCHETTI AND ASSOCIATES L.L.C. SHEET 8 OF 21 STONELEIGH AVE. FORCE MAIN I, AS-BUILT MARK UP BY CONTRACTOR ISSUED 6/7/99.
8. CONTRACTOR SHALL MINIMIZE THE EXTENT OF STONE WALL REMOVAL TO ONLY WHAT IS REQUIRED TO CONSTRUCT THE NEW CHANNEL.

CROTON FALLS RESERVOIR

NYCDEP WETLAND BOUNDARY

MERRITT RYDER

NYCDEP WETLAND 100' BUFFER ADJACENT AREA BOUNDARY

20' SAN EASEMENT

8" DIP FORCE MAIN

EXISTING GRAVEL ROAD

GB-2
N: 932008.53
E: 721044.53

NYCDEP WETLANDS 100' BUFFER ADJACENT AREA BOUNDARY

GB-1
N: 931909.49
E: 721009.24

REMOVE CABLE ACCESS GATE AND WOOD POSTS

REMOVE SECTIONS OF STONE WALL AND STABILIZE REMAINING WALL ENDS SEE NOTE 8

BREACH IN STONE WALL STORMWATER ENTRY POINT TO SITE

GAS MAIN

DREWVILLE ROAD

24"Ø CMP

15"Ø CMP

18"Ø CMP

15"Ø CMP

BOARD OF MANAGERS OF CLEARING IN THE WOODS C/O QUANTUM PROPERTY MANAGEMENT LTD 2049 SAW MILL RIVER RD ELMSFORD, NY 10523

14" CORRUGATED PLASTIC DIA CULVERT TO BE REMOVED

GATE VALVE

BENCHMARK EL. 342.05' SPIKE IN POLE

BENCHMARK SPIKE IN POLE
N:931672.05
E:721151.83
EL. 328.71'

ROOF OF LIFE CHURCH

J. HUIT & C. WINGER

PARCEL OWNER UNKNOWN

Scale in Feet

WARNING: IT IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER IN ANY WAY ANY PLANS, SPECIFICATIONS, PLATS OR REPORTS TO WHICH THE SEAL OF A PROFESSIONAL ENGINEER HAS BEEN AFFIXED. IF AN ITEM BEARING THE SEAL OF A PROFESSIONAL ENGINEER IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE, THE DATE, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

NO.	REVISIONS	DATE	BY
2	BEDC COMMENTS	2/15	SH
1	GENERAL REVISION	10/11	EL

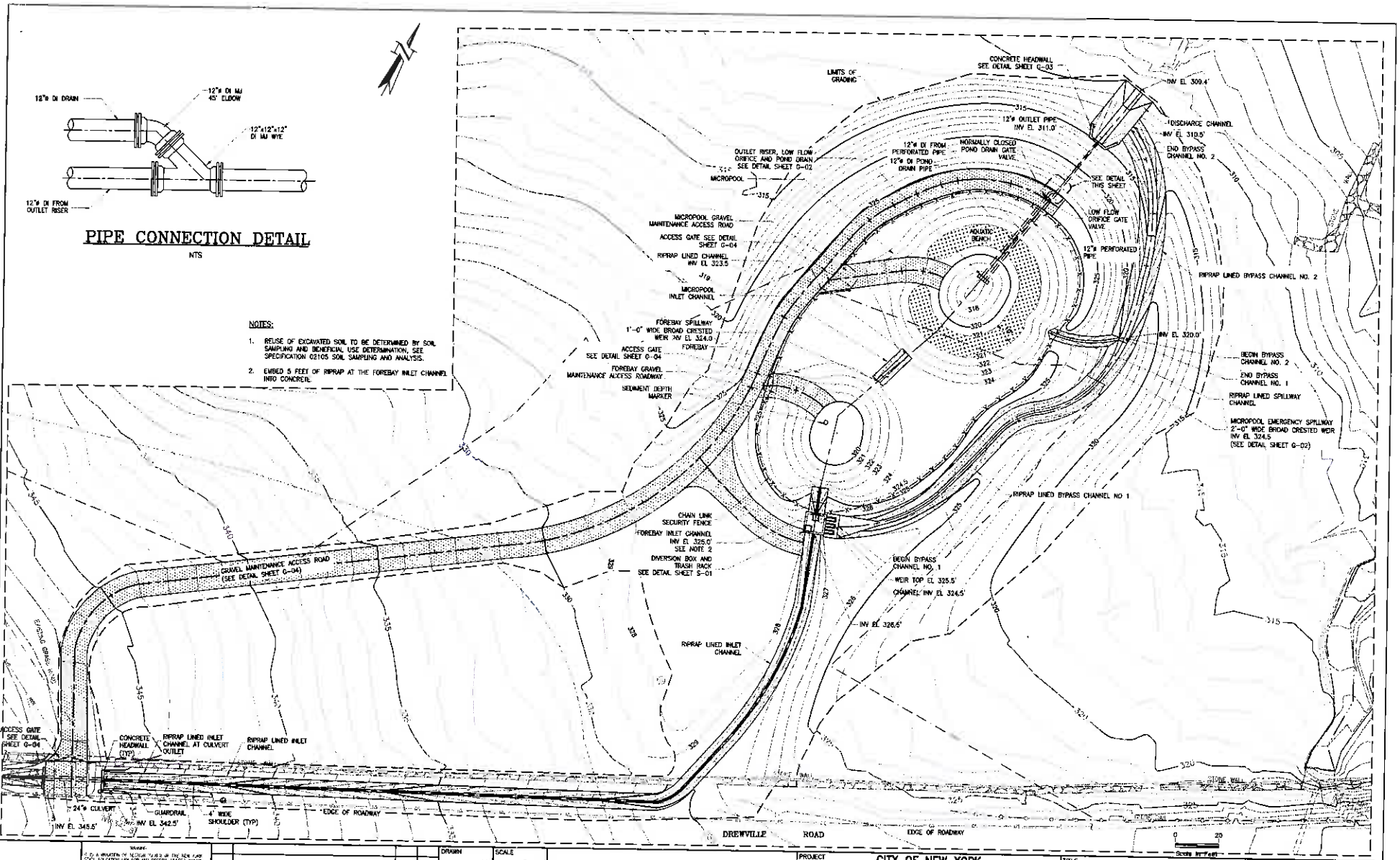
DRAWN: LK | SCALE: 1"=30'
DESIGNED: MS | JOB No. 45649.W012
APPROVED: SH | DATE: JAN. 2015

HDR + Gannett Fleming
A Joint Venture

PROJECT
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
CONTRACT CRO-420
FAD RELATED STORMWATER CONTROL
DREWVILLE ROAD, NEW YORK

TITLE
EXISTING SITE PLAN

SHEET No.
C-01



No.	REVISIONS	DATE	BY
2	REVISED ROAD AND POND LOCATIONS	01/15	
1	REVISED ROAD AND POND LOCATIONS	10/11	EL

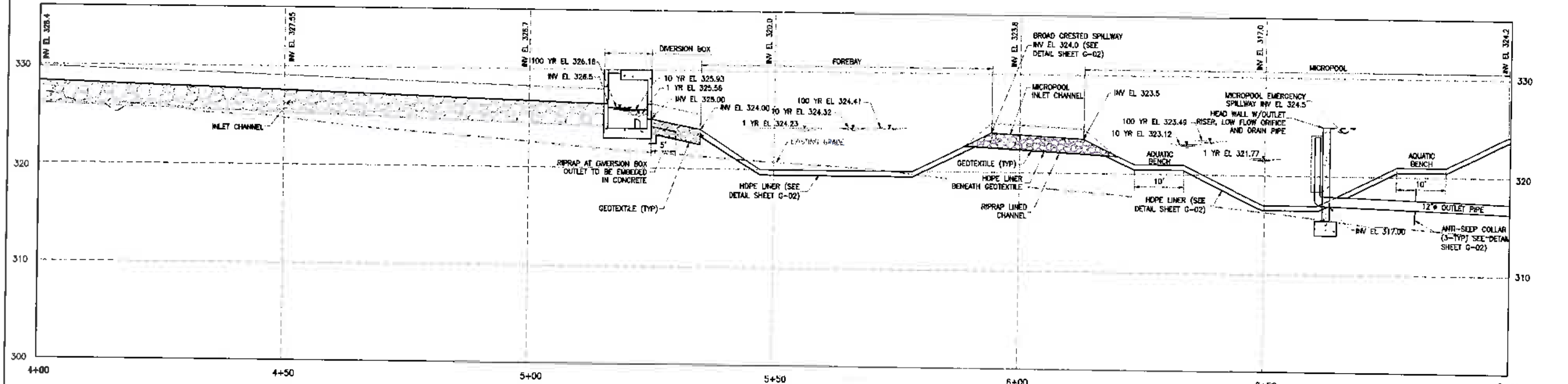
DRAWN LK | SCALE 1"=20'
DESIGNED MS | JOB No. 48649.WO12
APPROVED SH | DATE JAN. 2015

HDR • Gannett Fleming
A Joint Venture

PROJECT
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
CONTRACT CRO-420
FAD RELATED STORMWATER CONTROL
DREWVILLE ROAD, NEW YORK

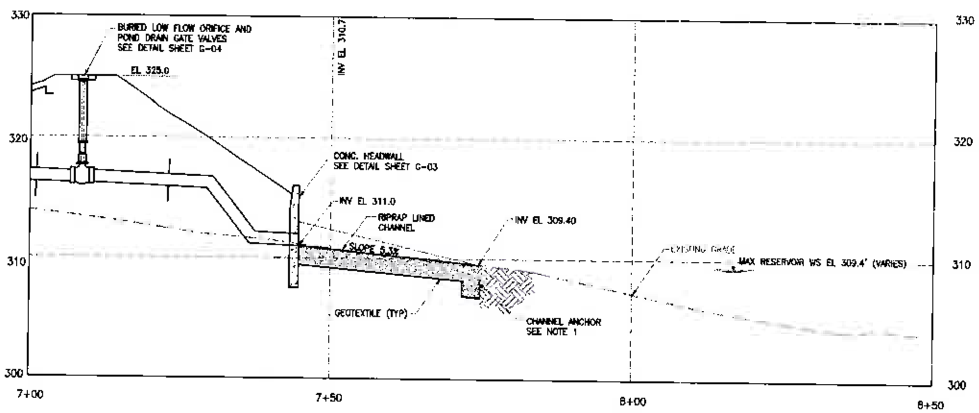
TITLE
STORMWATER TREATMENT SYSTEM AND GRADING PLAN

SHEET No.
C-03



STORMWATER TREATMENT SYSTEM PROFILE

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=5'



STORMWATER TREATMENT SYSTEM PROFILE

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=5'

NOTES:

1. ANCHOR THE END OF RIPRAP CHANNEL DIMENSIONS 3 FEET DEEP BY 1 FOOT FOR THE WIDTH OF THE CHANNEL.

0 10
Horizontal Scale in Feet

2	REVISED ROAD AND POND LOCATIONS	2/15	SH	
1	REVISED ROAD AND POND LOCATIONS	10/11	DL	
No.	DESCRIPTION	DATE	BY	
	REVISIONS			

DRAWN LK | SCALE AS SHOWN
DESIGNED MS | JOB No. 48649.W012
APPROVED SH | DATE JUN. 2014

HDR • Gannett Fleming
A Joint Venture

PROJECT
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
CONTRACT CRO-420
FAD RELATED STORMWATER CONTROL
DREWVILLE ROAD, NEW YORK

TITLE
STORMWATER TREATMENT SYSTEM PROFILES II

SHEET No.
C-05

APPENDIX C
AGENCY CORRESPONDENCE

New York State Office of Parks, Recreation and Historic Preservation

OFFICE OF PARKS, RECREATION, HISTORIC PRESERVATION
NEW YORK STATE

New York State Office of Parks, Recreation and Historic Preservation

Historic Preservation Field Services Bureau • Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643
www.nysparks.com

David A. Paterson
Governor

Carol Ash
Commissioner

November 5, 2010

Jennifer Farmwald
Project Manager
NYCDEP-Bureau of Environmental Planning
Analysis
59-17 Junction Boulevard
Flushing, NY 11373

Re: **CORPS, DEC, NYCDEP**
FAD Stormwater Control
Carmel, Putnam County
10PR06914

Dear Ms. Farmwald:

Thank you for requesting the comment of the State Historic Preservation Office (SHPO). We have reviewed the project in accordance with Section 14.09 (April 14, 2010) but are now responding to your request for review under Section106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8).

Based upon our review of the submitted information for this project, including a review for archeological sensitivity, it is the SHPO's opinion that the project will have No Adverse Effect upon properties in or eligible for inclusion in the National Register of Historic Places.

If you have any questions regarding this letter or your project, please feel free to contact me. Ext. 3273.

Sincerely,

Kenneth Markunas
Historic Sites
Restoration Coordinator

Andrew M. Cuomo
Governor

Rose Harvey
Commissioner

New York State Office of Parks, Recreation and Historic Preservation

Division for Historic Preservation
Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643
www.nysparks.com

January 29, 2015

Ms. Maria Mandarino
NYC DEP, Bureau of Water Supply
465 Columbus Avenue, Suite 270
Valhalla, NY 10595

Re: CORPS
FAD-Related Stormwater Control - Drewville Road
Drewville Road, Carmel, NY
10PR06914

Dear Ms. Mandarino:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include other environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York State Environmental Conservation Law Article 8).

SHPO continues to recommend that your project will have No Adverse Effect upon cultural resources in or eligible for inclusion in the National Registers of Historic Places.

If further correspondence is required regarding this project, please refer to the OPRHP Project Review (PR) number noted above. If you have any questions I can be reached at 518-268-2186.

Sincerely,

Tim Lloyd, Ph.D., RPA
Historic Preservation Specialist - Archeology
timothy.lloyd@parks.ny.gov

via e-mail only

New York State Department of Environmental Conservation

Division of Environmental Permits

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Region 3 Main Office
21 South Putt Corners Road, New Paltz, NY 12561-1620
P: (845) 256-3033 | F: (845) 255-3042
www.dec.ny.gov

March 23, 2015

Maria Mandarino, P.E.
Chief, Capital Planning
NYC DEP
71 Smith Avenue
Kingston, NY 12401

RE: FAD Related Stormwater Control CRO-420 inquiry, **CH 5690**
Drewville Road
Carmel (T), Putnam (C)

Dear Ms. Mandarino:

Based upon our review of your inquiry received March 9, 2015, we offer the following comments:

PROTECTION OF WATERS

The following stream is located within or near the site you indicated:

Name	Class	DEC Water Index #	Status
Tributary of Croton Falls Reservoir	[A]	H-31-P 44-23-P 59-4	[Protected]

- A Protection of Waters permit is required to physically disturb the bed or banks (up to 50 feet from stream) of any streams identified above as "protected."

- The U.S. Army Corps of Engineers regulates the placement of fill and the construction of certain structures in waterways and wetlands. Please contact the U.S. Army Corps of Engineers, telephone (917) 790-8411 for any permitting they might require.

If a permit is not required, please note the project sponsor is still responsible for ensuring that work shall not pollute any stream or waterbody. Care shall be taken to stabilize any disturbed areas promptly after construction, and all necessary precautions shall be taken to prevent contamination of the stream or waterbody by silt, sediment, fuels, solvents, lubricants, or any other pollutant associated with the project

FRESHWATER WETLANDS

- Your project/site is near or in Freshwater Wetland **LC-63**, Class 1. Be aware that a Freshwater Wetlands permit is required for any physical disturbance within these boundaries or within the 100 foot adjacent area. To have the boundary delineated, please contact Jonathan Russell in the Bureau of Habitat at (845) 256-3087.

From submitted information, it appears that portions of the proposed project would be located within Freshwater Wetland LC-63 and its 100-foot adjacent area. Please note that the applicant will be required by DEC to demonstrate that the project meets the permit issuance standards contained in the Freshwater Wetland Permit Requirements Regulations (6 NYCRR Part 663.5; copy available on-line at http://www.dec.ny.gov/regs/4613.html).

STATE-LISTED SPECIES

- No records of currently listed species were identified by this review

- DEC has reviewed the State's Master Habitat Databank (MHDB) records. We have determined that the proposed project area is located in or near records of the species Northern long-eared bat (*Myotis septentrionalis*). Although this species is not currently listed on either the NYS endangered or threatened species list, please note that this species has been proposed to be listed as a federally threatened species, and protection of this species through NYSDEC's implementation of Article 11, Title 5, Section 535 of the Environmental Conservation Law, Threatened and Endangered Species may occur within the near future. These regulations are expected to take effect in April of 2015.

  Therefore, the Department recommends application of the interim guidance on Northern Long-eared bats, available at http://www/fws/gov/midwest/endangered/mammals/nlba. Specifically, the Department recommends that all tree clearing take place between October 31st and March 31st (of any given year) to avoid impacts to Northern long-eared bats. If this tree clearing cannot be conducted within the above stated time frames, the applicant should contact this office for further discussion of reducing impacts to the bats and the impending regulations in relation to the project. For further information, please contact Lisa Masi of Wildlife at (845) 256-2257.

The absence of data does not necessarily mean that rare or state-listed species, natural communities or other significant habitats do not exist on or adjacent to the proposed site. Rather, our files currently do not contain information which indicates their presence. For most sites, comprehensive field surveys have not been conducted. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

OTHER

Please note that this letter only addresses the requirements for the following permits from the Department:

- ☐ Protection of Waters
- ☐ Freshwater Wetlands
- ☐ Master Habitat Databank

Other permits from this Department or other agencies may be required for projects conducted on this property now or in the future. Also, regulations applicable to the location subject to this determination occasionally are revised and you should, therefore, verify the need for permits if

your project is delayed or postponed. This determination regarding the need for permits will remain effective for a maximum of one year unless you are otherwise notified. Applications may be downloaded from our website at www.dec.ny.gov under "Programs" then "Division of Environmental Permits."

Please contact this office if you have questions regarding the above information. Thank you.

Sincerely,

Ashley Wilson
Division of Environmental Permits
Region 3, Telephone No. 845/256-3050

Ecc: Danielle Iuliucci diuliucci@gfnet.com
Lisa Masi
Jonathan Russell

NOTE: Regarding erosion/sediment control requirements:
Stormwater discharges require a SPDES Stormwater permit from this Department if they either:

- occur at industrial facilities and contain either toxic contaminants or priority pollutants OR
- result from construction projects involving the disturbance of 5000 square feet or more of land within the NYC Department of Environmental Protection East of Hudson Watershed, or the disturbance of 1 acre or more of land (outside the NYC DEP Watershed)

Your project may be covered by one of two Statewide General Permits or may require an individual permit. When other DEC permits are required, the Stormwater Pollution Prevention Plan (SWPPP) required by the SPDES General Permit must be submitted along with the permit application for concurrent review. Authorization for coverage under the SPDES General Permit is not granted until approval of the SWPPP and issuance of the other necessary DEC permits.

For information on stormwater and the general permits, see the DEC website at http://www.dec.ny.gov/chemical/8468.html. If this site is within an MS4 area (Municipal Separate Storm Sewer System), the stormwater plan must be reviewed and accepted by the municipality and the MS-4 Acceptance Form must be submitted to the Department. If the site is not within an MS4 area and other DEC permits are required, please contact the regional Division of Environmental Permits.

New York State Department of Environmental Conservation

New York Natural Heritage Program

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • Fax: (518) 402-8925
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

May 26, 2010

Jennifer Farmwald
New York City Department Environmental Protection
59-17 Junction Blvd
Flushing, NY 11373

Dear Ms. Farmwald:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed Filtration Avoidance Determination Related Stormwater Control, Project CAT-232, site as indicated on the map you provided, located on Drew Avenue, Town of Carmel, Putnam County.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

The enclosed report may be included in documents that will be available to the public. However, any enclosed maps displaying locations of rare species are considered sensitive information, and are intended only for the internal use of the recipient; they should not be included in any document that will be made available to the public, without permission from the New York Natural Heritage Program.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g. regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,

Tara Salerno gp

Tara Salerno, Information Services
New York Natural Heritage Program # 538

Enc.
cc: Reg. 3, Wildlife Mgr.
Reg. 3, Fisheries Mgr.

40 years of stewardship 1970-2010

Natural Heritage Report on Rare Species and Ecological Communities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

HISTORICAL RECORDS

The following plants and animals were documented in the vicinity of the project site at one time, but have not been documented there since 1979 or earlier.
There is no recent information on these plants and animals in the vicinity of the project site and their current status there is unknown. In most cases the precise location of the plant or animal in this vicinity at the time it was last documented is also unknown and therefore location maps are generally not provided.
If appropriate habitat for these plants or animals is present in the vicinity of the project site, it is possible that they may still occur there.

Natural Heritage Report on Rare Species and Ecological Communities

VASCULAR PLANTS

Liparis liliifolia

Large Twayblade

Office Use 8701

NY Legal Status: Endangered
Federal Listing:
Last Report: 1961-06-17

NYS Rank: S1 - Critically imperiled
Global Rank: G5 - Secure
EO Rank: Historical, no recent information

County: Putnam
Town: Carmel
Location: Croton Falls Reservoir
Directions: The plant was collected from dripping shaded ledges along the road near Croton Falls Reservoir.
General Quality and Habitat: The dripping shaded ledges along a road near a reservoir.

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1 Records Processed

More detailed information about many of the rare and listed animals and plants in New York, including biology, identification, habitat, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org, from NatureServe Explorer at http://www.natureserve.org/explorer, from NYSDEC at http://www.dec.ny.gov/animals/7494.html (for animals), and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

NYC Environmental Protection

Carter H. Strickland, Jr.
Commissioner

Angela Licata
Deputy Commissioner
alicata@dep.nyc.gov

59-17 Junction Blvd.
Flushing, New York 11373

Tel (718) 595-4398
Fax (718) 595-4479

September 12, 2011

NYS Department of Environmental Conservation
DFWMR - New York Natural Heritage Program
625 Broadway, 5th Floor
Albany, NY 12233-4757

RE: Request for Concurrence With NYNHP Data
NYCDEP CAT-232: FAD Related Stormwater Control
Drewville Road Water Quality Facility
Town of Carmel, Putnam County, New York

Dear Sir or Madam:

In May 2010 the New York State Department of Environmental Conservation New York Natural Heritage Program (NYSDEC NYNHP) conducted a review of the above referenced project in regards to the potential impact/effect on rare/ threatened/endangered species and significant natural communities on or in the vicinity of the project site. A copy of the NYNHP's review letter, dated May 26, 2010 is attached.

NYNHP determined that the endangered plant, the Large Twayblade orchid (Liparis Liliifolia) was documented in the vicinity of the project site on June 17, 1969. The NYNHP review letter also indicates that there is no recent information on the large Twayblade in the vicinity of the project site, and its current status is unknown.

On April 26 and May 13, 2011, Deborah Layton of the New York City Department of Environmental Protection conducted two site surveys to determine the presence of the Large Twayblade in the project vicinity. Based on the site surveys, no evidence of the Large Twayblade was observed at the project site or in its immediate vicinity.

The purpose of this letter is to notify the NYNHP that site surveys have been conducted and to request for NYNHP concurrence that this project would not impact the Large Twayblade or any other rare/threatened/endangered species on or in the vicinity of the project site.

Please respond to me at the New York City Department of Environmental Protection Bureau of Environmental Planning and Analysis, 59-17 Junction Boulevard, 11th Floor, Flushing, NY 11373. Should you have any questions regarding this project, please feel free to contact me at (718) 595-3287 or via email at jfarmwald@dep.nyc.gov.

Sincerely,

Jennifer Farmwald,
Project Manager

Enclosures

c: Zaidoun Ereifej – NYCDEP
Deborah Layton – NYCDEP
Michael Usai – NYCDEP
Eric Lochner – HDR-Gannett JV
Jesse Horsford – HDR-Gannett JV
Theresa Albanese – HDR-Gannett JV
Jeff Kitt – HDR-Gannett JV

New York State Department of Environmental Conservation

Joe Martens, Commissioner

Division of Lands & Forests
Forest Health and Protection, 5th Floor
625 Broadway, Albany, New York 12233-4253
Phone: (518) 402-9425 • **FAX:** (518) 402-9028
Website: www.dec.state.ny.us

November 1, 2011

Jennifer Farmwald
New York City Dept. of Environmental Protection
59-17 Junction Blvd
Flushing, NY 11373

Dear Ms. Farmwald:

In response to your letter of September 12, 2011, concerning NYC DEP CAT-232: FAD Related Stormwater Control Drewville Road Water Quality Facility, site as indicated on the map you provided, located in the Town of Carmel, Putnam County, we have reviewed the information provided in your letter. Based on the description of the project vicinity, and on the description of the work to be performed, it is unlikely that the project will have any negative impact on any rare or listed plants or animals, provided that the work is confined to the project site area.

While the NY Natural Heritage Program can report that it does not have any concerns about the proposed projects' impact on rare plants and animals, it does not have any regulatory or permitting authority, and so cannot provide any official determination as to any actions that are required or not required. Any such official determinations normally are done by the lead agency or permitting agency.

Sincerely,

Gerald A. Carlson,
Research Scientist 4
Chief, Forest Health and Protection
518-402-9419 or 9425 reception
jacarlso@gw.dec.state.ny.us

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

Joe Martens
Commissioner

February 04, 2015

Maria Mandarino
NYC Department of Environmental Protection
71 Smith Avenue
Kingston, NY 12401

Re: Filtration Avoidance Determination-Related Stormwater Control Project (CR0-420) -- Drewville Road Water Quality Facility
Town/City: Carmel. County: Putnam.

Dear Maria Mandarino :

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities, that our database indicates occur, or may occur, on your site or in the immediate vicinity of your site. Our database does not contain documentation of Bald Eagle nesting areas within 0.5 mi of your site.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

Our database is continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Sincerely,

Andrea Chaloux

Andrea Chaloux
Environmental Review Specialist
New York Natural Heritage Program

New York Natural Heritage Program

Report on State-Listed Animals

The following state-listed animals have been documented in the vicinity of your project site.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed or are candidates for federal listing. The list may also include significant natural communities that can serve as habitat for Endangered or Threatened animals, and/or other rare animals and rare plants found at these habitats.

For information about potential impacts of your project on these populations, how to avoid, minimize, or mitigate any impacts, and any permit considerations, contact the Wildlife Manager or the Fisheries Manager at the NYSDEC Regional Office for the region where the project is located. A listing of Regional Offices is at http://www.dec.ny.gov/about/558.html.

The following species have been documented within 2 mi of the project site. Individual animals may travel 5 mi from documented locations.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Mammals				
Northern Long-eared Bat *Hibernaculum*	*Myotis septentrionalis*	Unlisted	Candidate	14144

This report only includes records from the NY Natural Heritage databases. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

New York Natural Heritage Program

Report on Historical Records of Rare Animals, Rare Plants, and Natural Communities

The following rare plants and rare animals have historical records in the vicinity of your project site.

The following rare plants and animals were documented in the vicinity of the project site at one time, but have not been documented there since 1979 or earlier, and/or there is uncertainty regarding their continued presence. There is no recent information on these plants and animals in the vicinity of the project site and their current status there is unknown. In most cases the precise location of the plant or animal in this vicinity at the time it was last documented is also unknown.

If suitable habitat for these plants or animals is present in the vicinity of the project site, it is possible that they may still occur there. We recommend that any field surveys to the site include a search for these species, particularly at sites that are currently undeveloped and may still contain suitable habitat.

COMMON NAME	*SCIENTIFIC NAME*	*NYS LISTING*	*HERITAGE CONSERVATION STATUS*
Vascular Plants			
Large Twayblade	*Liparis liliifolia*	Endangered	Critically Imperiled in NYS

1961-06-17: The dripping shaded ledges along a road near a reservoir. 8701

This report only includes records from the NY Natural Heritage databases. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

APPENDIX D
PLANNED AVOIDANCE AND MINIMIZATION

FAD-Related Stormwater Control – Drewville Road Water Quality Facility

Planned Avoidance and Minimization

Proposed efforts to avoid, minimize, and mitigate for adverse impacts associated with this project are described below. Appropriate best management practices will be used where necessary.

WETLAND AND WATERCOURSE MEASURES

Location Information

The purpose of the proposed project, as described in the Project Narrative (**Section 2**), can only be met if the stormwater control facility is located between the Croton Falls Reservoir and Drewville Road. This location contains freshwater wetlands and watercourses as described and mapped in **Appendix G**; a New York State Department of Environmental Conservation (NYSDEC) Class 1 Freshwater Wetland designated LC-63 is located in the vicinity of the project area, as depicted in the NYSDEC Freshwater Wetlands Map provided in **Appendix G**. Class 1 wetlands include those adjacent to water bodies used primarily for public water supply, which applies to the Reservoir. The NYSDEC regulates this wetland along with its 100-foot adjacent area (see NYSDEC correspondence in **Appendix C**).

A protected NYSDEC Class A tributary of Croton Falls Reservoir is also located in the vicinity of the project area. The Class A designation is applied to streams that are tributary to New York City (NYC) water supply impoundments on NYC-owned land (6 NYCRR Part 864.4). The NYSDEC regulates this watercourse and its banks. The approximate location of the protected stream is indicated on the Stream Location Map in **Appendix G**.

DEP-delineated wetland and watercourse boundaries were approved and certified by NYSDEC; these boundaries and the NYSDEC certification block are included in **Appendix G**.

Design Information

The proposed project alternative selected for implementation, as described in this application package, has been approved by the Town of Carmel. An earlier project layout was presented to the Town and rejected due to its proximity to Drewville Road. In order to satisfy the Town, DEP shifted the proposed facility approximately 75 feet further north of Drewville Road, closer to the Croton Falls Reservoir.

The increased proximity of the proposed facility to the Reservoir and its adjacent wetlands increased the disturbance to wetlands. However, DEP will minimize total permanent and temporary impacts to DEC-

verified Palustrine Forested (PFO) wetlands to 3,796 square feet (0.087 acre) and wetland-adjacent areas to 26,827 square feet (0.616 acre), as described in the below table. PFO wetland and 100-foot adjacent area boundaries are depicted over the proposed design in Appendix F. No impacts are proposed to Freshwater Wetland LC-63 or the Class A stream. All impacts fall within the proposed limit-of-disturbance (LOD). Some of the proposed plantings fall outside the proposed LOD.

NYSDEC-Verified Feature	Permanent Impacts		Temporary Impacts		Total Impacts	
	Cause of Disturbance	(square feet)	Cause of Disturbance	(square feet)	(square feet)	(acres)
PFO Wetlands	Grading and installation of outlet & bypass channels	2,923	Use of turbidity curtain & silt fence	873	3,796	0.087
100-foot Adjacent Area	Grading and installation of forebay, micropool, outlet & bypass channels, and access road	25,417	Use of silt fence	1,410	26,827	0.616

Best management practices (BMPs), such as clearly marking the LOD to prevent any impacts from occurring outside this boundary, erecting silt fence and a turbidity barrier to prevent sediment from entering surface water, and protecting trees not proposed for removal, will be implemented to avoid unnecessary impacts. In addition, soil erosion and sediment control, stormwater management, air quality, traffic management, and noise disturbance BMPs will be utilized.

VEGETATION MEASURES

Tree Removal Information

Under the current design, approximately 159 trees are proposed to be removed. The following table presents a summary of this information; additional details can be found in **Appendix E**.

Species of trees to be removed	Number of trees to be removed	Diameter at breast height (dbh) of trees to be removed (inches)
Maple	107	6 to 38
Birch	15	6 to 24

Planned Avoidance and Minimization

Species of trees to be removed	Number of trees to be removed	Diameter at breast height (dbh) of trees to be removed (inches)
Ash	13	8 to 32
Oak	12	6 to 34
Hickory	6	12 to 20
Pine	4	14 to 18
Cherry	1	14
Hemlock	1	28
Total	159	--

All trees to be removed are located within the LOD, including areas to be graded, as shown on plans included in **Appendix E**. Approximately nine (9) of the total trees to be removed are within the DEC-mapped wetland limits. Approximately 60 of the total trees to be removed are within the wetland-adjacent area. Each tree to be removed will be designated with distinctive means at two readily-visible points; one point will be low enough on the tree so as to be visible on the stump after tree removal. The tree removal process will include cutting trees in the project area, transporting fallen trees to the contractor's staging area for temporary storage, and loading fallen trees for transport to an approved off-site facility. Cut trees and brush are expected to be removed daily.

In accordance with recommendations from the New York State Department of Environmental Conservation Region 3 Division of Environmental Permits, provided in **Appendix C**, all tree removal will occur between October 31 and March 31 to avoid impacting northern long-eared bats, which are on record as being in the vicinity of the project area. Additional information regarding rare, threatened, and endangered species can be found in the U.S. Fish and Wildlife consultation request package included in **Appendix C**.

Construction fence, protective fence, and/or other approved techniques will be used to protect trees that are scheduled to be avoided during the proposed work. Trees within the action area that will not be removed include one (1) ash (12" dbh), one (1) birch (10" dbh), and nine (9) maples (6" to 32" dbh).

Planned Avoidance and Minimization

Vegetation Restoration Information

To compensate for the permanent loss of trees and disturbance to PFO wetlands, an extensive restoration plan is proposed that will include plantings of native trees, shrubs, and herbaceous plants; this plan, summarized below and presented in **Appendix F**, will replicate pre-existing vegetative conditions and reestablish wetland area functions and values. Native wetland trees and shrubs will be planted and permitted to naturalize to re-establish some of the wetland overstory that will be disturbed by the proposed project. The proposed improvements to stormwater control offset the unavoidable disturbances. Success of the reforestation plantings will be evaluated through implementation of a monitoring schedule that will include maintenance and replacements as needed.

The restoration of the project site will be divided into distinctive planting zones as depicted in **Appendix F**. Zone A includes the area surrounding the facility, Zone B includes the micropool (B-1 is the inner area of the micropool and B-2 is the outer micropool area), Zone C includes the aquatic bench surrounding the micropool, Zone D includes the forebay, Zone E includes the area between the micropool and forebay, Zone F includes the temporary disturbance areas, and Zone G includes areas to be graded. The below table summarizes the proposed plantings by vegetation category. Species are listed by zone within **Appendix F**.

Vegetation Category	Species		Total number of plantings
Trees	Swamp white oak Sugar maple Red maple White oak American elm	Black/sweet birch Tuliptree Flowering Dogwood Hornbeam Shadbush	118
Shrubs	Gray dogwood Winterberry holly Witch hazel Arrowwood Winterberry holly	Spicebush Hazelnut Elderberry Red-osier dogwood Pussy willow	113
Ferns	Christmas fern	New York fern	50
Herbs	Softstem bulrush Hardstem bulrush Pickerelweed White lily Common three-square	Lesser bur-reed Sweetflag Blue flag iris Tussock sedge	1,009

A few of the zones will receive applications of seeds derived from seed mixes. Additional information can be found in **Appendix F**.

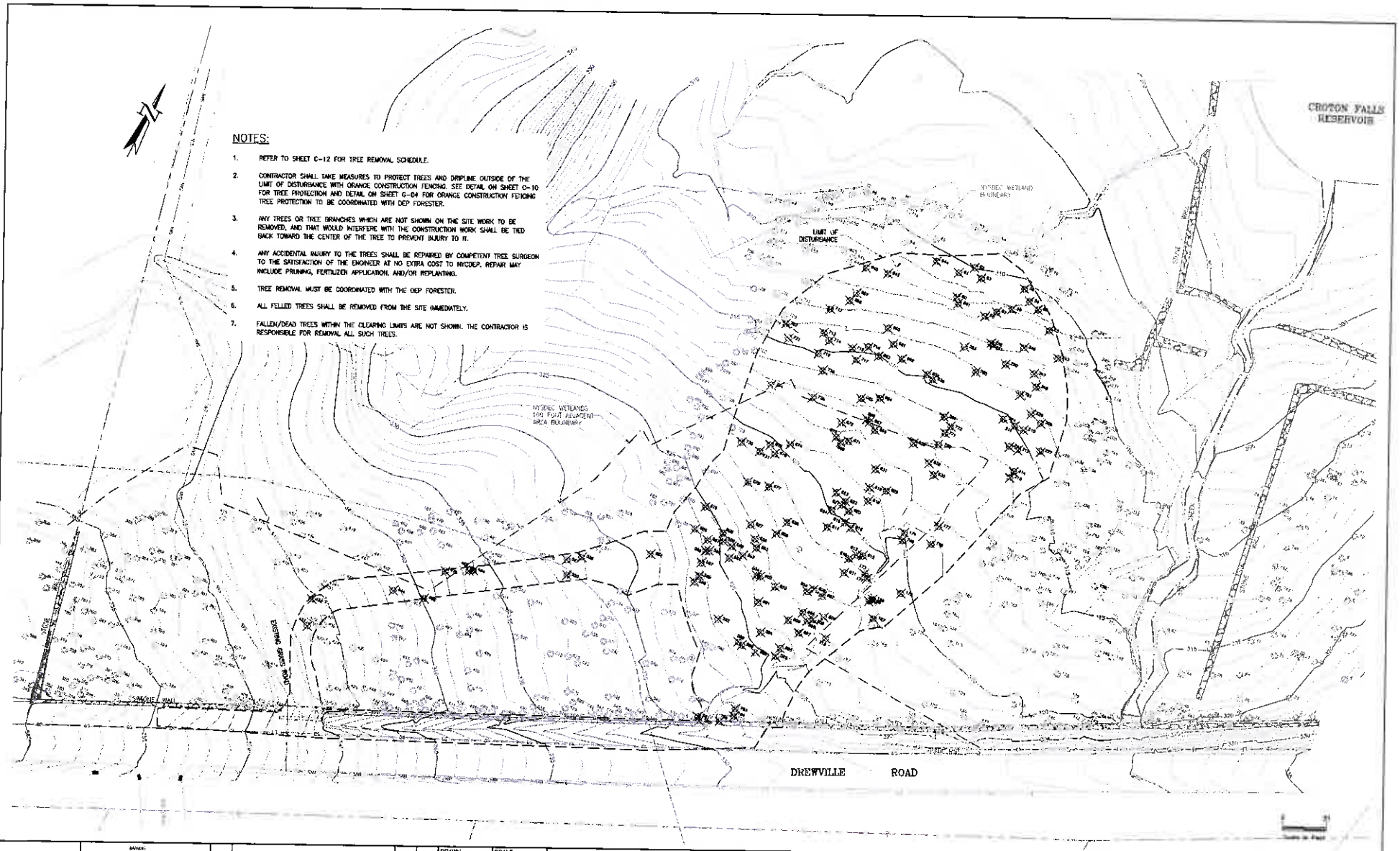
CONCLUSIONS

The objective of the proposed plantings plan is to restore the ecological functions and values that will be impacted by the proposed wetland disturbance. The micropool and forebay would be planted with a variety of indigenous plants, most of which are hardy aquatic perennial species, and the area surrounding the micropool would be planted with scrub-shrub species. These proposed plantings would be permitted to naturalize, creating wetland habitat suitable for native wildlife such as macroinvertebrates, songbirds, and amphibians.

Deciduous trees, perennial plants, and a variety of shrubs, ferns, and grasses would also be planted within and around the proposed facility. The proposed upland and wetland plantings would serve to reestablish a forest community, stabilize the disturbed land, and restore the functions and values of the forested wetland habitat. Success of the proposed plantings plan will be evaluated through implementation of a monitoring schedule that will include maintenance and replacements as needed.

In addition to the habitat and wildlife benefits that would be attributable to the vegetation restoration, the goal of the proposed project is to filter contaminants and sediments from surface water runoff, which would improve the overall water quality of the Croton Falls Reservoir. The construction of this stormwater control facility would therefore serve an environmentally beneficial purpose without causing any significant adverse impacts to natural resources.

APPENDIX E
TREE REMOVAL INFORMATION



NO.	REVISIONS	BY	APP
2	REVISED ROAD AND POND LOCATIONS	01/15	
1	REVISED ROAD AND POND LOCATIONS	10/11	EL

DRAWN: LK | SCALE: 1"=30'
DESIGNED: MS | JOB No. 48649.W012
APPROVED: SH | DATE: JAN. 2015

HDR • Gannett Fleming
A Joint Venture

PROJECT
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
CONTRACT CRD-420
FAD RELATED STORMWATER CONTROL
DREWVILLE ROAD, NEW YORK

TITLE
TREE REMOVAL PLAN

SHEET No.
C-11

TREE REMOVAL SCHEDULE

#	TREE TAG	DESCRIPTION
1	52	12" OAK
2	53	6" BIRCH
3	54	22" OAK
4	55	28" MAPLE
5	56	10" MAPLE
6	57	8" MAPLE
7	58	34" OAK
8	60	24" OAK
9	61	12" MAPLE
10	62	10" MAPLE
11	63	10" MAPLE
12	103	8" MAPLE
13	104	10" MAPLE
14	106	26" ASH
15	118	8" MAPLE
16	167	12" ASH
17	168	16" MAPLE
18	169	12" ASH
19	170	8" ASH
20	172	6" OAK TWIN
21	173	12" ASH
22	174	6" OAK
23	177	15" MAPLE
24	178	16" MAPLE
25	209	10" BIRCH
26	210	12" MAPLE
27	211	10" MAPLE
28	212	6" BIRCH
29	213	12" MAPLE
30	214	12" MAPLE
31	215	14" MAPLE
32	224	12" MAPLE
33	226	10" OAK
34	227	10" MAPLE
35	243	36" MAPLE
36	246	12" OAK
37	247	14" OAK
38	248	6" MAPLE
39	250	8" MAPLE
40	251	6" MAPLE
41	252	6" MAPLE
42	253	18" MAPLE
43	254	10" BIRCH
44	421	12" OAK
45	432	6" OAK
46	444	12" OAK
47	456	20-24" MAPLE
48	478	14" MAPLE
49	484	16" BIRCH
50	485	12" MAPLE

#	TREE TAG	DESCRIPTION
51	526	14" MAPLE
52	527	8" MAPLE
53	528	10" MAPLE
54	554	36" MAPLE
55	556	6" MAPLE
56	557	14" MAPLE
57	558	18" MAPLE
58	559	6" MAPLE
59	560	14" MAPLE
60	561	14" MAPLE
61	562	14" MAPLE
62	563	18" MAPLE
63	564	12" MAPLE
64	565	10" MAPLE
65	566	12" MAPLE
66	567	14" MAPLE
67	568	12" MAPLE
68	569	6" MAPLE
69	580	14" MAPLE
70	581	14" MAPLE
71	588	12" MAPLE
72	589	14" MAPLE
73	590	12" MAPLE
74	592	10-16" MAPLE
75	594	10" MAPLE
76	595	8" ASH
77	596	32" ASH
78	597	18" ASH
79	598	18" HICKORY
80	599	10" MAPLE
81	600	12" MAPLE
82	601	6" MAPLE
83	602	12" ASH
84	603	12" MAPLE
85	604	18" HICKORY
86	605	12" MAPLE
87	606	6" MAPLE
88	607	14" MAPLE
89	608	12" MAPLE
90	610	12" MAPLE
91	611	6" MAPLE
92	612	8" MAPLE
93	613	12" HICKORY
94	614	12" HICKORY
95	615	20" ASH
96	616	12" MAPLE
97	618	16" MAPLE
98	619	6" MAPLE
99	620	10" MAPLE
100	621	20" HICKORY

#	TREE TAG	DESCRIPTION
101	622	12" MAPLE
102	623	18" ASH
103	624	8" MAPLE
104	625	10" BIRCH
105	626	10" MAPLE
106	627	12" MAPLE
107	628	8" MAPLE
108	629	8" ASH
109	630	12" MAPLE
110	631	6" BIRCH
111	632	18" MAPLE
112	633	12" HICKORY
113	635	12" MAPLE
114	636	12" MAPLE
115	641	14-22" MAPLE TWIN
116	644	28" MAPLE
117	645	28" MAPLE
118	646	22" MAPLE
119	657	16" BIRCH
120	658	10" MAPLE
121	660	10" MAPLE
122	661	10" MAPLE
123	662	6" MAPLE
124	663	12" MAPLE
125	664	8" MAPLE
126	665	24" BIRCH
127	666	14" BIRCH
128	667	12" BIRCH
129	668	12" BIRCH
130	669	12" BIRCH
131	670	12" BIRCH
132	671	8" ASH
133	672	6" MAPLE
134	674	8" MAPLE
135	675	6" MAPLE
136	676	10" MAPLE TWIN
137	677	16" MAPLE
138	678	10" MAPLE
139	679	12" MAPLE
140	691	6" MAPLE
141	712	12" MAPLE
142	713	14" CHERRY
143	714	14" BIRCH
144	715	12" MAPLE
145	716	6" MAPLE
146	717	6" MAPLE
147	719	18" MAPLE
148	721	18" BIRCH
149	722	8" MAPLE
150	730	12" MAPLE

#	TREE TAG	DESCRIPTION
151	731	12" MAPLE
152	734	8" MAPLE
153	735	10" MAPLE
154	736	8" MAPLE
155	746	28" HEMLOCK
156	755	16" PINE
157	758	18" PINE
158	771	14" PINE
159	772	16" PINE

No.	DESCRIPTION	DATE	BY
2	REVISED ROAD AND POND LOCATIONS	01/15	
1	REVISED ROAD AND POND LOCATIONS	10/11	EL

REVISIONS

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FAD RELATED STORMWATER CONTROL
DREWVILLE ROAD, NEW YORK

TITLE
TREE REMOVAL SCHEDULE

SHEET No.
C-12

APPENDIX F

VEGETATION RESTORATION INFORMATION

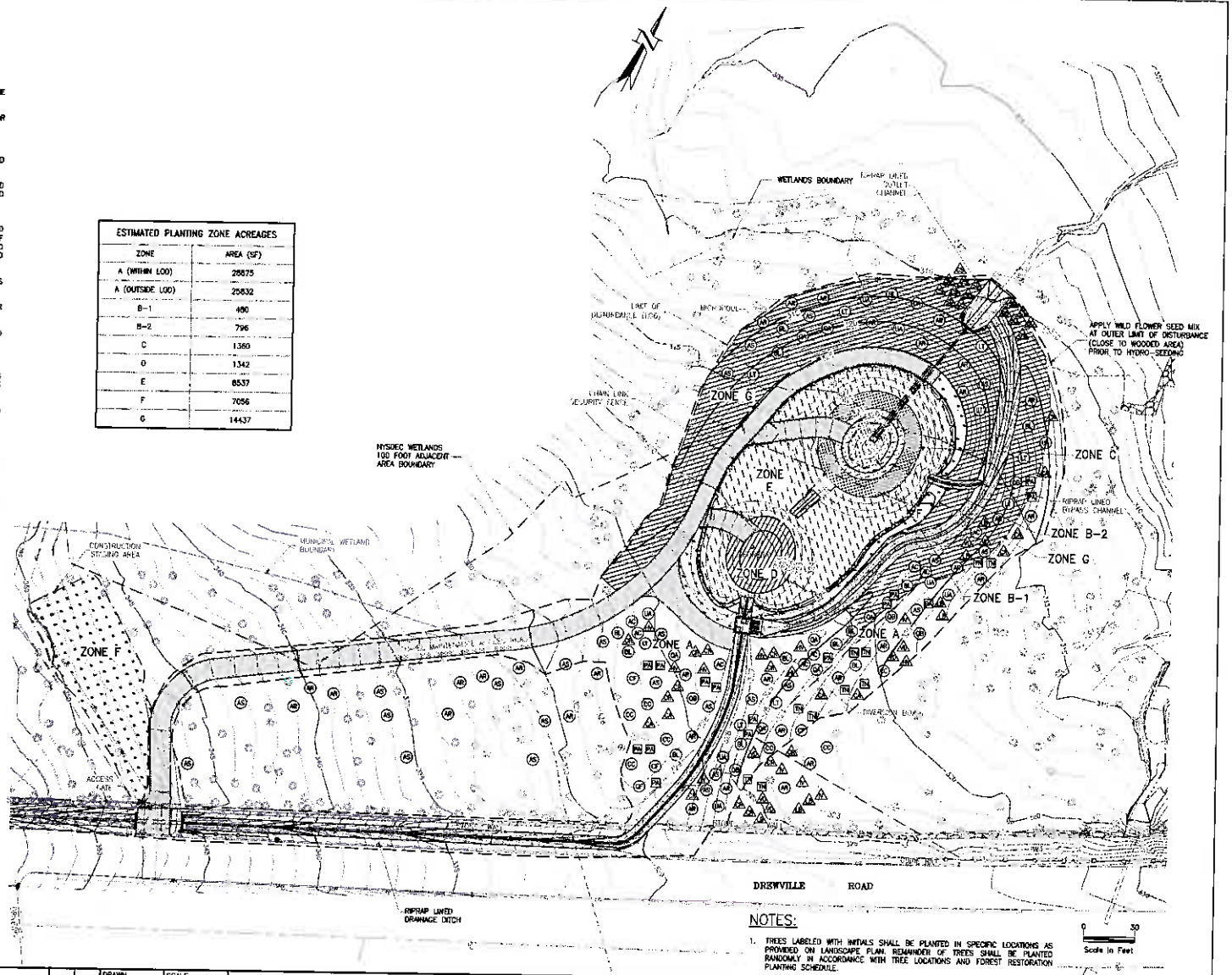
NOTES:

1. EROSION AND SEDIMENT CONTROL MEASURES AND DEVICES WILL BE IN PLACE PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AREAS ARE TO BE SECURED FOR SAFETY WITH ORANGE CONSTRUCTION OR SILT FENCING.
3. THE CONSTRUCTION STAGING AREA WILL BE RESTORED TO ITS PRE-EXISTING CONDITION.
4. ALL WORK PERFORMED BY CONTRACTOR WILL BE IN ACCORDANCE WITH THE DETAILED SPECIFICATIONS IN ACCORDANCE WITH THE APPROVED PLANS.
5. NO SURFACE AREA SOILS ARE TO REMAIN EXPOSED OR UNTREATED. A TEMPORARY SEED MIXTURE WILL BE APPLIED FOR DISTURBED AREAS THAT WILL NOT BE PERMANENTLY STABILIZED WITHIN 30 DAYS OR WHEN WORK HAS BEEN POSTPONED FOR THE SEASON.
6. TEMPORARY SEEDING DATES: MARCH 1 – JUNE 15 AND AUGUST 1 – OCTOBER 15.
7. TEMPORARY VEGETATION STABILIZATION/TEMPORARY SEEDING: USE TILLER TO LOOSEN COMPACTED SOILS TO A DEPTH OF SIX (6) INCHES. PLACE LOAMY TOPSOIL WHERE NEEDED TO A DEPTH OF 2 INCHES ON 3:1 SLOPES AND 4 INCHES ON FLATTER SLOPES. APPLY APPROPRIATE SPECIFIED SEED MIX PROVIDED IN TABLE 1. FERTILIZE, LIME AND MULCH AS NEEDED. WATER THE SEEDED AREAS AS PER SEED SUPPLIER'S RECOMMENDATIONS.
8. ALL SEEDED AREAS SHOULD BE COVERED WITH CLEAN STRAW MULCH AT A RATE OF 90 LBS PER 1,000 SQUARE FEET.
9. PROPOSED PLANTINGS WILL PROCEED TO COMPLETION UNDER THE DIRECTION OF DEP OR AUTHORIZED AGENT, WHO WILL INSPECT ALL PLANT MATERIALS.
10. VEGETATION OUTSIDE OF CLEARING/PROJECT LIMIT OF DISTURBANCE SHALL BE CLEARLY MARKED IN THE FIELD AS AREAS TO BE PRESERVED.
11. THE RECOMMENDED PLANTING SCHEDULE FOR PLANT MATERIALS IS PROVIDED IN TABLE 2.
12. BALLED AND BURLAPPED PLANTS – MUST BE FREE OF WINTER DAMAGE. PLANT IN EARLY SPRING BEFORE BUD BREAK; CONTAINER-GROWN PLANTS ARE BEST PLANTED IN WARM SOILS DURING EARLY SUMMER AND FALL TO ENCOURAGE RAPID ROOT DEVELOPMENT.
13. HERBIVORY CONTROL MEASURES – IF HERBIVORY BY WATER FOWL/GEESE IS DETECTED HERBIVORY CONTROLS SUCH AS GOOSE EXCLUSION AND DEER FENCING SHALL BE INSTALLED.
14. AFTER INSTALLATION, ALL PLANTS SHALL BE WATERED THOROUGHLY AND DEEPLY UNTIL THE SURROUNDING SOIL IS SATURATED.
15. MULCH TO A DEPTH OF 2 TO 3 INCHES TAPERING INWARD AROUND TREES AND SHRUBS IN UPLAND ZONES. PREFERRED COMMON MULCHES ARE DOUBLE-SHREDDED PINE BARK AND AGED WOOD CHIPS.
16. GOOSE DETERRENT: FOR AREAS ADJACENT TO MICROPOOL AND FOREBAY PLANT A NATIVE WARM SEASON GRASS MIX AS TALL BUFFER STRIPS; NO MOWING OF BUFFER STRIPS IS PERMITTED. BUFFER TO RETAIN THEIR MATURE HEIGHT THROUGHOUT THE ENTIRE YEAR. IN ADDITION TO GRASS SEED MIX A CLUSTER OF DENSE SHRUBS WILL BE INSTALLED (PLANT ZONE C).

ESTIMATED PLANTING ZONE ACREAGES	
ZONE	AREA (SF)
A (WITHIN LOD)	28875
A (OUTSIDE LOD)	25832
B-1	490
B-2	796
C	1360
D	1342
E	8537
F	7056
G	14437

LEGEND:

- TREE
- SHRUB
- FERN (2 FERNS PER SYMBOL)
- ZONE A (RANDOM TREE PLACEMENT)
- ZONE B-1
- ZONE B-2
- ZONE C
- ZONE D
- ZONE E
- ZONE F
- ZONE G



NOTES:

1. TREES LABELED WITH INITIALS SHALL BE PLANTED IN SPECIFIC LOCATIONS AS PROVIDED ON LANDSCAPE PLAN. REMAINDER OF TREES SHALL BE PLANTED RANDOMLY IN ACCORDANCE WITH TREE LOCATIONS AND FOREST RESTORATION PLANTING SCHEDULE.

0 30
Scale in Feet

NO.	REVISIONS	DATE	BY
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1	REVISED ROAD AND POND LOCATIONS	10/11	EL

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FAD RELATED STORMWATER CONTROL
DREWVILLE ROAD, NEW YORK

TITLE
LANDSCAPING PLAN

SHEET No.
C-13

FOREST RESTORATION AREA – PLANTING SCHEDULE

	COMMON NAME	SCIENTIFIC NAME	CALIPER (INCH)/ FORM	AVERAGE HEIGHT	SPEC. (MIN)	SPACING	QUANTITY	PLANTING PERIOD
TREES	SWAMP WHITE OAK (OB)	QUERCUS BICOLOR	2 1/2	12–14'	B&B	15'	4	SPRING ONLY
	SUGAR MAPLE (AS)	ACER SACCHARUM	2 1/2	12–14'	B&B	15'	18	SPRING/FALL
	RED MAPLE (AR)	ACER RUBRUM	2 1/2	12–14"	B&B	15'	21	SPRING ONLY
	WHITE OAK (OA)	QUERCUS ALBA	2 1/2	10–12'	B&B	15'	3	SPRING ONLY
	AMERICAN ELM (UA)	ULMUS AMERICANA	2 1/2	10'	B&B	15'	5	SPRING/FALL
	BLACK/SWEET BIRCH (BL)	BETULA LENTA	2 1/2	10'	B&B	15'	8	SPRING ONLY
	TULIPTREE (LT)	LIRIODENDRON TULIPIFERA	2 1/2	10–12'	B&B	15'	3	SPRING ONLY
	FLOWERING DOGWOOD (CF)	CORNUS FLORIDA	2"	10–12'	B&B	15'	4	SPRING/FALL
	HORNBEAM (CC)	CARPINUS CAROLINIANA	2 1/2	12–14'	B&B	15'	7	SPRING/FALL
	SHADBUSH (AC) (SERVICEBERRY)	AMELANCHIER CANADENSIS	2"	10–12'	B&B	15'	5	SPRING/FALL
						TOTAL:	78	
SHRUBS/ SMALL TREES	GRAY DOGWOOD (CR)	CORNUS RACEMOSA	–	4'	2 GAL.	7' OC	12	SPRING/FALL
	WINTERBERRY HOLLY (W)	ILEX VERTICILLATA	–	4'	2 GAL.	7' OC	5	SPRING/FALL
	WITCH HAZEL (HV)	HAMAMELIS VIRGINIANA	–	4'	2 GAL.	7' OC	7	SPRING/FALL
	ARROWWOOD (VD)	VIBURNUM DENTATUM	–	4'	B&B	7' OC	2	5/1 – 7/1
	SPICEBUSH (LB)	LINDERA BENZOIN	–	4'	2 GAL.	7' OC	5	5/1 – 7/1
	HAZELNUT (CA)	CORYLUS AMERICANA	–	4'	2 GAL.	15' OC	8	SPRING/FALL
						TOTAL:	39	
FERNS	CHRISTMAS FERN (FA)	POLYSTICHUM ACROSTICHOIDES		–	QUART	2' OC	30	SPRING/FALL
	NEW YORK FERN (TN)	THELYPTERIS NOVEBORACENSIS		–	QUART	2' OC	20	SPRING/FALL
						TOTAL:	50	

NOTES:
1. APPLY WILD FLOWER SEED MIX AT THE OUTER LIMITS OF DISTURBED AREAS (CLOSE TO WOODED AREA) PRIOR TO HYDRO-SEEDING.
2. SEE SHEET C-15 FOR PLANTING DETAILS.

MICROPOOL PLANTING SCHEDULE ZONE B-1 – HERBACEOUS (ELEVATION 317' – 319')

COMMON NAME	SCIENTIFIC NAME	FORM*	SPACING**	QUANTITY	PLANTING PERIOD
SOFTSTEM BULRUSH	SCHOENOPLECTUS TABERNAEMONTANI	2" PLUG	18" OC	67	SPRING ONLY 4/1 – 6/1
HARDSTEM BULRUSH	SCHOENOPLECTUS ACUTUS	2" PLUG	18" OC	67	SPRING ONLY 4/1 – 6/1
PICKEREL WEED	PONTEDERIA CORDATA	2" PLUG	18" OC	70	SPRING ONLY 4/1 – 6/1
WHITE LILY	NYMPHEA ODORATA	2" PLUG	18" OC	10	SPRING ONLY 4/1 – 6/1
			TOTAL:	214	

MICROPOOL PLANTING SCHEDULE ZONE B-2 – HERBACEOUS (ELEVATION 319' – 321')

COMMON NAME	SCIENTIFIC NAME	FORM*	SPACING*	QUANTITY	PLANTING PERIOD
COMMON THREE-SQUARE	SCHOENOPLECTUS PUNGENS	2" PLUG	18" OC	55	4/1 – 6/1
SOFTSTEM BULRUSH	SCHOENOPLECTUS TABERNAEMONTANI	2" PLUG	18" OC	50	4/1 – 6/1
LESSER BUR-REED	SPARGANIUM AMERICANUM	2" PLUG	18" OC	55	4/1 – 6/1
SWEETFLAG	ACORCUS AMERICANUS	2" PLUG	18" OC	55	4/1 – 6/1
BLUE FLAG IRIS	IRIS VERSICOLOR	2" PLUG	18" OC	50	4/1 – 6/1
TUSSOCK SEDGE	CAREX STRICTA	2" PLUG	18" OC	70	4/1 – 6/1
			TOTAL:	345	

*FORM – 2" PLUG OR PEAT POT, MINIMUM 4"
**SPACING – 18" ON CENTER, ALTERNATING GRID PATTERN

MICROPOOL AQUATIC BENCH ZONE C – SHRUBS (ELEVATION 321')

COMMON NAME	SCIENTIFIC NAME	FORM	SPACING*	QUANTITY	PLANTING PERIOD
ELDERBERRY (ESC)	SAMBUCUS CANADENSIS	#1 /2–3'	5' OC	15	4/1 – 6/1
RED-OSIER DOGWOOD (CS)	CORNUS SERICEA	#2 /18–24"	5' OC	20	4/1 – 6/1
WINTERBERRY (W)	ILEX VERTICILLATA	#1 /2–3'	5' OC	20	4/1 – 6/1
			TOTAL:	55	

*SPACING: LINEAR ROWS – 3'x3' (THREE FEET BETWEEN ROWS AND 3' WITHIN EACH ROW)

FOREBAY PLANTING SCHEDULE ZONE D – HERBACEOUS (ELEVATION 320' – 322.0')

COMMON NAME	SCIENTIFIC NAME	SIZE*	SPACING**	QUANTITY	PLANTING PERIOD
COMMON THREE-SQUARE	SCHOENOPLECTUS PUNGENS	2" PLUG	18" OC	75	4/1 – 6/1
SOFTSTEM BULRUSH	SCIRPUS VALIDUS	2" PLUG	18" OC	100	4/1 – 6/1
LESSER BUR-REED	SPARGANIUM AMERICANUM	2" PLUG	18" OC	100	4/1 – 6/1
SWEETFLAG	ACORCUS AMERICANUS	2" PLUG	18" OC	100	4/1 – 6/1
BLUE FLAG IRIS	IRIS VERSICOLOR	2" PLUG	18" OC	75	4/1 – 6/1
			TOTAL:	450	

*FORM – 2" PLUG OR PEAT POT, MINIMUM 4"
**SPACING – 18" ON CENTER, ALTERNATING GRID PATTERN

EXTENDED DETENTION SEEDING SCHEDULE ZONE E – (TO ELEVATION 325.0')

COMMON NAME	SCIENTIFIC NAME	SEEDING RATE	APPLICATION SCHEDULE
SWITCH GRASS	PANICUM VIRGATUM	35 LBS/ACRE	4/1 – 6/15
CREEPING BENTGRASS	AGROSTIS STOLONIFERA		4/1 – 6/15
VIRGINIA WILD RYE	ELYMUS VIRGINICUS		4/1 – 6/15

NOTE:
MIX DERIVED FROM NEW ENGLAND WET MEADOW ROADSIDE MEADOW SEED MIX.

DISTURBED AREAS SEEDING SCHEDULE ZONE F

COMMON NAME	SCIENTIFIC NAME	PERCENT MIX	SEEDING RATE	APPLICATION SCHEDULE
SWITCH GRASS	PANICUM VERGATUM	VARIES	23 LBS/ACRE	4/1 – 6/15
INDIAN GRASS	SORGUSTRUM NUTANS	VARIES		4/1 – 6/15
VIRGINIA WILD RYE	ELYMUS VIRGINICUS	VARIES		4/1 – 6/15
ANNUAL RYEGRASS	LOLIUM SP	VARIES		4/1 – 6/15

NOTE:
1. DERIVED FROM NEW ENGLAND NATIVE WARM SEASON GRASS MIX.
2. ADDITIONAL AMENDMENT OF ANNUAL RYE-GRASS – APPLICATION RATE OF 10 LBS/ACRE.
3. RECOMMENDED SEEDING APPLICATION DATE – SPRING.
4. QUICK COVER CROP: 1/3 ANNUAL RYE-GRASS (LE NON-PERSISTING NURSE CROP) WITH 2/3 NATIVE SEED MIX.

TABLE 1

TEMPORARY VEGETATION STABILIZATION

SEED	LBS/ACRE	LBS/1,000 S.F.
ANNUAL RYEGRASS	40	1.0
WINTER RYE	120	3.0

TABLE 2

RECOMMENDED PLANTING SCHEDULE

PLANT	SPRING	FALL
DECIDUOUS	5/1–7/1	9/1–11/1
HERBACEOUS (PLUGS)	4/1–6/1	–

SLOPE STABILIZATION SEEDING SCHEDULE ZONE G (EROSION AND REGRADING AREA)

COMMON NAME	SCIENTIFIC NAME	PERCENT MIX	SEEDING RATE	APPLICATION SCHEDULE
REDTOP	AGROSTIS ALBA	VARIES	35 LBS/ACRE	4/1 – 6/15
UPLAND BENTGRASS	AGOSTIS PERENNANS	VARIES		4/1 – 6/15
BLUE GRAMA	BOUTELOUA GRACILIS	VARIES		4/1 – 6/15
CANADA WILD RYE	ELYMUS CANADENSIS	VARIES		4/1 – 6/15
ANNUAL AND PERENNIAL RYEGRASS	LOLIUM SPECIES	VARIES		4/1 – 6/15
LITTLE BLUESTEM	SCHIZACHYRIUM	VARIES		4/1 – 6/15
INDIAN GRASS	SORGUSTRUM NUTANS	VARIES		4/1 – 6/15

PERMANENT SEEDING MIX

SOURCE: NEW ENGLAND EROSION CONTROL/RESTORATION MIX – PREMIXED.

ADDITIONAL NOTES:
1. APPLY BY HYDRO SEED METHOD FOR SLOPES.
2. SEEDING APPLICATION RATE: RECOMMENDED 35 LBS/ACRE – COVERS 1,250 SQ FT/LB.
3. APPLY FAST RELEASE FERTILIZER EXCLUDING PHOSPHORUS BASED ON SOIL CHEMISTRY RESULTS.
4. LIGHT MULCHING OF STRAW IS RECOMMENDED FOR SLOPE STABILIZATION.

ZONE G – TREES AND SHRUBS ON SLOPES

	COMMON NAME	SCIENTIFIC NAME	CALIPER (INCH)/FORM	AVERAGE HEIGHT	SPEC (MIN)	SPACING*	QUANTITY	PLANTING PERIOD
TREES	SUGAR MAPLE (AS)	ACER SACCHARUM	1 ½" – 2"	8–10'	B&B	15'	6	SPRING ONLY
	RED MAPLE (AR)	ACER RUBRUM	1 ½" – 2"	8–10'	B&B	15'	11	SPRING ONLY
	TULIPTREE (LT)	LIRIODENDRON TULIPIFERA	1 ½" – 2"	8–10'	B&B	15'	6	SPRING ONLY
	BLACK/SWEET BIRCH (BL)	BETULA LENTA	1 ½" – 2"	8–10'	B&B	15'	5	SPRING ONLY
	WHITE OAK (OA)	QUERCUS ALBA	1 ½" – 2"	8–10'	B&B	15'	3	SPRING ONLY
	SWAMP WHITE OAK (OB)	QUERCUS BICOLOR	1 ½" – 2"	8–10'	B&B	15'	1	SPRING ONLY
	AMERICAN ELM (UA)	ULMUS AMERICANA	1 ½" – 2"	8–10'	B&B	15'	5	SPRING ONLY
	SHADBUSH (AC) (SERVICEBERRY)	AMELANCHIER CANADENSIS	1 ½" – 2"	8–10'	B&B	15'	3	SPRING ONLY
						TOTAL:	40	
SHRUBS	PUSSY WILLOW (SD)	SALIX DISCOLOR	#1 /2–3'			7' OC	7	4/1 – 6/1
	RED-OSIER DOGWOOD (CS)	CORNUS SERICEA	#2 /18–24"			7' OC	8	4/1 – 6/1
	SPICEBUSH (LB)	LINDERA BENZOIN		4'	2 GAL.	7' OC	2	5/1 – 7/1
	ARROWWOOD (VD)	VIBURNUM DENTATUM		4'	2 GAL.	7' OC	2	5/1 – 7/1
						TOTAL:	19	

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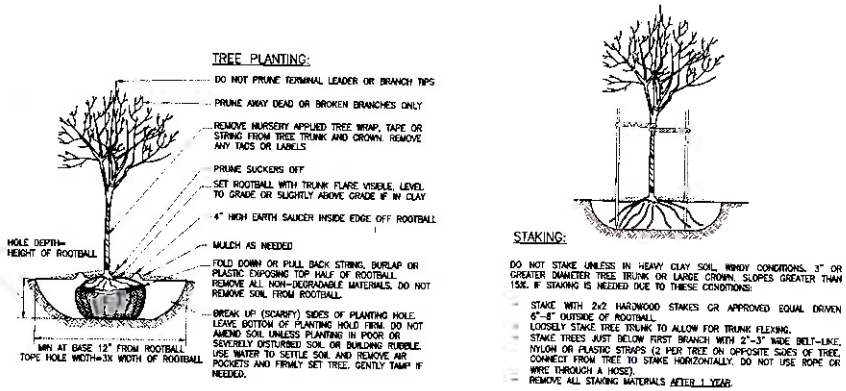
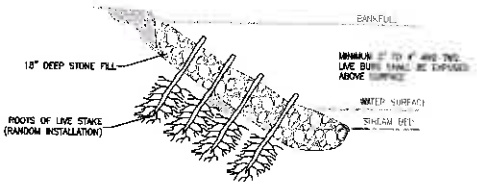
TITLE
LANDSCAPING SCHEDULES

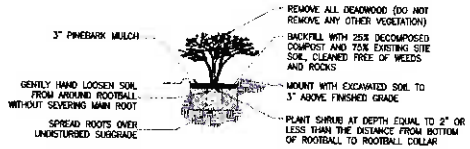
SHEET No.
C-14



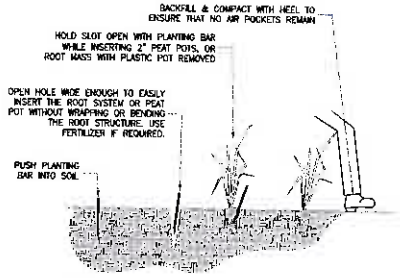
DECIDUOUS TREE PLANTING
NOT TO SCALE



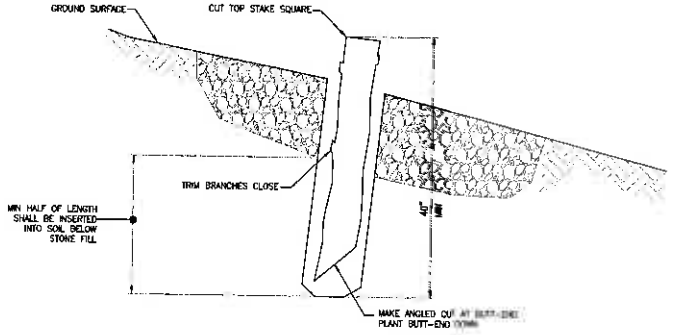
TYPICAL LIVE STAKE PLANTING SECTION
NTS



SHRUB PLANTING – CONTAINER GROWN
NOT TO SCALE



HERBACEOUS PLANT INSTALLATION DETAIL (TYPICAL)
NOT TO SCALE



TYPICAL LIVE STAKE DETAIL
NTS

NOTES:
1. PLANT STAKES DURING DORMANT SEASON.
2. DO NOT DAMAGE STAKES OR SPLIT ENDS DURING INSTALLATION.
3. SOAK CUTTINGS FOR 24 HOURS (MIN) PRIOR TO INSTALLATION.

NO.	REVISIONS	DATE	BY
2	REVISED ROAD AND POND LOCATIONS	1/15	SH
1	REVISED ROAD AND POND LOCATIONS	10/11	EL

DRAWN: LK | SCALE: NONE
DESIGNED: TA | JOB No.: 48649.W012
APPROVED: SH | DATE: JAN. 2015

HDR • Gannett Fleming
A Joint Venture

PROJECT: CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
CONTRACT CRO-420
FAD RELATED STORMWATER CONTROL
DREWVILLE ROAD, NEW YORK

TITLE: LANDSCAPING DETAILS

SHEET No.: C-15

APPENDIX G

WETLAND DELINEATION AND ASSESSMENT

FAD-Related Stormwater Control – Drewville Road Water Quality Facility

Wetland Delineation and Assessment

WETLAND ASSESSMENT/DELINEATION: METHODOLOGY AND APPROACH

A desktop review of existing information and mapping was conducted. The United States Geological Survey (USGS) 7.5-minute quadrangle map (Lake Carmel, NY), USFWS National Wetlands Inventory (NWI) Wetlands Mapper, NYSDEC Freshwater Wetlands Mapping, the Westchester County Soil Survey, Town of Carmel Wetland Map (1982), and aerial imagery were reviewed to determine the presence of on-site wetlands prior to beginning field investigations. The topographic and aerial imagery maps are provided in **Appendix A**. The NWI, NYSDEC, and Town of Carmel wetland maps are herein attached.

The NYSDEC Freshwater Wetlands Mapping depicts a wetland, identified as LC-63, within the vicinity of the project site. The wetland has a NYSDEC Class 1 designation, indicating that LC-63 is "adjacent or contiguous to a reservoir or other body of water that is used primarily for public water supply." The boundaries of this wetland are depicted on the attached NYSDEC Freshwater Wetlands Map.

NYSDEC consultation indicated the presence of a protected Class A tributary to the Croton Falls Reservoir in the vicinity of the project area; the Class A designation is applied to streams that are tributary to New York City (NYC) water supply impoundments on NYC-owned land (6 NYCRR Part 864.4). The approximate location of the protected stream is indicated on the attached Stream Location Map.

A review of the wetland map adopted by the Town of Carmel in 1982, attached, indicated that there are local regulated wetlands present on a portion of the project site. Both the local and state wetland jurisdictional areas are depicted and labeled accordingly on Figure C-11 in **Appendix E**.

The project study area was investigated for vegetative, soil, and hydrologic wetland indicators. The wetland field investigations were performed in accordance with methods outlined in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory 1987) and the USACE *Interim Regional Supplement to the Corps: Northcentral and Northeast Region* (Environmental Laboratory 2009). The wetland field investigations were conducted on February 27 and August 28, 2009, and January 5 and March 26, 2010.

VEGETATION, SOILS, AND HYDROLOGIC CONDITIONS AT THE PROJECT SITE

Vegetation Composition

The majority of the project site vegetation composition was forested uplands with a low density of understory trees and shrubs; perennial grasses and herbaceous plants were also present. The forest vegetation included the following trees: sugar maple (*Acer saccharum*), tulip poplar (*Liriodendron tulipifera*), white ash (*Fraxinus americana*), hickory, and black birch (*Betula lenta*). Few saplings were present in the understory, including maple, birch, and poplar species. Deciduous shrubs included an invasive species, privet, along with some raspberry, catbriar (*Smilax rotundifolia*), poison ivy (*Toxicodendron radicans*), and fox grape (*Vitis labrusca*). Spicebush (*Lindera benzoin*) was present in the lower slopes and near the reservoir edge. Herbaceous vegetation was present in some locations. Perennial plants included ground covers, wood ferns, and grass species.

The wetlands delineated on-site comprised mainly palustrine forested deciduous wetland areas associated with two unnamed tributaries to the Croton Falls Reservoir. The wetland limits were confined to the streams and fringe of the Reservoir. The vegetation associated with the wetland areas included dominant red maple with spicebush, arrow-wood (*Viburnum dentatum*), and gray birch (*Betula populifolia*) occupying the understory and cinnamon fern (*Osmundastrum cinnamomeum*) and skunk-cabbage (*Symplocarpus foetidus*) as the dominant herbaceous vegetation species.

Soil Types

According to the Natural Resources Conservation Services' (NRCS) Soil Survey Geographic database (SSURGO2), project soils fall under the "B" hydrologic group. Two soil types are mapped in the project area: Charlton Loam (ChB/ChE) and Leicester Loam (LcB). The Charlton soil type is a well-drained loamy soil formed in till derived from parent materials. The soils are found on nearly-level to very steep plains and hills. The Leicester soil is a deep poorly-drained soil comprised of loamy soils typically mapped on low-lying positions on hills; the water table is at or near the surface.

Soil borings were obtained at different locations throughout the project site; the soil boring log data sheets are attached (Sampling Points 1, 2, 3, 4, D-4, and C-2). The majority of the borings taken outside of the delineated wetland areas demonstrate that the soils are not hydric and do not display wetland morphological characteristics. Most of the soils were moderately- to well-drained and did not display indicators of inundation or wetland soil conditions. The soil borings within the

wetland areas contained hydric soil indicators including redoximorphic features and dark subsoil layers.

Secondary wetland soil indicators were also present, such as shallow root systems. Additionally, two geotechnical borings were taken at the project site in September 2009. The borings indicate that the soils are a mixture of sand, clay, and gravel from 0 to 10 feet below grade and a mixture of rock, sand, and gravel from 10 to 14 feet below grade. Groundwater was found to range from 6 to 8 feet below grade. The geotechnical boring logs are attached (GB-1 and GB-2).

Hydrologic Conditions

On the project site, wetland hydrology characteristics, including high water table in soil borings, inundated soils, and wetland drainage patterns, were identified within the wetland fringe areas adjacent to the Croton Falls Reservoir (C and D wetland areas). Both primary and secondary indicators were observed confirming the presence of wetland hydrology. The surface water tributaries, areas of inundation, and oxidized rhizospheres were all primary indicators confirming wetland hydrology. Since the area has been severely impacted by stormwater runoff, disturbed conditions were considered during determination of the wetland areas.

RESULTS

The wetland delineation was conducted by a Professional Wetland Scientist in 2009 and 2010 and field-verified by NYSDEC staff on March 26, 2010. The freshwater wetland identified on the project site is known as LC-63. The NYSDEC certification block is provided on the attached Wetlands and Waterways Plan, indicating that the wetland areas have been approved by the State of New York.

The flagged wetland areas on or adjacent to the project site consisted of Wetlands A, B, C, and D, which roughly follow the boundaries of NYSDEC wetland LC-63 as shown in the attached Wetland Boundaries Map. A portion of the watercourse (Croton Falls Reservoir) was labeled as "Water Edge" where there was an absence of adjacent vegetated wetlands. Wetland data and boundary points were marked using pink wetland flagging and located by WSP Sells, NYS professional land surveyor. The survey data were transferred onto project plans. Wetland Areas A and B are forested wetlands along the periphery of an unnamed perennial stream adjacent to sloped uplands and terraces. The stream is a tributary to the Croton Falls Reservoir with a gravel-rock dominant substrate. Common vegetation associated with Wetland Areas A and B included skunk cabbage, red maple, and ash trees and spicebush in the understory as the dominant shrub. Wetland Area C was a young maple-birch forest with spicebush and cinnamon fern dominant. Wetland

Area D was a narrow vegetated swale extending from the Reservoir, occupying a low topographic position; vegetation in this small wetland area consisted of mostly a scrub-shrub system.

Additional flags, labeled S1 to S7, were placed at the top of the western bank of a watercourse feature east of the project site. This stream appeared to have perennial flow, but may be intermittent. The watercourse appeared to be man-made due to its linear configuration. A culvert at its intersection with Drewville Road received drainage and runoff from properties to the south/southeast with flows carried to the Croton Falls Reservoir.

Source: Aerial imagery and NYSDEC Freshwater Wetlands provided by ESRI through ArcGIS Online webservice.

FAD-Related Stormwater Control
Drewville Road Water Quality Facility
NYSDEC Freshwater Wetlands Map

NYC Environmental Protection

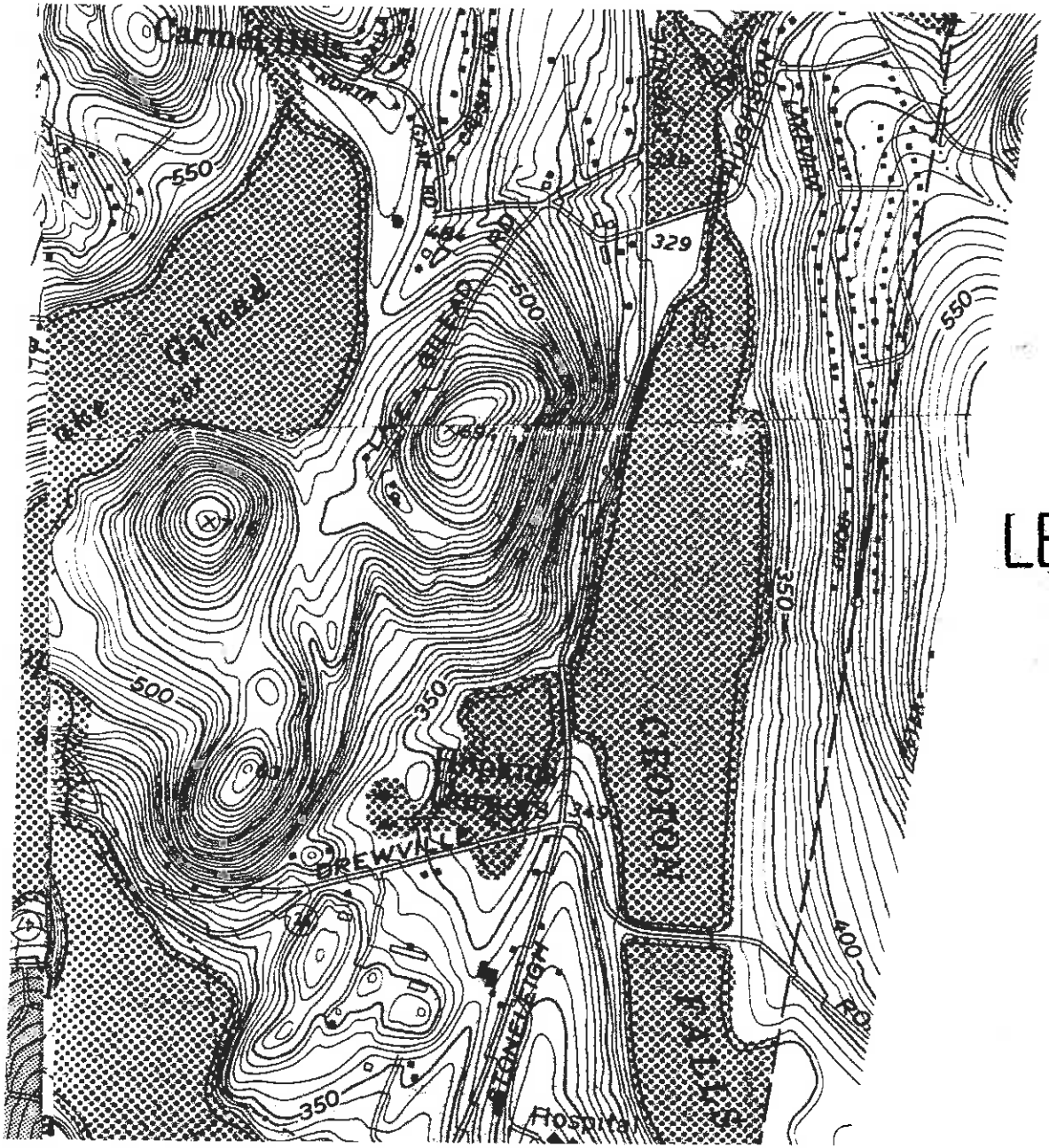
Town of Carmel
Putnam County, New York

Scale
0 250 500 1,000 Feet

Gannett Fleming

Map Prepared: 3/24/2015

N



Adopted _____
by the Town Board

OCTOBER 1982

Amendments: _____

LEGEND

BOUNDARIES:
State
County
Town or City
Incorporated Village
Federal and Indian Area

ROADS:
Touring Route Markers:
Interstate
U. S.
State

State Highway number and limit

County road

Interchange number

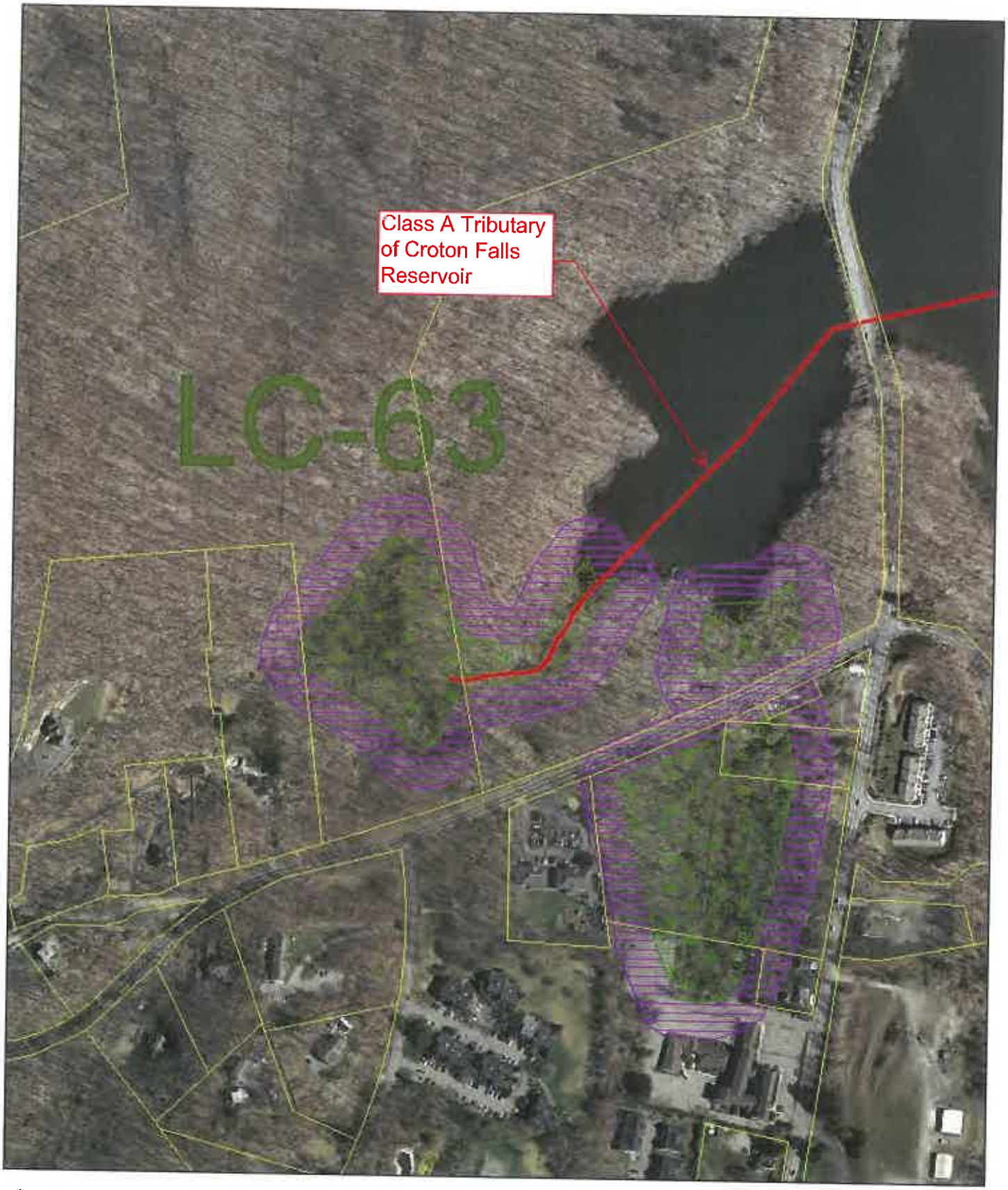
Divided highways and streets:
Wide mall
Narrow mall or barrier

Undivided highways and streets:
4 or more lanes
Less than 4 lanes

Vehicle track; trail

ONE SQUARE ACRE (208' x 208')

WETLAND



Stream Location Map
Provided by NYSDEC

0 0.0275 0.055 0.11 0.165 0.22 Miles

CH 5690 NYC DEP CRO-420
Drewville Rd stormwater fac
Carmel (T), Putnam (C)
Lake Carmel Quad
2.27.15 ALW

N

Drewville Rd

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	2.5y 3/3		none				loam	no redox/no oxidized rhizopheres in A

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: none

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Date: 8-29-2009

Location:
- Forested upland
- Soil boring with auger taken approx. 75 feet north of stone wall and 50 west of erosional ditch
- no wetland hydrology observed

Drewville Rd

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5 yr 4/3		same	<15	c	m	Sandy loam	no oxidized rhizopheres

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: none

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Date: 8-29-2009

Location:
- In eroded ditch; approx. 60 feet north of stone wall
- soils are very moist; water from stormwater flow not ground or surface
- silts, sands and gravels present as substrate
- ground cover: < 50% smartweeds, impatiens
- minimal stormwater runoff
- not perennial or intermittent

Drewville Rd

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	dark. brown						loam	no oxidized rhizopheres
	10 yr -chroma >3							
13-20	same		reddish brown		C	M	gravelly	
							loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: none

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Date: 8-29-2009

Location:
- 30 feet west of eroded ditch; approx. 60 feet north of stone wall
- gravel loam texture;
- vegetation present is not hydrophtic (tulip poplar, v. creeper, sugar maple)
- soils are permeable

Drewville Rd

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	dark brown						loam	no oxidized rhizopheres
18-22	2.5 yr 5/3		reddish brown		C	M	silts and sands	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: none

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Date: 8-29-2009

Location:
- in center of eroded ditch about 130 feet north of stone wall
- slightly moist soils; no water in soil bore hole
- vegetation present is not hydrophtic (tulip poplar, V. creeper, sugar maple)
- distinct erosion /scour patterns from sw flow
- boring revealed 1-foot depth of silt/sand sediments
- <5% skunk cabbage

SOIL DATE: 1-15-11 Drewville Rd

Sampling Point: D4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10yr 4/2						Silt loam	very moist
8-15	10yr 3/2						Si Loam	oxid. Rhizospheres wet/saturated organic matter Nodules

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

- topographic depression/swale feature
- Snow cover Approx 2"
- water table static @ 8" in hole
- PEM/PFO1 - Palustrine emergent/forested

DATE: 1-5-11 Drewville Rd

SOIL

Sampling Point: C-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10yr 3/2						Loam	oxid. Rhizospheres
6-12+	10yr 3/2		10yr 5/6	40	C	M	Loam	very moist

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
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- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

- near edge Reservoir
- dom. hydrophytic veg. present
- Snow cover ~ 2"
- water table @ 6"
- 2° hydric soil parameters
- Red maple/HB Blueberry/Silver Maple/ Cinnamon Fern/S. Dogwood – Dominant hydrophytes

SOIL BORING LOG

Client: New York City Department of Environmental Protection		Boring No.: GB-1	HDR/GF JV 480 Forest Avenue Locust Valley, NY 11560 (516) 671-8440
Project # : 48649.WO12		Sheet 1 of 1	
Site Location: Drewville Rd.		Date: 9/29/2009	
Drilling Co: Aquifer Drilling and Testing, Inc.		Location of boring (not to scale)	
Method: Mud Rotary		~270 feet northeast and ~45 feet northwest of access area	
Personnel: Jessica Ferngren			
Total Depth: 10'	Depth to Water: ~8'		

depth (feet)	PID (ppm)	Blow Counts	Sample ID	Depth (From-To)	Moisture Content	Recovery	Soil Classification	Remarks
0	0.0	Weight of Hammer 1	0'-2'	0'-2'	Slightly Moist	8"/24"	2"-Light Brown Silty F SAND	
1		2 3					3"-Dark Brown Silty F SAND 3"-Brown Silty F SAND	
2	0.0	4 6	2'-4'	2'-4'	Slightly Moist	18"/24"	Light Brown Silty F SAND, trace Clay and Gravel	
3		11 9						
4	0.0	11 11	4'-6'	4'-6'	Slightly Moist	12"/24"	Same as above	
5		14 13						
6	0.0	10 9	6'-8'	6'-8'	Slightly Moist	12"/24"	Same as above	
7		9 10						Moist at bottom 2 inches of spoon
8	0.0	11 14	8'-10'	8'-10'	Saturated	18"/24"	Same as above	
9		11 16						
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

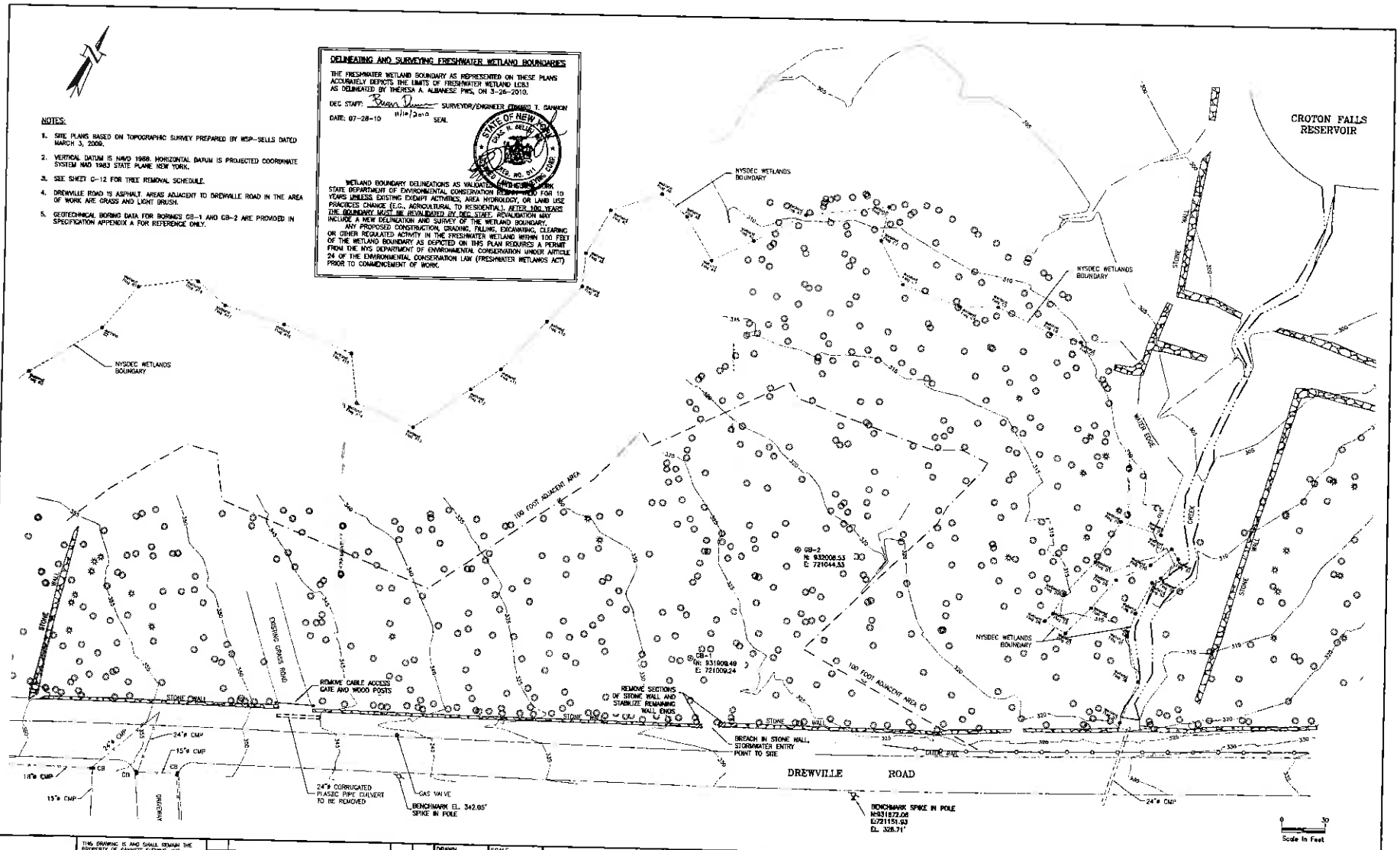
TRACE = 1 - 10% LITTLE = 11 - 20 % SOME = 21 - 35% AND = 36 - 50%

SOIL BORING LOG

Client: New York City Department of Environmental Protection		Boring No.: GB-2	HDR/GF JV 480 Forest Avenue Locust Valley, NY 11560 (516) 671-8440
Project # : 48649.WO12		Sheet 1 of 1	
Site Location: Drewville Rd.		Date: 9/29/2009	
Drilling Co: Aquifer Drilling and Testing, Inc.		Location of boring (not to scale)	
Method: Mud Rotary		~340 feet northeast and ~120 feet northwest of access area	
Personnel: Jessica Ferngren			
Total Depth: 14'	Depth to Water: ~6'		

depth (feet)	PID (ppm)	Blow Counts	Sample ID	Depth (From-To)	Moisture Content	Recovery	Soil Classification	Remarks
	0.0	Weight of Hamme Weight of Hammer	0'-2'	0'-2'	Slightly Moist	18"/24"	10"-Brown Silty F SAND, some organics	
1		4 8					8 "-Light Brown Silty F SAND, trace Clay and Gravel	
2	0.0	13 15	2'-4'	2'-4'	Slightly Moist	10"/24"	Light Brown Silty F SAND, trace Clay and Gravel	
3		16 13						
4	0.0	11 10	4'-6'	4'-6'	Slightly Moist	10"/24"	Light Yellowish Brown SILT, little F Sand, trace Gravel	
5		12 17						Moist at bottom 2 inches of spoon
6	0.0	8 8	6'-8'	6'-8'	Slightly Moist	12"/24"	Light Brown Silty F SAND, some C Gravel	
7		7 10						
8	0.0	8 9	8'-10'	8'-10'	Saturated	10"/24"	Same as above	
9		11 12						
10	0.0	45 50	10'-12'	10'-12'	Saturated	6"-24"	4"-Same as above 2"-Crushed GNEISS	
11		19 8						
12	0.0	8 11	12'-14'	12'-14'	Saturated	12"/24"	Light Brown Silty F SAND, some C Gravel	
13		9 9						
14								
15								
16								
17								
18								
19								
20								

TRACE = 1 - 10% LITTLE = 11 - 20 % SOME = 21 - 35% AND = 36 - 50%



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No.	REVISIONS	DATE	BY
1	ADD DEC VALIDATION BLOCK/LABEL WETLAND BOUNDARY	9/27/10	TA

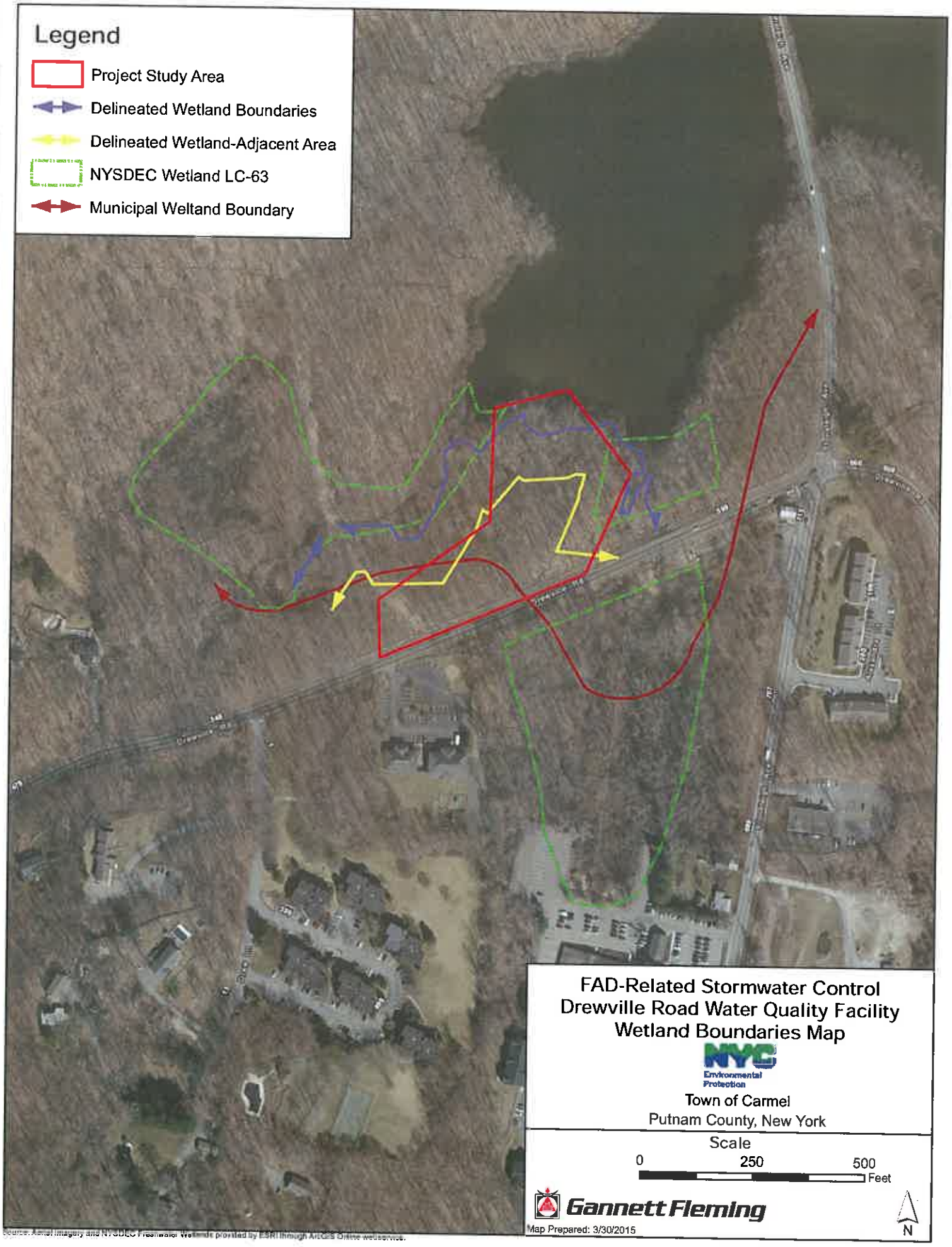
DRAWN: LK
DESIGNED: MS
APPROVED: SH
SCALE: 1"=30'
JOB No.: 46649.WO12
DATE: MAR. 2010

HDR • Gannett Fleming
A Joint Venture

PROJECT: CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER SUPPLY
CONTRACT CRO-420
FAD RELATED STORMWATER CONTROL
DREWVILLE ROAD, NEW YORK

TITLE: WETLANDS AND WATERWAYS PLAN

SHEET No.:


Legend
Project Study Area
Delineated Wetland Boundaries
Delineated Wetland-Adjacent Area
NYSDEC Wetland LC-63
Municipal Weltand Boundary
FAD-Related Stormwater Control
Drewville Road Water Quality Facility
Wetland Boundaries Map
NYC Environmental Protection
Town of Carmel
Putnam County, New York
Scale
0
250
500
Feet
Gannett Fleming
Map Prepared: 3/30/2015
N

APPENDIX H
PHOTOGRAPHS

Photographs of Project Study Area
FAD-Related Stormwater Control (CAT-232)
Drewville Road Water Quality Facility
Town of Carmel, Putnam County, New York

Photograph 1: Drewville Road and existing drainage ditch. View is to the east/northeast. Photograph taken February 2009.

Photograph 2: Drewville Road and existing drainage ditch. View is to the west. Photograph taken February August 2009.

Photographs of Project Study Area
FAD-Related Stormwater Control (CAT-232)
Drewville Road Water Quality Facility
Town of Carmel, Putnam County, New York

Photograph 3: Drewville Road and woodlands associated with proposed project. View is to the north. Photograph taken February 2009.

Photograph 4: Breech in stone wall with erosional swale starting at ditch along Drewville Road. View is to the south/southeast. Photograph taken August 2009.

Photographs of Project Study Area
FAD-Related Stormwater Control (CAT-232)
Drewville Road Water Quality Facility
Town of Carmel, Putnam County, New York

Photograph 5: Erosion and deposition in upland woodlands. View is to the north. Photograph taken August 2009.

Photograph 6: Approximate location of proposed access road. View is to the east. Photograph taken August 2009.

Photographs of Project Study Area
FAD-Related Stormwater Control (CAT-232)
Drewville Road Water Quality Facility
Town of Carmel, Putnam County, New York

Photograph 7: Approximate location of proposed access road entrance and construction staging area. View is to the southeast. Photograph taken August 2009.