PROPOSED HARTLEY ROAD ELECTRICAL SUBSTATION

Hartley Road and Cheechunk Road
Goshen, New York

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Volume II

December 20, 2011

Project Sponsor:

Orange & Rockland Utilities, Inc.
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HARTLEY ROAD DEIS

VOLUME II – TECHNICAL APPENDICES

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APPENDIX A

Scoping Document and Other SEQRA Documentation

617.20
Appendix A
State Environmental Quality Review
FULL ENVIRONMENTAL ASSESSMENT FORM

Purpose: The full EAF is designed to help applicants and agencies determine, in an orderly manner, whether a project or action may be significant. The question of whether an action may be significant is not always easy to answer. Frequently, there are aspects of a project that are subjective or unmeasurable. It is also understood that those who determine significance may have little or no formal knowledge of the environment or may not be technically expert in environmental analysis. In addition, many who have knowledge in one particular area may not be aware of the broader concerns affecting the question of significance.

The full EAF is intended to provide a method whereby applicants and agencies can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

Full EAF Components: The full EAF is comprised of three parts:

Part 1: Provides objective data and information about a given project and its site. By identifying basic project data, it assists a reviewer in the analysis that takes place in Parts 2 and 3.

Part 2: Focuses on identifying the range of possible impacts that may occur from a project or action. It provides guidance as to whether an impact is likely to be considered small to moderate or whether it is a potentially-large impact. The form also identifies whether an impact can be mitigated or reduced.

Part 3: If any impact in Part 2 is identified as potentially-large, then Part 3 is used to evaluate whether or not the impact is actually important.

THIS AREA FOR LEAD AGENCY USE ONLY

DETERMINATION OF SIGNIFICANCE -- Type 1 and Unlisted Actions

Identify the Portions of EAF completed for this project: ☑ Part 1 ☑ Part 2 ☐ Part 3

Upon review of the information recorded on this EAF (Parts 1 and 2 and 3 if appropriate), and any other supporting information, and considering both the magnitude and importance of each impact, it is reasonably determined by the lead agency that:

☐ A. The project will not result in any large and important impact(s) and, therefore, is one which **will not** have a significant impact on the environment, therefore **a negative declaration will be prepared.**

☐ B. Although the project could have a significant effect on the environment, there will not be a significant effect for this Unlisted Action because the mitigation measures described in PART 3 have been required, therefore **a CONDITIONED negative declaration will be prepared.***

☐ C. The project may result in one or more large and important impacts that may have a significant impact on the environment, therefore **a positive declaration will be prepared.**

*A Conditioned Negative Declaration is only valid for Unlisted Actions

Hartley Road Electrical Substation

Name of Action

Town of Goshen Town Board

Name of Lead Agency

Print or Type Name of Responsible Officer in Lead Agency

Title of Responsible Officer

Signature of Responsible Officer in Lead Agency

Signature of Preparer (If different from responsible officer)

website

Date

PART 1--PROJECT INFORMATION
Prepared by Project Sponsor

NOTICE: This document is designed to assist in determining whether the action proposed may have a significant effect on the environment. Please complete the entire form, Parts A through E. Answers to these questions will be considered as part of the application for approval and may be subject to further verification and public review. Provide any additional information you believe will be needed to complete Parts 2 and 3.

It is expected that completion of the full EAF will be dependent on information currently available and will not involve new studies, research or investigation. If information requiring such additional work is unavailable, so indicate and specify each instance.

Name of Action Hartley Road Electrical Substation

Location of Action (include Street Address, Municipality and County)

Hartley Road and Cheechunk Road

Name of Applicant/Sponsor Orange and Rockland Utilities, Inc.

Address One Blue Hill Plaza

City / PO Pearl River State NY Zip Code 10965

Business Telephone 845-577-3700

Name of Owner (if different) Same as Applicant

Address

City / PO State Zip Code

Business Telephone

Description of Action:

Construction of an Electrical Substation which will include but not be limited to the following:

Clearing and grading of the site

Construction of switch gear, transformer, take-off structure, transmission poles and lines, gravel platform, paved driveway, stormwater management, landscaping, chain link fence, secured access points, foundations and conduit work, and other related appurtenances.

Please Complete Each Question--Indicate N.A. if not applicable

A. SITE DESCRIPTION

Physical setting of overall project, both developed and undeveloped areas.

1. Present Land Use: ☐ Urban ☐ Industrial ☐ Commercial ☐ Residential (suburban) ☑ Rural (non-farm)
   ☐ Forest ☐ Agriculture ☑ Other Vacant

2. Total acreage of project area: 48.73 acres. Acreage is defined by property boundary

APPROXIMATE ACREAGE		PRESENTLY	AFTER COMPLETION
Meadow or Brushland (Non-agricultural)		6.36 acres	5.393 acres
Forested		28.58 acres	27.05 acres
Agricultural (Includes orchards, cropland, pasture, etc.)		0 acres	0 acres
Wetland (Freshwater or tidal as per Articles 24,25 of ECL)	(Separate Wetland Areas)	13.40 acres	13.397 acres
Water Surface Area		0.39acres	0.39 acres
Unvegetated (Rock, earth or fill)		0 acres	0 acres
Roads, buildings and other paved surfaces inlc. gravel path		0 acres	1.42 acres
Other (Indicate type) Landscape, Lawns, STM Areas		0 acres	1.08 acres

3. What is predominant soil type(s) on project site? MdB - Mardin gravelly silt loam & BnC - Bath-Nassau channery silt loams
   a. Soil drainage: ☐ Well drained ____% of site ☑ Moderately well drained 100% of site.
   ☐ Poorly drained ____% of site
   b. If any agricultural land is involved, how many acres of soil are classified within soil group 1 through 4 of the NYS Land Classification System? 0 acres (see 1 NYCRR 370).

4. Are there bedrock outcroppings on project site? ☐ Yes ☒ No (Based on Limit of Disturbance)
   a. What is depth to bedrock 5.5 (in feet) (Based on NRCS soil data and borings)

5. Approximate percentage of proposed project site with slopes: (Based on Entire Parcel)
   ☑ 0-10% 64% ☑ 10- 15% 22% ☑ 15% or greater 14 %

6. Is project substantially contiguous to, or contain a building, site, or district, listed on the State or National Registers of Historic Places? ☐ Yes ☒ No

7. Is project substantially contiguous to a site listed on the Register of National Natural Landmarks? ☐ Yes ☒ No

8. What is the depth of the water table? >6 (in feet) (Based on Borings)

9. Is site located over a primary, principal, or sole source aquifer? ☐ Yes ☒ No

10. Do hunting, fishing or shell fishing opportunities presently exist in the project area? ☐ Yes ☒ No

11. Does project site contain any species of plant or animal life that is identified as threatened or endangered? ■ Yes ☐ No

According to:

U.S. Fish and Wildlife Services

Identify each species:

Based on the UFWS database the habitat for Indiana Bat and Bog Turtle are present on-site however the actual species has not been indentified to be present on the site.

12. Are there any unique or unusual land forms on the project site? (i.e., cliffs, dunes, other geological formations?

☐ Yes ■ No

Describe:

13. Is the project site presently used by the community or neighborhood as an open space or recreation area?

☐ Yes ■ No

If yes, explain:

14. Does the present site include scenic views known to be important to the community? ■ Yes ☐ No

A portion of the property is included in a Scenic Road Overlay District (Owens Road)

15. Streams within or contiguous to project area:

Tribs of Rio Grande (NYSDEC Class C)
Cheechunk Creek (NYSDEC Class C)

a. Name of Stream and name of River to which it is tributary

Wallkill

16. Lakes, ponds, wetland areas within or contiguous to project area:

There are two (2) A.C.O.E. wetland areas located on the site one to the east and the other to the west.

b. Size (in acres):

A: East side - 5.45
B: West side - 7.95
Total: 13.4

17. Is the site served by existing public utilities? ☐ Yes ☒ No

a. If **YES**, does sufficient capacity exist to allow connection? ☐ Yes ☐ No

b. If **YES**, will improvements be necessary to allow connection? ☐ Yes ☐ No

18. Is the site located in an agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐ Yes ☒ No

19. Is the site located in or substantially contiguous to a Critical Environmental Area designated pursuant to Article 8 of the ECL, and 6 NYCRR 617? ☐ Yes ☒ No

20. Has the site ever been used for the disposal of solid or hazardous wastes? ☐ Yes ☒ No

B. Project Description

1. Physical dimensions and scale of project (fill in dimensions as appropriate).

a. Total contiguous acreage owned or controlled by project sponsor: 48.73 acres.

b. Project acreage to be developed: 6.62 acres initially; 6.62 acres ultimately.

c. Project acreage to remain undeveloped: 42.11 acres.

d. Length of project, in miles: N/A (if appropriate)

e. If the project is an expansion, indicate percent of expansion proposed. _____ %

f. Number of off-street parking spaces existing 0; proposed 1

g. Maximum vehicular trips generated per hour: 0 (upon completion of project)? There will be no significant increase in traffic over the existing conditions.

h. If residential: Number and type of housing units:

	One Family	Two Family	Multiple Family	Condominium
Initially				
Ultimately				

i. Dimensions (in feet) of largest proposed structure: SG HFP | 15.5' 68' height; 14.5' 5' (bot.) width; 66' NA length.

SG- switch gear
HFP - H-Frame and Poles

j. Linear feet of frontage along a public thoroughfare project will occupy is? +/-2666 ft. (Hartley Road and Cheechunk Road)

2. How much natural material (i.e. rock, earth, etc.) will be removed from the site? 0 tons/cubic yards.

3. Will disturbed areas be reclaimed ☐ Yes ☐ No ☒ N/A

a. If yes, for what intended purpose is the site being reclaimed?

b. Will topsoil be stockpiled for reclamation? ☐ Yes ☒ No

c. Will upper subsoil be stockpiled for reclamation? ☐ Yes ☒ No

4. How many acres of vegetation (trees, shrubs, ground covers) will be removed from site? 1.53 acres.

5. Will any mature forest (over 100 years old) or other locally-important vegetation be removed by this project?

☐ Yes ■ No

6. If single phase project: Anticipated period of construction: NA months, (including demolition)

7. If multi-phased:

   a. Total number of phases anticipated 2 (number)

   b. Anticipated date of commencement phase 1: Jan month 2012 year, (including demolition)

   c. Approximate completion date of final phase: Jul month 2013 year.

   d. Is phase 1 functionally dependent on subsequent phases? ☐ Yes ■ No

8. Will blasting occur during construction? ☐ Yes ■ No

9. Number of jobs generated: during construction 10 ; after project is complete 0

10. Number of jobs eliminated by this project 0 .

11. Will project require relocation of any projects or facilities? ☐ Yes ■ No

    If yes, explain:

12. Is surface liquid waste disposal involved? ☐ Yes ■ No

    a. If yes, indicate type of waste (sewage, industrial, etc) and amount _____

    b. Name of water body into which effluent will be discharged _____

13. Is subsurface liquid waste disposal involved? ☐ Yes ■ No Type _____

14. Will surface area of an existing water body increase or decrease by proposal? ☐ Yes ■ No

    If yes, explain:

15. Is project or any portion of project located in a 100 year flood plain? ☐ Yes ■ No

16. Will the project generate solid waste? ☐ Yes ■ No

    a. If yes, what is the amount per month? _____ tons

    b. If yes, will an existing solid waste facility be used? ☐ Yes ☐ No

    c. If yes, give name _____ ; location _____

    d. Will any wastes not go into a sewage disposal system or into a sanitary landfill? ☐ Yes ☐ No

e. If yes, explain:

17. Will the project involve the disposal of solid waste? ☐ Yes ■ No

a. If yes, what is the anticipated rate of disposal? _____ tons/month.

b. If yes, what is the anticipated site life? _____ years.

18. Will project use herbicides or pesticides? ■ Yes ☐ No During construction, herbicides will not be used; pre-emergent weed control applications limited to fenced areas.

19. Will project routinely produce odors (more than one hour per day)? ☐ Yes ■ No

20. Will project produce operating noise exceeding the local ambient noise levels? ☐ Yes ■ No Based on Noise Study

21. Will project result in an increase in energy use? ☐ Yes ■ No

If yes, indicate type(s)

22. If water supply is from wells, indicate pumping capacity N/A gallons/minute.

23. Total anticipated water usage per day 0 gallons/day.

24. Does project involve Local, State or Federal funding? ☐ Yes ■ No

If yes, explain:

25. Approvals Required:

			Type	Submittal Date
City, Town, Village Board	☒ Yes	☐ No	Special Permit	8/10/10
City, Town, Village Planning Board	☒ Yes	☐ No	Site Plan Approval	
City, Town Zoning Board	☒ Yes	☐ No	Variance - Scenic Overlay District Variance - Underground Transmission Line	
City, County Health Department	☐ Yes	☒ No		
Other Local Agencies	☒ Yes	☐ No	Building Department	
Other Regional Agencies	☐ Yes	☒ No		
State Agencies	☒ Yes	☐ No	Stormwater General Permit (DEC)	
Federal Agencies	☒ Yes	☐ No	A.C.O.E. Jurisdictional Det.	

C. Zoning and Planning Information

1. Does proposed action involve a planning or zoning decision? ☒ Yes ☐ No

If Yes, indicate decision required:

☐ Zoning amendment	☒ Zoning variance	☐ New/revision of master plan	☐ Subdivision
☒ Site plan	☒ Special use permit	☐ Resource management plan	☐ Other

2. What is the zoning classification(s) of the site?

Ru, Rural District
HC, Highway Commercial
SR, Scenic Road Corridor Overlay District

3. What is the maximum potential development of the site if developed as permitted by the present zoning?

As proposed - Electrical Substation

4. What is the proposed zoning of the site?

N/A

5. What is the maximum potential development of the site if developed as permitted by the proposed zoning?

N/A

6. Is the proposed action consistent with the recommended uses in adopted local land use plans? ■ Yes ☐ No

7. What are the predominant land use(s) and zoning classifications within a ¼ mile radius of proposed action?

RU, Rural - CO, Commercial/Office Mixed-Use, & I, Industrial

8. Is the proposed action compatible with adjoining/surrounding land uses with a ¼ mile? ■ Yes ☐ No

9. If the proposed action is the subdivision of land, how many lots are proposed? N/A

   a. What is the minimum lot size proposed? N/A

10. Will proposed action require any authorization(s) for the formation of sewer or water districts? ☐ Yes ■ No

11. Will the proposed action create a demand for any community provided services (recreation, education, police, fire protection?

☐ Yes ■ No

a. If yes, is existing capacity sufficient to handle projected demand? ☐ Yes ■ No

12. Will the proposed action result in the generation of traffic significantly above present levels? ☐ Yes ■ No

a. If yes, is the existing road network adequate to handle the additional traffic. ☐ Yes ☐ No

D. Informational Details

Attach any additional information as may be needed to clarify your project. If there are or may be any adverse impacts associated with your proposal, please discuss such impacts and the measures which you propose to mitigate or avoid them.

E. Verification

I certify that the information provided above is true to the best of my knowledge.

Applicant/Sponsor Name Orange and Rockland Utilites, Inc Date _____

Signature _____

Title _____

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment.

PART 2 - PROJECT IMPACTS AND THEIR MAGNITUDE

Responsibility of Lead Agency

General Information (Read Carefully)

! In completing the form the reviewer should be guided by the question: Have my responses and determinations been **reasonable?** The reviewer is not expected to be an expert environmental analyst.

! The **Examples** provided are to assist the reviewer by showing types of impacts and wherever possible the threshold of magnitude that would trigger a response in column 2. The examples are generally applicable throughout the State and for most situations. But, for any specific project or site other examples and/or lower thresholds may be appropriate for a Potential Large Impact response, thus requiring evaluation in Part 3.

! The impacts of each project, on each site, in each locality, will vary. Therefore, the examples are illustrative and have been offered as guidance. They do not constitute an exhaustive list of impacts and thresholds to answer each question.

! The number of examples per question does not indicate the importance of each question.

! In identifying impacts, consider long term, short term and cumulative effects.

Instructions (Read carefully)

a. Answer each of the 20 questions in PART 2. Answer **Yes** if there will be **any** impact.

b. **Maybe** answers should be considered as **Yes** answers.

c. If answering **Yes** to a question then check the appropriate box(column 1 or 2)to indicate the potential size of the impact. If impact threshold equals or exceeds any example provided, check column 2. If impact will occur but threshold is lower than example, check column 1.

d. Identifying that an Impact will be potentially large (column 2) does not mean that it is also necessarily **significant**. Any large impact must be evaluated in PART 3 to determine significance. Identifying an impact in column 2 simply asks that it be looked at further.

e. If reviewer has doubt about size of the impact then consider the impact as potentially large and proceed to PART 3.

f. If a potentially large impact checked in column 2 can be mitigated by change(s) in the project to a small to moderate impact, also check the **Yes** box in column 3. A **No** response indicates that such a reduction is not possible. This must be explained in Part 3.

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
Impact on Land			
1. Will the Proposed Action result in a physical change to the project site? NO ☒ YES ☐			
Examples that would apply to column 2			
• Any construction on slopes of 15% or greater, (15 foot rise per 100 foot of length), or where the general slopes in the project area exceed 10%.	☐	☐	☐ Yes ☐ No
• Construction on land where the depth to the water table is less than 3 feet.	☐	☐	☐ Yes ☐ No
• Construction of paved parking area for 1,000 or more vehicles.	☐	☐	☐ Yes ☐ No
• Construction on land where bedrock is exposed or generally within 3 feet of existing ground surface.	☐	☐	☐ Yes ☐ No
• Construction that will continue for more than 1 year or involve more than one phase or stage.	☐	☐	☐ Yes ☐ No
• Excavation for mining purposes that would remove more than 1,000 tons of natural material (i.e., rock or soil) per year.	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
• Construction or expansion of a santary landfill.	☐	☐	☐ Yes ☐ No
• Construction in a designated floodway.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

2. Will there be an effect to any unique or unusual land forms found on the site? (i.e., cliffs, dunes, geological formations, etc.)
   ☒ NO ☐ YES

• Specific land forms:	☐	☐	☐ Yes ☐ No

Impact on Water

3. Will Proposed Action affect any water body designated as protected? (Under Articles 15, 24, 25 of the Environmental Conservation Law, ECL)
   ☐ NO ☒ YES

Examples that would apply to column 2

• Developable area of site contains a protected water body.	☐	☐	☐ Yes ☐ No
• Dredging more than 100 cubic yards of material from channel of a protected stream.	☐	☐	☐ Yes ☐ No
• Extension of utility distribution facilities through a protected water body.	☐	☐	☐ Yes ☐ No
• Construction in a designated freshwater or tidal wetland.	☒	☐	☐ Yes ☒ No
Wetland Disturbance < 1/10 acre			
• Other impacts:	☐	☐	☐ Yes ☐ No

4. Will Proposed Action affect any non-protected existing or new body of water?
   ☒ NO ☐ YES

Examples that would apply to column 2

• A 10% increase or decrease in the surface area of any body of water or more than a 10 acre increase or decrease.	☐	☐	☐ Yes ☐ No
• Construction of a body of water that exceeds 10 acres of surface area.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
5. Will Proposed Action affect surface or groundwater quality or quantity? ☐ NO ☒ YES			
Examples that would apply to column 2 • Proposed Action will require a discharge permit.	☐	☐	☐ Yes ☐ No
• Proposed Action requires use of a source of water that does not have approval to serve proposed (project) action.	☐	☐	☐ Yes ☐ No
• Proposed Action requires water supply from wells with greater than 45 gallons per minute pumping capacity.	☐	☐	☐ Yes ☐ No
• Construction or operation causing any contamination of a water supply system.	☐	☐	☐ Yes ☐ No
• Proposed Action will adversely affect groundwater.	☐	☐	☐ Yes ☐ No
• Liquid effluent will be conveyed off the site to facilities which presently do not exist or have inadequate capacity.	☐	☐	☐ Yes ☐ No
• Proposed Action would use water in excess of 20,000 gallons per day.	☐	☐	☐ Yes ☐ No
• Proposed Action will likely cause siltation or other discharge into an existing body of water to the extent that there will be an obvious visual contrast to natural conditions.	☐	☐	☐ Yes ☐ No
• Proposed Action will require the storage of petroleum or chemical products greater than 1,100 gallons.	☒	☐	☐ Yes ☒ No
• Proposed Action will allow residential uses in areas without water and/or sewer services.	☐	☐	☐ Yes ☐ No
• Proposed Action locates commercial and/or industrial uses which may require new or expansion of existing waste treatment and/or storage facilities.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change

6. Will Proposed Action alter drainage flow or patterns, or surface water runoff?
   ☒ NO ☐ YES

Examples that would apply to column 2

• Proposed Action would change flood water flows	☐	☐	☐ Yes	☐ No
• Proposed Action may cause substantial erosion.	☐	☐	☐ Yes	☐ No
• Proposed Action is incompatible with existing drainage patterns.	☐	☐	☐ Yes	☐ No
• Proposed Action will allow development in a designated floodway.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON AIR

7. Will Proposed Action affect air quality?
   ☒ NO ☐ YES

Examples that would apply to column 2

• Proposed Action will induce 1,000 or more vehicle trips in any given hour.	☐	☐	☐ Yes	☐ No
• Proposed Action will result in the incineration of more than 1 ton of refuse per hour.	☐	☐	☐ Yes	☐ No
• Emission rate of total contaminants will exceed 5 lbs. per hour or a heat source producing more than 10 million BTU's per hour.	☐	☐	☐ Yes	☐ No
• Proposed Action will allow an increase in the amount of land committed to industrial use.	☐	☐	☐ Yes	☐ No
• Proposed Action will allow an increase in the density of industrial development within existing industrial areas.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON PLANTS AND ANIMALS

8. Will Proposed Action affect any threatened or endangered species?
   ☒ NO ☐ YES

Examples that would apply to column 2

• Reduction of one or more species listed on the New York or Federal list, using the site, over or near the site, or found on the site.	☐	☐	☐ Yes	☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
• Removal of any portion of a critical or significant wildlife habitat.	☐	☐	☐ Yes ☐ No
• Application of pesticide or herbicide more than twice a year, other than for agricultural purposes.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

9. Will Proposed Action substantially affect non-threatened or non-endangered species?
☒ NO ☐ YES

Examples that would apply to column 2

• Proposed Action would substantially interfere with any resident or migratory fish, shellfish or wildlife species.	☐	☐	☐ Yes ☐ No
• Proposed Action requires the removal of more than 10 acres of mature forest (over 100 years of age) or other locally important vegetation.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

IMPACT ON AGRICULTURAL LAND RESOURCES

10. Will Proposed Action affect agricultural land resources?
☒ NO ☐ YES

Examples that would apply to column 2

• The Proposed Action would sever, cross or limit access to agricultural land (includes cropland, hayfields, pasture, vineyard, orchard, etc.)	☐	☐	☐ Yes ☐ No
• Construction activity would excavate or compact the soil profile of agricultural land.	☐	☐	☐ Yes ☐ No
• The Proposed Action would irreversibly convert more than 10 acres of agricultural land or, if located in an Agricultural District, more than 2.5 acres of agricultural land.	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
• The Proposed Action would disrupt or prevent installation of agricultural land management systems (e.g., subsurface drain lines, outlet ditches, strip cropping); or create a need for such measures (e.g. cause a farm field to drain poorly due to increased runoff).	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

IMPACT ON AESTHETIC RESOURCES

11. Will Proposed Action affect aesthetic resources? (If necessary, use the Visual EAF Addendum in Section 617.20, Appendix B.)
☐ NO ■ YES

Examples that would apply to column 2			
• Proposed land uses, or project components obviously different from or in sharp contrast to current surrounding land use patterns, whether man-made or natural.	☐	☐	☐ Yes ☐ No
• Proposed land uses, or project components visible to users of aesthetic resources which will eliminate or significantly reduce their enjoyment of the aesthetic qualities of that resource.	☐	☐	☐ Yes ☐ No
• Project components that will result in the elimination or significant screening of scenic views known to be important to the area.	☐	☐	☐ Yes ☐ No
• Other impacts:	■	☐	☐ Yes ■ No

A portion of the substation will be located within a Scenic Road Overlay District; however, with the existing vegetation surrounding the site and the proposed supplemental landscaping the substation will be screened from the surrounding roads.

IMPACT ON HISTORIC AND ARCHAEOLOGICAL RESOURCES

12. Will Proposed Action impact any site or structure of historic, prehistoric or paleontological importance?
■ NO ☐ YES

Examples that would apply to column 2			
• Proposed Action occurring wholly or partially within or substantially contiguous to any facility or site listed on the State or National Register of historic places.	☐	☐	☐ Yes ☐ No
• Any impact to an archaeological site or fossil bed located within the project site.	☐	☐	☐ Yes ☐ No
• Proposed Action will occur in an area designated as sensitive for archaeological sites on the NYS Site Inventory.	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
• Other impacts:	☐	☐	☐ Yes ☐ No

IMPACT ON OPEN SPACE AND RECREATION

13. Will proposed Action affect the quantity or quality of existing or future open spaces or recreational opportunities?
☒ NO ☐ YES

Examples that would apply to column 2

• The permanent foreclosure of a future recreational opportunity.	☐	☐	☐ Yes ☐ No
• A major reduction of an open space important to the community.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

IMPACT ON CRITICAL ENVIRONMENTAL AREAS

14. Will Proposed Action impact the exceptional or unique characteristics of a critical environmental area (CEA) established pursuant to subdivision 6NYCRR 617.14(g)?
☒ NO ☐ YES

List the environmental characteristics that caused the designation of the CEA.

Examples that would apply to column 2

• Proposed Action to locate within the CEA?	☐	☐	☐ Yes ☐ No
• Proposed Action will result in a reduction in the quantity of the resource?	☐	☐	☐ Yes ☐ No
• Proposed Action will result in a reduction in the quality of the resource?	☐	☐	☐ Yes ☐ No
• Proposed Action will impact the use, function or enjoyment of the resource?	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change

IMPACT ON TRANSPORTATION

15. Will there be an effect to existing transportation systems?
☒ NO ☐ YES

Examples that would apply to column 2

• Alteration of present patterns of movement of people and/or goods.	☐	☐	☐ Yes ☐ No
• Proposed Action will result in major traffic problems.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

IMPACT ON ENERGY

16. Will Proposed Action affect the community's sources of fuel or energy supply?

☒ NO ☐ YES

Examples that would apply to column 2

• Proposed Action will cause a greater than 5% increase in the use of any form of energy in the municipality.	☐	☐	☐ Yes ☐ No
• Proposed Action will require the creation or extension of an energy transmission or supply system to serve more than 50 single or two family residences or to serve a major commercial or industrial use.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

NOISE AND ODOR IMPACT

17. Will there be objectionable odors, noise, or vibration as a result of the Proposed Action?

☒ NO ☐ YES

Examples that would apply to column 2

• Blasting within 1,500 feet of a hospital, school or other sensitive facility.	☐	☐	☐ Yes ☐ No
• Odors will occur routinely (more than one hour per day).	☐	☐	☐ Yes ☐ No
• Proposed Action will produce operating noise exceeding the local ambient noise levels for noise outside of structures.	☐	☐	☐ Yes ☐ No
• Proposed Action will remove natural barriers that would act as a noise screen.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change

IMPACT ON PUBLIC HEALTH

18. Will Proposed Action affect public health and safety?
☒ NO ☐ YES

• Proposed Action may cause a risk of explosion or release of hazardous substances (i.e. oil, pesticides, chemicals, radiation, etc.) in the event of accident or upset conditions, or there may be a chronic low level discharge or emission.	☐	☐	☐ Yes	☐ No
• Proposed Action may result in the burial of "hazardous wastes" in any form (i.e. toxic, poisonous, highly reactive, radioactive, irritating, infectious, etc.)	☐	☐	☐ Yes	☐ No
• Storage facilities for one million or more gallons of liquefied natural gas or other flammable liquids.	☐	☐	☐ Yes	☐ No
• Proposed Action may result in the excavation or other disturbance within 2,000 feet of a site used for the disposal of solid or hazardous waste.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON GROWTH AND CHARACTER OF COMMUNITY OR NEIGHBORHOOD

19. Will Proposed Action affect the character of the existing community?
☒ NO ☐ YES

Examples that would apply to column 2

• The permanent population of the city, town or village in which the project is located is likely to grow by more than 5%.	☐	☐	☐ Yes	☐ No
• The municipal budget for capital expenditures or operating services will increase by more than 5% per year as a result of this project.	☐	☐	☐ Yes	☐ No
• Proposed Action will conflict with officially adopted plans or goals.	☐	☐	☐ Yes	☐ No
• Proposed Action will cause a change in the density of land use.	☐	☐	☐ Yes	☐ No
• Proposed Action will replace or eliminate existing facilities, structures or areas of historic importance to the community.	☐	☐	☐ Yes	☐ No
• Development will create a demand for additional community services (e.g. schools, police and fire, etc.)	☐	☐	☐ Yes	☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
• Proposed Action will set an important precedent for future projects.	☐	☐	☐ Yes ☐ No
• Proposed Action will create or eliminate employment.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

20. Is there, or is there likely to be, public controversy related to potential adverse environment impacts?
☒ NO ☐ YES

If Any Action in Part 2 Is Identified as a Potential Large Impact or If you Cannot Determine the Magnitude of Impact, Proceed to Part 3

Part 3 - EVALUATION OF THE IMPORTANCE OF IMPACTS

Responsibility of Lead Agency

Part 3 must be prepared if one or more impact(s) is considered to be potentially large, even if the impact(s) may be mitigated.

Instructions (If you need more space, attach additional sheets)

Discuss the following for each impact identified in Column 2 of Part 2:

1. Briefly describe the impact.

2. Describe (if applicable) how the impact could be mitigated or reduced to a small to moderate impact by project change(s).

3. Based on the information available, decide if it is reasonable to conclude that this impact is **important**.

   To answer the question of importance, consider:

   - The probability of the impact occurring
   - The duration of the impact
   - Its irreversibility, including permanently lost resources of value
   - Whether the impact can or will be controlled
   - The regional consequence of the impact
   - Its potential divergence from local needs and goals
   - Whether known objections to the project relate to this impact.

Reset

FINAL SCOPING DOCUMENT
FOR THE PREPARATION OF A DRAFT
ENVIRONMENTAL IMPACT STATEMENT
FOR ORANGE AND ROCKLAND SUBSTATION
TO BE LOCATED ON HARTLEY ROAD
TOWN OF GOSHEN, ORANGE COUNTY, NEW YORK

Lead Agency Contact Person
Hon. Ralph Huddleston, Chairman
Town of Goshen Planning Board
41 Webster Avenue
Goshen, New York 10924
(845) 294-6430

Sponsor Contact Person
Mr. Diego Morales
Principal Engineer
390 West Route 59
Spring Valley, New York 10977
(845) 577-3647

GENERAL GUIDELINES

The Draft Environmental Impact Statement ("DEIS") will address all items in this Scoping Document and conform to the format outlined in this Scoping Document. If appropriate, impact issues listed separately in this outline may be combined in the DEIS, provided all such issues described in this Scoping Document are addressed as fully in a combined format, as if they were separately addressed.

The document should be written in the third person. The terms "we" and "our" should not be used. The Applicant's conclusions and opinions should be identified as those of the "Project Sponsor", "Applicant" or the "Developer".

Narrative discussions should be accompanied by appropriate charts, graphs, maps and diagrams whenever possible. If a particular subject matter can most effectively be described in graphic format, the narrative discussion should merely summarize and highlight the information presented graphically. All plans and maps showing the site shall include adjacent homes, other neighboring uses and structures, roads, water bodies and a legend.

The entire document should be checked carefully to ensure consistency with respect to the information presented in the various sections.

Environmental impacts should be described in terms that the layperson can readily understand (e.g., truck-loads of fill and cubic yards rather than just cubic yards).

All discussions of mitigation measures should consider at least those measures mentioned in the Scoping Outline. Where reasonable and necessary, mitigation measures should be incorporated into the Proposed Action if they are not already included.

All discussions of adverse impacts must, whenever possible, offer more than one method to mitigate the potential impact. The potential mitigation measures should be considered with input from the involved agencies.

The DEIS is intended to convey general and technical information regarding the potential environmental impacts of the proposed project to the Lead Agency, as well as several other agencies involved in the review of the proposed project. The DEIS is also intended to convey the same information to the interested public. The Preparer of the Draft Environmental Impact Statement is encouraged to keep this audience (of the DEIS) in mind as it prepares the document. Enough detail should be provided in each subject area to ensure that most readers of the document will understand and be able to make decisions based upon the information provided.

Because the DEIS will become a document that may, if appropriate, support objective findings upon the approvals requested under the application, upon acceptance by the Lead Agency, the Preparer is requested to avoid subjective statements regarding potential impacts. The DEIS should contain objective statements and conclusions of facts based upon technical analyses. Subjective evaluations of impacts where evidence is inconclusive or subject to opinion should be prefaced by statements indicating that "It is the Applicant's opinion that . . . . As Lead Agency, the Town of Goshen Planning Board reserves the right during review of the document, to request that subjective statements be removed from the document or otherwise modified to indicate that such subjective statements are not necessarily representative of the findings of the Planning Board.

BRIEF DESCRIPTION OF THE PROPOSED ACTION

Orange and Rockland Utilities, Inc. (sometimes the "Applicant" and sometimes "ORU") has applied to the Town of Goshen Town Board and to the Planning Board for a Special Permit and Site Plan Approval respectively, to construct a new electrical substation on its property (the Property") located at the intersection of Hartley and Cheechunk Roads. The tax map designation for the Property is Section 12, Block 1, Lot 1.7. ORU is the owner of the Property which consists of 48.73± acres. The substation driveway is intended to be located on Cheechunk Road. The Property is located partly in an RU (Rural District) zoning district (in which public utility substations are permitted by Special Permit issued by the Town Board), partly in an SR (Scenic Road Overlay District), and partly in the CO (Commercial/Office Mixed-Use District).

SITE PLAN

The proposed substation is centrally located on the western half of the Property and is situated in the southwest corner of an open field delineated by a rock wall adjacent to the existing Orange and Rockland Utilities, Inc. ("ORU") transmission right-of-way. The station will occupy an area of approximately 210 ft. X 210 ft. (44,100 square feet). To minimize the visual impact the station will be set back approximately 215 feet from Cheechunk Road and the driveway will curve to eliminate a direct view of the station from the road. All of the existing rock walls are to be maintained to the greatest extent feasible. The driveway entrance is accessed through an existing opening (farm access road) in the rock wall along Cheechunk Road.

The Action has been classified as Unlisted under SEQRA and the Lead Agency has determined to conduct a coordinated review and approval by other agencies. A determination was made by the Lead Agency on February 17, 2011 and filed in accordance with Sections 617.7 and 617.12 of the State Environmental Quality Review Act.

INVOLVED AGENCIES

A variety of permits and approvals are required for this project from the following agencies:

Agency	Approval/Permit/Review
Town of Goshen	
Town Board	Special Permit for Electrical Substation and Acceptance of conservation easement affecting a portion of the lands within which the development site is included, provided the granting of such conservation easement is authorized by the New York State Public Service Commission
Planning Board	Site Plan Approval
Highway Department	Highway Work Permit
Zoning Board of Appeals	Variances
New York State Agencies	
Department of Environmental Conservation	SPDES General Permit for Stormwater Discharge from Construction Activities and Operation of Electrical Substation
Public Service Commission	Approval of Conservation Easement

INTERESTED AGENCIES

U.S. Army Corps of Engineers	
Town of Goshen Environmental Review Board	
Orange County Department of Planning	GML § 239-m referral

SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

The following items are required elements of the Draft Environmental Impact Statement (DEIS).

A. Cover Sheet

The cover sheet shall identify the following:

1. Identification as the Draft Environmental Impact Statement;
2. The date the document was submitted to the Planning Board;
3. Environmental Impact Statement Distribution;
4. The name and location of the Project;
5. The Lead Agency for the Project, and the name, address, telephone number of the contact person for the Lead Agency, and website of the Lead Agency;
6. The name and address of the Project Sponsor, and the name, address and telephone number of the contact person representing the applicant;
7. The name and address of the primary preparers of the DEIS, and the name, address and telephone number of the contact person representing the preparer;
8. The date the DEIS was accepted by the Lead Agency as complete, i.e., adequate for public review (to be inserted at a later date);
9. The date of the public hearing, and any subsequent adjournments, on the DEIS (to be inserted at a later date);
10. The date which written public comments on the DEIS are due to the Planning Board (to be inserted at a later date);
11. All revision dates of the DEIS.

B. Table of Contents

The DEIS will include a Table of Contents identifying major sections and subsections of the document. The Table of Contents must also include a list of figures, tables, appendices and any additional volumes if necessary.

C. Body of the Document

Chapter I: Executive Summary

An Executive Summary shall be required as part of the DEIS. No information will be included in the Executive Summary that is not found within the body of the document. The executive summary will include the following elements:

1. An introduction, including the purpose of the DEIS, a relevant history of the SEQRA process and other legal proceedings that have occurred.

2. List of Involved and Interested Agencies and Required Approvals

3. Summary of Existing Conditions, Potential Impacts and Proposed Mitigation – This section should be organized by topic areas of discussion, as presented in this scoping document under the Chapter III below, in tabular form if possible. Discussion should be brief and can reference back to the Section where more information can be found.

4. Project Purpose, need and benefits.

5. Summary of Alternatives.

6. Unavoidable Adverse Impacts and Irreversible and Irretrievable Commitment of Resources.

Chapter II: Description of Proposed Action

1. Site Location and Description – This section will include a narrative description and graphical representation of the regional and area location of the proposed project. In addition, the tax map designation, abutting streets, utilities and infrastructure, surrounding land uses and existing zoning categories will also be presented, as well as the location of the property in relation to landfills and/or any superfund sites.

   Existing Site Description – Provide a short description, as well as a brief history of the subject property and characterize its topographical, water, natural features and use of the property and where existing changes to its natural state have

occurred (*i.e.*, locations of buildings and/ or farming activities). A site location map and an existing conditions map will be provided.

2. Description of Proposed Action – A narrative description of the proposed project, zoning requirements will be provided and the Applicant shall indicate if any waivers or variances will be required. This description shall identify the site as partially located within the Town's Flood Plain and Ponding Area Overlay District and the AQ-6 Overlay District. A description of the proposed improvements within the Town's right-of-way shall be included.

   Project Description Overview – Provide sufficient narrative detail to provide an overview of the project design including all major elements to be constructed such as buildings, roads and utility infrastructure.

3. The proposed Site Plan, including proposed limits of site disturbance. The Plan shall include the area occupied by the project, including by the proposed driveway, stormwater pond and graded areas.

4. Project purpose, need and benefits.

5. Construction Impact – Include a brief discussion of single phase plan, as well as provide a summary of potential impacts that are likely to occur during the period of the construction of the project.

6. Permits and Approvals.

Chapter III: Existing Conditions, Anticipated Impacts and Proposed Mitigation Measures

1. Land Use, Zoning and Public Policy

   a. Existing Conditions:

   Existing zoning and land use within a half mile of the project site will be discussed and presented graphically. The prior use of this property will be identified, and the location of the property in relation to landfills and/or any superfund sites will be discussed.

   Existing zoning and land use on the Property, including a description of what is permitted in the zoning districts and applicable overlay districts. Other requirements related to the site, such as the Heritage Trail right-of-way will be shown on the plan and addressed in the text.

   Address the environmental impacts for an underground alternative. Discuss the impact of underground transmission lines if variance is not granted for overhead transmission lines.

b. Potential Impacts:

Relationship with surrounding, reasonably proximate, land uses including sensitive uses such as parks (Heritage Trail) and agricultural uses, landfills and/or superfund sites.

Project's relationship to existing zoning, including regulations applicable to the proposed Hartley Road Electrical Substation.

c. Proposed Mitigation:

Proposed and potential mitigation measures for identified adverse environmental impacts will be discussed.

2. Visual Character

a. Existing Conditions:

This section will document views from public roadways into the project site. Views analysis will include the following locations:

- Cheechunk Road at its intersection with Owens Road.
- Heritage Trail near the location of the existing overhead transmission lines.
- Intersection between Cheechunk Road and Hartley Road taken from Echo Lake Road 500~~'~~ feet from the intersection.
- Hartley Road 500 feet southeast of the intersection between Cheecunk, Hartley and Echo Lake Roads and 450~~'~~ feet west of the location of the support poles for the proposed overhead transmission lines.
- Intersection of Owens and Cheechunk Roads at the location of the proposed driveway for access to the substation site.
- Cheechunk Road 500~~'~~ feet east of the ~~proposed driveway for access to the substation site~~intersection with Owens Road.
- Cheechunk Road 100~~'~~ feet north of its intersection with Hartley Road

Photographs of the site and its environs will be provided in this chapter. Prevalent land forms, vegetative cover and stonewalls (for example) within the project site that are visible from public roadways or other public resources such as the Heritage Trail.

b. Potential Impacts:

Description and photo simulation of the project's physical design, site lighting, landscaping plan including proposed buffering. Visual impacts related to the construction of the substation facility will be evaluated, which shall include the views listed above.

By the use of photographs, cross sections or photo simulations, elevations and/or sketches, the post-construction views into the project site from the locations listed above. At a minimum, photographs, cross sections or photo simulations will be utilized to illustrate the potential visual impact of this project.

Discuss any adverse impacts related to the character of the surrounding area, and the effect of the project upon residential values in the neighborhood of the project.

c. Proposed Mitigation: Proposed and potential mitigation measures for identified adverse environmental impacts will be discussed, including the potential for vegetated berms, wooded buffers and stonewalls. Unavoidable adverse environmental impacts will be identified.

3. Vegetation and Wildlife

a. Existing Conditions:

Updated site information concerning rare, endangered and threatened species, and species of conservation concern will be obtained from the NYS Natural Heritage Program, NYS Department of Environmental Conservation ("DEC") and the US Department of the Interior Fish and Wildlife Service (The DEC definitions for these terms will be used.) This list will include, but not be limited to the Indiana bat and bog turtle.

The Applicant shall engage a qualified consultant in flora, to walk the property, take an inventory of and provide a study concerning rare, endangered and threatened species, and species of conservation concern. The Applicant shall hire a qualified consultant in fauna, to walk the property, take an inventory of and provide a study concerning rare, endangered and threatened species, and species of conservation concern.

Describe onsite vegetative communities. Mappings for habitats of threatened, rare and endangered species will be provided. For purposes of this DEIS, a habitat is a place where a plant or animal lives, with all the living and nonliving conditions necessary for it to thrive. Also, an ecological community shall be considered an assemblage of plants and animals that interact in a shared environment, and a vegetative community is only the plant component of the assemblage.

The existing habitats onsite, within the areas of disturbance, should be identified and described, including terrestrial, wetland and aquatic habitats. Identify those species that are rare, endangered, threatened or are species of conservation concern, as identified by the NYS Natural Heritage Program, NYS DEC, and US FWS, that can be supported by those habitats described as being present onsite.

b. Potential Impacts:

Discuss the project's potential impacts to habitats of threatened, rare and endangered species that use them, as identified in Section 3 a. above. This will include a discussion of any onsite or downstream water quality or temperature impacts on animals and plants.

In addition, the impact on existing trees within the limits of potential site disturbance will be presented. All trees within the site disturbance area, of 12" dbh @ four (4) feet above grade will be identified and shown on a tree survey plan. The Applicant shall address whether any existing trees will require trimming or removal for the installation of the proposed overhead transmission lines.

Discuss the project's potential for fire, as well as, hazards to and caused by animals.

c. Proposed Mitigation:

Proposed and potential mitigation measures for identified adverse environmental impacts will be discussed. Unavoidable adverse environmental impacts will be identified.

4. Wetlands and Surface Water Hydrology

a. Existing Conditions:

A map of all existing wetlands will be included, verified by the US Army Corps of Engineers ("ACOE") and the extent of New York State Department of Environmental Conservation ("DEC") wetlands.

Regulated State and Federal wetlands and other surface water or flood plains will be described (including size, classification and appropriate jurisdiction) and delineated as well as associated buffers as enacted by the NYS DEC and ACOE.

Identify any wetlands on the Property or buffers from adjacent properties that extend onto the project site, in accordance with the Town of Goshen Code.

b. Potential Impacts:

Identify and discuss all wetlands (as defined by the Town of Goshen Code) and/or buffer encroachments and the reason for such encroachments. Identify all direct and indirect impacts on wetlands from construction or stormwater management systems.

Discussion of any potential impacts to the existing flood plains, including any changes to current flood levels both on and off site.

Discuss the potential impacts for soil erosion and sediment control, in accordance with DEC regulations.

c. Proposed Mitigation:

Proposed and potential mitigation measures for identified adverse environmental impacts will be discussed.

5. Stormwater Management

a. Existing Conditions:

Existing drainage patterns.

The Applicant shall quantify existing pre-development rates of runoff for a comparison to post-development conditions.

b. Potential Impacts:

Post construction drainage patterns, flows, quality and quantity, as defined in the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities will be described.

Discussion of transformer oil, including but not limited to, the type of oil, containment, potential for release, volume and mitigation proposed.

c. Proposed Mitigation:

Proposed and potential mitigation measures for identified adverse environmental impacts will be discussed.

6. Geology, Topography and Soils

a. Existing Conditions:

Underlying bedrock, soil conditions and topographic features of the site will be described utilizing data provided in the Orange County Soils Survey and supported with information provided by actual borings when necessary.

b. Potential Impacts:
Discussion of potential impacts based upon soil borings.

c. Proposed Mitigation:

Proposed and potential mitigation measures for identified adverse environmental impacts will be discussed. Unavoidable adverse environmental impacts will be identified.

7. Traffic and Transportation

a. Existing Conditions:

Description of adjacent roads and classification.

b. Potential Impacts:

Study will include a sight distance evaluation and comparison to AASHTO guidelines and Town of Goshen sight distance standards.

Updated estimate of number of vehicles will be provided and identification of potential traffic patterns.

The impact of traffic patterns due to trenching for electrical utility connections will be discussed. The impacts of trenching for electrical utility connections, including but not limited to, fire and explosion.

c. Proposed Mitigation:

Proposed and potential mitigation measures for identified adverse environmental impacts will be discussed. Unavoidable adverse environmental impacts will be identified.

8. Cultural Resources

a. Existing Conditions:

Historic resources on-site and within a one-half mile radius will be identified and those on site studied in accordance with the NYS Standards for Cultural Resources Investigation.

b. Potential Impacts:

Impacts identified to archeological, cultural or historic resources.

c. Proposed Mitigation:

Proposed and potential mitigation measures for identified adverse environmental impacts will be discussed.

9. EMF Analysis

a. Existing Conditions:

This section will discuss the electromagnetic fields that currently exist on the project site. The description will detail the EMF levels at different locations on the project site at the property line.

b. Potential Impacts:

This section will discuss the proposed electromagnetic fields at the project site. The description will detail the EMF levels at varying locations at the Property Line for each alternative. It will also discuss the criteria set forth by the NYS Public Service Commission, and provide a comparison of the anticipated EMF levels to the NYS Public Service Commission criteria.

Discuss the significance of any changes in EMF levels at the property lines.

Discuss any significant adverse impacts of any increase in EMF levels, including any significant adverse impacts on the health of humans and animals.

c. Proposed Mitigation:

Proposed and potential mitigation measures for the identified impacts will be discussed.

10. Noise

a. Existing Conditions:

This section will discuss the noise levels that currently exist on the project site. The description will detail the decibel levels at different locations on the Property Line.

b. Potential Impacts:

This section will discuss the proposed noise at the project site resulting from two transformers on site. The description will detail the decibel levels at varying locations on the Property. It will also discuss the noise criteria set forth by the Town of Goshen Zoning Code.

c. Proposed Mitigation:

Proposed and potential mitigation measures for the identified impacts will be discussed.

11. Fiscal Analysis

a. Existing Conditions:

Current project site property taxes broken down by jurisdiction will be described. Taxes and assessments of properties within 300 feet of the boundary lines of the project site will be described.

b. Potential Impacts:

Identify the projected annual tax revenue to the Town. Identify the cost of any projected increase in Town services, such as the Fire Department, Police Department, Department of Public Works, etc. Identify generally the anticipated impact of the facility on the market value of properties as a whole within 300 feet of the boundaries of the project site. The Applicant is not required to perform individual property specific impacts within this 300-foot area. (*Anderson v. New York State Urban Dev. Corp.*, 45 A.D.3d 582 (2d Dept. 2007)(although economic displacement generally must be studied for "the community as a whole," "the agency is not obligated to separately consider the impact on a particular subgroup or upon particular individuals.")).

c. Proposed Mitigations:

Proposed and potential mitigation measures for identified significant adverse environmental impacts will be discussed to the extent that these economic impacts have some nexus to the environment, *i.e.*, land, air, water, minerals, flora, fauna, noise, objects of historic or aesthetic significance and impacts related to population patterns or existing community character. *See* 6 NYCRR § 617.2.

Chapter IV: Construction Impacts

This chapter will outline the construction schedule for the project. Hours of construction will be provided. Environmental impacts related to construction, including noise (as regulated under the Town of Goshen Code), construction traffic and dust control will be discussed, with references to truck traffic and impacts to and weight limits on Town roads.

Chapter V: Alternatives

1. No Action Alternative
2. Failure to secure variance to allow overhead transmission lines.
3. Alternative locations for the project onsite, including outside of the Scenic Road Corridor Overlay District.
4. Trenching the south side of Cheechunk Road, rather than the north side, for installation of the electrical utility connections.

Chapter VI: Unavoidable Adverse Impacts

This Section will identify and summarize those adverse environmental impacts that can be expected to occur, with or without possible mitigation measures.

Chapter VII: Irreversible and Irretrievable Commitment of Resources

This chapter will summarize the proposed project and its Environmental Impacts in terms of the loss of environmental resources, both in the immediate future and in the long term.

Chapter VIII: Growth Inducing Impact

This chapter will discuss whether there is a growth inducing impact as the consequence of the approval and construction of the project.

Technical Appendices

1. SEQRA Documentation: EAF, DEIS Scope and Agency Correspondence
2. SWPPP and supporting data
3. Wetland Delineation Map and all other technical reports
4. Site Plan (Full size)
5. Natural resources reports: Bog Turtle and Indiana Bat
6. Subsurface Exploration Report
7. Appraisal Report
8. Acoustical Impact
9. Magnetic Field Modeling Assessment
10. Archaeological Survey: ~~B~~ Phases 1A and 1B
11. Resumes of Professionals submitting reports

12. Spill Prevention Report

STATE ENVIRONMENTAL QUALITY REVIEW
NOTICE OF ASSUMPTION OF LEAD AGENCY STATUS

The Planning Board of the Town of Goshen hereby assumes Lead Agency Status for the proposed construction of an electric distribution substation on approximately 48.7+/- acres in the Town of Goshen, Orange County, New York.

This notice is issued pursuant to Part 617 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law.

Title of Action: Proposed electric distribution substation for Orange and Rockland Utilities, Inc.

Date: February 18, 2011

SEQR Status: Unlisted Action

Description of Action: The Applicant, Orange & Rockland Utilities, Inc. proposes to build an electric distribution substation on property located within the Town of Goshen as shown on the Tax Map thereof as Section 12, Block 1, Lot 1.7; said property consists of approximately 48.7 +/- acres and is located along Hartley Road in the RU and HC zoning districts.

Reasons Supporting This Determination:

The Town of Goshen Town Board distributed its Notice of Intent for Designation of Lead Agency on October 29, 2010. Subsequently, on November 29, 2010, the Town of Goshen Planning Board, as an involved agency, requested that the Town Board allow the Planning Board to serve as Lead Agency with this application. The Town Board, having received no notice of objection from any other involved agency and thirty (30) days having passed, consented to the request of the Planning Board to serve as Lead Agency.

Contact Person: Ralph Huddleston, Town of Goshen Planning Board
Town Hall – 41 Webster Avenue
Goshen, New York 10924
(845) 294-6430

Agency Circulation: This notice is being sent to the following agencies:

1. Town of Goshen Town Board
   Town Hall – 41 Webster Avenue
   Goshen, New York 10924

2. New York State Department of Transportation
   SEQRA Unit – Traffic Engineering & Safety Division
   4 Burnett Boulevard
   Poughkeepsie, New York 12603

3. Town of Goshen Environmental Review Board
   Town Hall – 41 Webster Avenue
   Goshen, New York 10924

4. Town of Wallkill Town Board
   Town Hall – 99 Tower Drive
   Middletown, New York 10941

5. Town of Wallkill Planning Board Board
   Town Hall – 99 Tower Drive
   Middletown, New York 10941

6. Town of Wawayanda Town Board
   Town Hall – 80 Ridgebury Hill Road
   Slate Hill, New York 10973

7. Town of Wawayanda Planning Board
   Town Hall – 80 Ridgebury Hill Road
   Slate Hill, New York 10973

8. New York State Department of Environmental Conservation
   Division of Environmental Permits, Region 3
   21 South Putt Corners Road
   New Paltz, New York 12561

9. New York State Department of Transportation
   3233 Route 6
   Middletown, New York

10. Orange County Department of Health
    124 Main Street
    Goshen, New York 10924

11. Orange County Planning Department
    124 Main Street
    Goshen, New York 10924

12. New York State Department of Agriculture & Markets
    10-B Airline Drive
    Albany, New York 12235

13. New York State Office of Parks, Recreation and Historic Preservation
    Post Office Box 189, Peebles Island
    Waterford, New York 12188

14. Dennis P. Caplicki, Esq.
    Post Office Box 940
    Goshen, New York 10924

15. Alan S. Lipman, Esq.
    1 Harriman Square
    Goshen, New York 10924

16. Neal Halloran, Building Inspector
    Town of Goshen
    Town Hall – 41 Webster Avenue
    Goshen, New York 10924

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40 MATTHEWS STREET
SUITE 209
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*** ADMITTED IN NEW YORK, NEW JERSEY & CONNECTICUT

ROCKLAND COUNTY OFFICE:

POST OFFICE BOX 397
SUFFERN, N.Y. 10901
(845) 357-7500
(845) 357-7321 (FAX)

REPLY TO: ☒ ORANGE CO. ☐ ROCKLAND CO.

Respond to Post Office Box

November 29, 2010

Douglas Bloomfield, Supervisor
Town of Goshen Town Board
Town Hall
41 Webster Avenue
Goshen, New York 10924

Re: Lead Agency Determination for Orange and Rockland Utilities, Inc.

Dear Hon. Bloomfield:

At its meeting on November 18, 2010, the Planning Board acknowledged receipt of the Town Board's Notice of Intent for Designation of Lead Agency pursuant to the State Environmental Quality Review Act ("SEQRA"), dated October 28, 2010, for the Orange and Rockland Utilities, Inc. application, which proposes to develop an electric distribution substation. As you are aware, the application also requires site plan review, which will be performed by the Planning Board pursuant to the Town Code.

The Planning Board has asked that I respectfully request the Town Board to allow the Planning Board to serve as Lead Agency in connection with this application. The Planning Board believes that it is well equipped and experienced in serving as Lead Agency in this type of action, and many of the potential environmental impacts involved with such utility facility applications are usually related to site planning issues that are overseen by the Planning Board in the ordinary course.

Should you have any questions or comments, please feel free to contact our office.

Very truly yours,

RICHARD B. GOLDEN

cc: Town of Goshen Town Board
Town Hall – 41 Webster Avenue
Goshen, New York 10924

New York State Dept. of Transportation
SEQRA Unit-Traffic Engineering & Safety Div.
4 Burnett Blvd
Poughkeepsie, New York 12603

Town of Goshen Environmental Review Board
Town Hall – 41 Webster Avenue
Goshen, NY 10924

Town of Wallkill Town Board
Town Hall – 99 Tower Drive
Middletown, New York 10941

Town of Wallkill Planning Board
Town Hall – 99 Tower Drive
Middletown, New York 10941

Town of Wawayanda Planning Board
Town Hall – 80 Ridgebury Hill Road
Slate Hill, New York 10973

New York State Dept. of Environmental Conservation
Division of Environmental Permits, Region 3
21 South Putt Corners Road
New Paltz, New York 12561

New York State Department of Transportation
32-33 Route 6
Middletown, New York

Orange County Department of Health
124 Main Street
Goshen, New York 10924

Orange County Planning Department
124 Main Street
Goshen, New York 10924

New York State Department of Agriculture & Markets
10-B Airline Drive
Albany, New York 12235

New York State Office of Parks, Recreation and Historic Preservation
Post Office Box 189, Peebles Island
Waterford, New York 12188

Interested Agencies:
Dennis P. Caplicki, Esq.
P.O. Box 940
Goshen, New York 10924

Neal Halloran, Building Inspector
Town of Goshen
Town Hall – 41 Webster Avenue
Goshen, New York 10924

Alan S. Lipman, Esq.
1 Harriman Square
Goshen, New York 10924

APPENDIX B

Full Size Site Plan

APPENDIX C

Visual Resource Evaluation

VISUAL RESOURCE EVALUATION

FOR:

PROPOSED HARTLEY ROAD ELECTRICAL SUBSTATION

APPLICANT:

390 WEST ROUTE 59
SPRING VALLEY, NY 10977
CONTACT: JOHN COFFEY
(845) 577-3704

PREPARER:

CMX

CMX ENGINEERING, SURVEYING & LANDSCAPE ARCHITECT, PC
AN AFFILIATE OF BIRDSALL SERVICES GROUP, INC.
1311 MAMARONECK AVENUE, SUITE 50
WHITE PLAINS, NY 10605
(914) 686-1000

AUGUST, 2011

HARTLEY ROAD ELECTRICAL SUBSTATION

TOWN OF GOSHEN

Orange County, New York

Table of Contents

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3 SUMMER "LEAF ON" VIEWS

4 WINTER "LEAF OFF" VIEWS

5 PHOTO LOCATION PLAN – ALONG HERITAGE TRAIL

6 VIEWS FROM HERITAGE TRAIL

INTRODUCTION:

CMX has been retained by Orange and Rockland Utilities, Inc (ORU) to conduct a *Visual Resource Evaluation* for the Hartley Road Substation, which is proposed within the Town of Goshen, Orange County, New York. This evaluation considers views of the proposed substation from various pre-determined locations surrounding the site. The locations where chosen by ORU with input from the Town of Goshen, and all are within close proximity to the proposed project. These target-points are illustrated on the "Photo Location Plan" (refer to section 2).

The proposed Hartley Road substation is located east of Hartley Road near its intersection with Owens Road. The proposed substation is centrally located on the western half of the Property and is situated in the southwest corner of an open field delineated by a rock wall adjacent to the existing "ORU" transmission right-of-way. The station will occupy an area of approximately 210 ft X 210 ft. (44,100 square feet) and will be surrounded by a 7 foot high security fence with 1 foot of barbed wire above. To minimize the visual impact, the station will be set back approximately 215 feet from Cheechunk Road and the driveway will curve to eliminate a direct view of the station from the road. All of the existing rock walls are to be maintained to the greatest extent feasible. The driveway entrance is accessed through an existing opening (farm access road) in the rock wall along Cheechunk Road. The substation structure includes, but is not limited to, a 68 foot high "H" frame with one 16 foot-high dynasphere air terminal set at the top, two transformers approximately 11'-0" high with terminals above reaching approximately 19'-0", and a metal clad switch gear structure approximately 12'-6" high. Also, there will be (3) three 81'-6" steel high poles located near the existing tower (to be removed) at the southern property corner near Hartley Road. In addition, (2) two poles ranging in height from 71'-0" to 72'-0" will be located within the proposed 100-foot wide ORU right-of-way, which extends from the proposed substation to the new steel poles adjacent to the existing tower (south corner of property). All other components of the substation will be at lower elevations than described above.

The site plan documents prepared by ORU propose a landscaping plan to screen the substation structure; this plan includes, but is not limited to, the planting of evergreen trees. Additionally, ORU proposes to construct a 4 foot to 6-foot high earth berm along Cheechunk Road behind the existing trees; this berm will be approximately 530 linear feet, beginning at the proposed entrance to the substation running easterly. This berm will help screen the views of the substation from Cheechunk Road.

METHODOLOGY:

The Town of Goshen recommended ORU perform a visual impact study at designated areas (seven total) where visibility of the project was deemed likely; visibility at these points were to be studied under summer (leaf on) and winter (leaf off) conditions.

On July 15, 2010 and again on December 9, 2010, CMX conducted "leaf on" and "leaf off" field investigations to evaluate the viewsheds associated with the proposed substation, primarily, the 68-foot high "H" frame. Weather conditions were clear and sunny with low to moderate wind speed during both site visits. For purposes of providing a reference point for the substation, a "balloon test" was utilized during our investigation; a helium-filled weather balloon of approximately three feet (3 ft) in diameter was floated to the height of the 'H" frame structure, at its approximate center. In this investigation, one balloon was elevated to 66 feet above ground level. The balloon was elevated to 66 feet because the gravel yard is proposed to be cut 2 feet

below the existing grade present at the site, thus matching the ultimate elevation of the installed structures (68 feet above grade).

Once the balloon had been positioned to its appropriate location and elevated, a CMX crewmember drove to each viewpoint location to take photographs while another ensured that the balloon stayed positioned at the right location and elevation.

Based on our field investigation and photographs, it has been determined that a total of four (4) locations -of the five (5) summer "leaf on" photographs- have visible views of the proposed substation; all seven (7) winter "leaf off" views have visible views. All photographs are attached herewith and made part of this report (refer to sections 3 and 4). Below is a brief description of the photographs with views of the proposed substation, including the location and orientation from which they were taken.

PROPOSED SITE DESCRIPTIONS:

View 1 – Approximately 600~~575~~ feet west of the proposed access point along Cheechunk Road (approximately 168 feet from the intersection of Hartley Road and Cheechunk Road), looking southeast toward the proposed substation structures from approximately 650 feet. Portions of the substation structures are visible from this location; however, this is limited to the top 15-20 feet of the structure during the summer ("leaf on" conditions) and 20-25 feet during the winter ("leaf off" conditions). The difference in the exposure of the structure is due to the deciduous nature of the surrounding trees.

View 2 – Approximately 100 feet north of the proposed access point along Owens Road, looking south toward the proposed substation structure from approximately 215 feet from property line. During "leaf on" conditions, the substation structure is barely visible from this location due to the foliage of existing vegetation. However, during "leaf off" conditions; there is a greater visibility of the substation structure due to the deciduous nature of the surrounding trees. As demonstrated in the winter view the lower portions of the substation, approximately 10-15 feet, will be obscured by the earth berm and evergreen screening; however, the remaining portions of the structure is expected to be visible through the tree branches and trunks.

View 3 – Approximately 450 feet east of the proposed access to the substation along Cheechunk Road, looking southwest toward the substation structure at a distance of approximately 500 feet. During "leaf on" conditions, the substation structure is barely visible from this location due to the foliage of existing vegetation; "leaf off" conditions, however, will allow for a greater visibility of the substation structure due to the deciduous nature of the surrounding trees. As demonstrated in the winter view the lower portions of the substation, approximately 15-20 feet, will be obscured by the earth berm and evergreen screening; however, the remaining portions of the structure is expected to be visible through the tree branches and trunks.

View 4 – Approximately 700 feet southeast from the intersection of Cheechunk Road and Hartley Road along Hartley Road (near Heritage Trail), looking northeast toward the proposed substation structures from approximately 650 feet. During "leaf on" conditions, the substation structure is not visible. "Leaf off" conditions allow for some visibility of the substation structure due to the deciduous nature of the surrounding trees; however, this is limited to the top 15-20 feet of the structure. As can be seen from the photograph views of the "H" frame are obscured by the tree branch and trunk cover.

the substation structure is visible from this location during "leaf on" and "leaf off" conditions; however, this is limited to the top of the structure due to the proposed evergreen landscaping strategically placed within the curvature of the entry driveway. The landscaping and curvature of the driveway allow for the lower portions, approximately 10-15 feet, of the substation to be screened.

View 6 – Approximately 500 feet west from the intersection of Echo Lake Road and Hartley Road along Echo Lake Road, looking east toward the proposed substation structure from approximately 1,250 feet. Views of the substation structure, during "leaf off" conditions are mostly obscured in this location due to existing vegetation (i.e. tree trunks, branches, and brush) and the distance from the substation. The top 10-15 feet of the structures are expected to be barely visible at this distance as indicated in the photograph; no "leaf on" view is provided due to heavier vegetation and reduced visibility of the site from this location.

View 7 – This view is approximately 1,100 feet southeast from the intersection of Cheechunk Road and Hartley Road along Hartley Road (Heritage Trail), looking north toward the proposed substation structure from approximately 875 feet. Views of the substation structure, during "leaf off" conditions, are mostly obscured in this location due to existing vegetation (i.e. tree trunks and branches) the top 10-15 feet of the structures are expected to be partially visible at this distance. The steel poles located along Hartley Road, within the ORU right-of-way, will be visible from this view. No summer-time ("leaf on") view is provided since the view is not expected to be substantially different from the "leaf off" condition with the exception that additional vegetation cover will provide increase screening of these poles.

These photograph locations are illustrated on the "Photo Location Plan" attached to this report.

HERITAGE TRAIL VIEWSHED ANALYSIS:

In addition to the photo-simulations of the substation, as described above, CMX has performed a view shed analysis from the Heritage Trail of the proposed substation. Under the direction of ORU, on March 30, 2011 ("leaf off" conditions), our office performed the analysis which included photographs along the trail at 17 equally-spaced locations. These locations (views) are shown on a map titled "Photo Location – Along Heritage Trail" within section 5 of this report. The methodology of this study is similar to that described above. CMX elevated a red weather balloon to the highest point of the substation and took photographs along the trail.

The analysis of these views revealed that the proposed substation will be visible from 13 of the 17 targeted views (views 1-13); however, these views are limited to the top 15-20 feet of the structures and are mostly obscured by existing vegetation (i.e. tree trunks, branches, and brush). It is expected that visibility of the proposed substation will be further reduced and/or completely eliminated during summer "leaf on" conditions. These views are attached herewith and made part of this report (section 6).

View 9 along Heritage Trail, which is the same location as *Winter View 7* (section 4 of this report), was decided to be photo-simulated because it presents views of the transmission poles along the Orange and Rockland transmission line to the substation (refer to description for View 7 above).

PHOTOGRAPH PROCESS AND SIMULATIONS:
Photographs of the weather balloon from each view point were taken with a Canon EOS Digital Rebel XSI camera. The zoom setting was 55 mm. One, three-foot diameter helium filled red balloon was floated to a height of 66 feet, equivalent to the substation structure's height.

Utilizing 3D software, the substation was rendered to reflect actual conditions. Upon completion of the rendering, the camera location was positioned based on the photograph location, angle, and approximate height based on GIS topographical information. This produced a realistic true-scale view of the proposed substation. A snapshot of each view (for the substation structures) was created and superimposed into each photograph/view (as described above), matching the weather balloon's height and location utilizing Adobe PhotoShop. Minor manipulations of the snapshot renderings were performed to align the substation with the balloon location. Additionally, the snapshot views were cropped to illustrate existing vegetation that would remain both in the foreground and background of the substation, be it summer or winter foliage.

Simulated views of the proposed substation are attached to this report in addition to the balloon test photographs to illustrate that the substation has been positioned properly.

CONCLUSION:
CMX has explored the pre-determined locations and concludes that most of the photographed locations –with the exception of the main entrance to the substation- did not reveal significant views of the proposed substation and are at such a distance that the site was not entirely visible. Furthermore, the addition of evergreen trees at the top of a 4 to 6 foot high berm (at the north portion of the project) screens a significant portion of the lower areas of the substation.

As shown on the attached documentation, the proposed substation is expected to be partially or completely obscured by mature vegetation, the natural terrain, or distance during "leaf on" and a majority of the "lead off" conditions. Those areas which have views of the substation year-long reveal that only the top of the structure (approximately 15-20 feet) is visible with the exception of View 7 from the Heritage Trail, which presents views of the transmission towers proposed along 100 foot ORU right-of-way.

Additionally, certain areas will provide visibility to the substation only during winter "leaf off" conditions (through tree trunks and branches); these views however, are greatly reduced when foliage is restored.

Very Truly Yours,
CMX

Michel Finan, PE LEED®AP
Senior Associate/ Project Manager

\White Plains\Jobs\Orange and Rockland Utilities\57031200100\GIS\Projects\PhotoLocation.mxt

CMX

CMX Engineering Survey & Landscaping Architects, PC
Subsidiary of Birdsall Services Group

1311 MAMARONECK AVENUE
SUITE 50
WHITE PLAINS, NY 10605
TEL (914) 686-1000
FAX (914) 682-1222

PHOTO LOCATION PLAN

HARTLEY ROAD SUBSTATION

TOWN OF GOSHEN ORANGE COUNTY NEW YORK

VIEW 1 EXISTING

VIEW 1 PROPOSED

SUMMER VIEW 1

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\570312000100\Photos\HartleyViewsRev.ppt

VIEW 2 EXISTING

VIEW 2 PROPOSED

SUMMER VIEW 2

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\570312000100\Photos\HartleyViewsRev.ppt

VIEW 3 EXISTING

VIEW 3 PROPOSED

SUMMER VIEW 3

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\5703120000100\Photos\Hartley Views Rev.ppt

VIEW 4 EXISTING

VIEW 4 PROPOSED (NO VIEW)

SUMMER VIEW 4

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\57031200100\Photos\HartleyViewsRev.ppt

VIEW 5 EXISTING

VIEW 5 PROPOSED

SUMMER VIEW 5

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\57031200\100\Photos\HartleyViewsRev.ppt

VIEW 1 EXISTING

VIEW 1 PROPOSED

WINTER VIEW 1

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\57031200\100\Photos\Hartley Views Rev.ppt

VIEW 2 EXISTING

VIEW 2 PROPOSED

WINTER VIEW 2

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\5703120000100\Photos\HartleyViewsRev.ppt

VIEW 3 EXISTING

VIEW 3 PROPOSED

WINTER VIEW 3

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\57031200\100\Photos\HartleyViewsRev.ppt

VIEW 4 EXISTING

VIEW 4 PROPOSED

WINTER VIEW 4

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\5703120000100\Photos\HartleyViewsRev.ppt

VIEW 5 EXISTING

VIEW 5 PROPOSED

WINTER VIEW 5

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

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VIEW 6 EXISTING

VIEW 6 PROPOSED

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Image Source: CMX

WINTER VIEW 6

Hartley Road Substation

Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

VIEW 7 EXISTING

VIEW 7 PROPOSED

WINTER VIEW 7

Hartley Road Substation

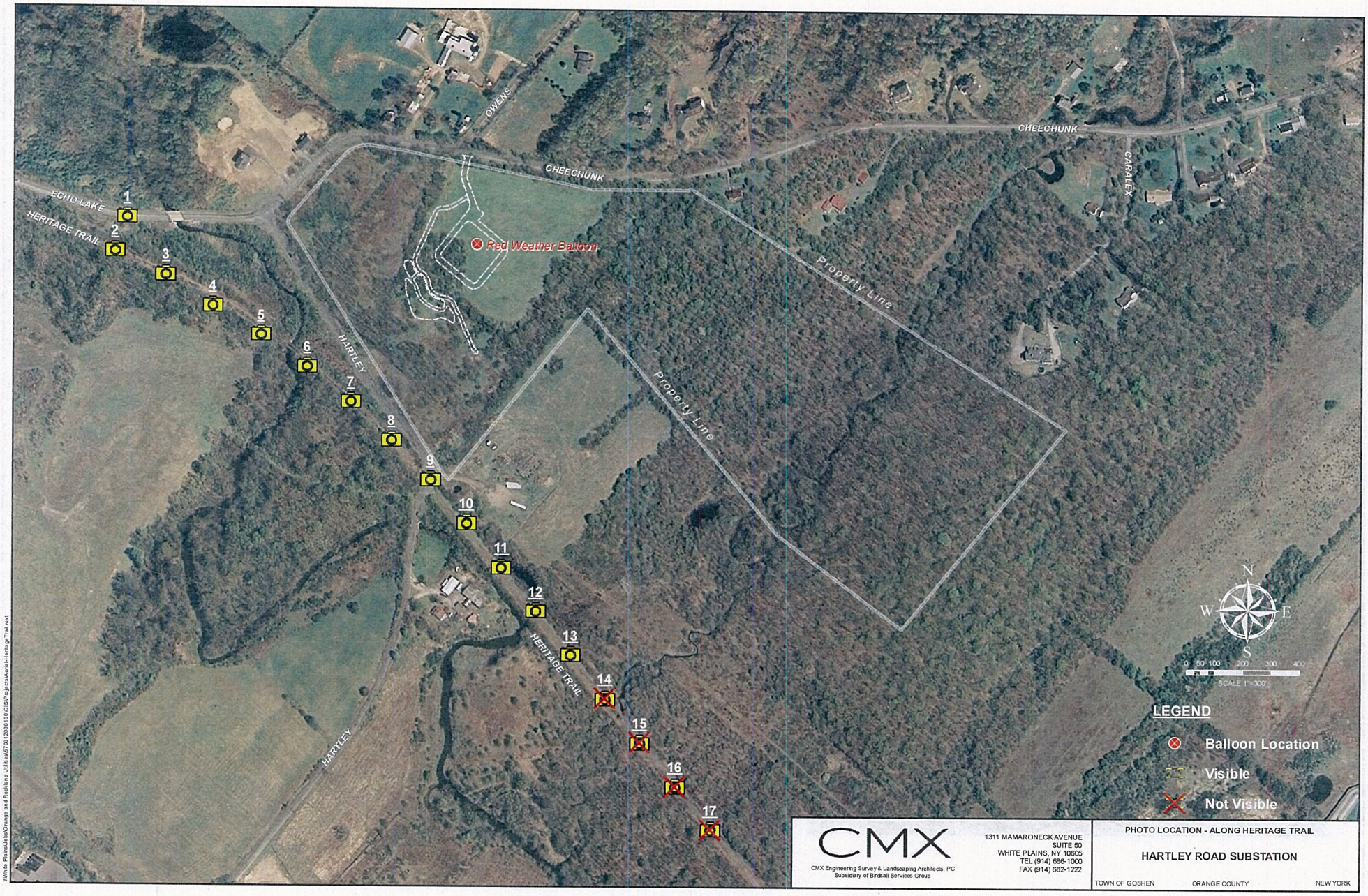
Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\57031200100\Photos\HartleyViewsRev.ppt



CMX

CMX Engineering Survey & Landscaping Architects, PC
Subsidiary of Birdsall Services Group

1311 MAMARONECK AVENUE
SUITE 50
WHITE PLAINS, NY 10605
TEL (914) 686-1000
FAX (914) 682-1222

PHOTO LOCATION - ALONG HERITAGE TRAIL

HARTLEY ROAD SUBSTATION

TOWN OF GOSHEN ORANGE COUNTY NEW YORK

White Plains/Jobs/Orange and Rockland Utilities/57013200/100CSI/Projects/Aerial-HeritageTrail.mxd

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VIEW 1 FROM ECHO LAKE ROAD

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\Photos\HeritageTrail_033011\HeritageTrail.pptx

VIEW 2 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

VIEW 3 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

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VIEW 4 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

VIEW 5 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

\\White Plains\Jobs\Orange and Rockland Utilities\Photos\HeritageTrail_033011\HeritageTrail.pptx

VIEW 6 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

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VIEW 7 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

Image Source: CMX

\\White Plains\Jobs\Orange and Rockland Utilities\Photos\HeritageTrail_033011\HeritageTrail.pptx

VIEW 8 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

VIEW 9 INTERSECTION AT HARTLEY ROAD & HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

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VIEW 10 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

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VIEW 11 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

Image Source: CMX

VIEW 12 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

VIEW 13 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

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VIEW 14 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.

Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

VIEW 15 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

VIEW 16 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

VIEW 16 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

VIEW 17 FROM HERITAGE TRAIL

Hartley Road Substation
Orange and Rockland Utilities, Inc.
Town of Goshen, Orange County, New York

Image Source: CMX

CMX 1311 Mamaroneck Avenue Suite 50 White Plains New York

APPENDIX D
Flora Survey

KLEINFELDER
Bright People. Right Solutions.

September 7, 2011

Gwen H. Keeble
Section Manager, Environmental Services
Orange and Rockland Utilities, Inc.
390 West Route 59
Spring Valley, New York 10977-5300

Re: Proposed Hartley Road Electrical Substation Flora Surveys
Kleinfelder Project # 121732

Ms. Keeble,

Orange and Rockland Utilities, Inc. (ORU) is proposing to construct a new electrical substation on Cheechunk Road in the Town of Goshen to improve electrical reliability and meet the needs of a growing consumer base in the surrounding Orange County area. The Proposed Project will consist of the development of a new electrical substation constructed on an engineered gravel pad, installation of ancillary equipment, construction of an access driveway off of Cheechunk Road, overhead transmission line spur to bring electricity to the substation, distribution lines to distribute electricity to the surrounding area, onsite access road to the transmission line spur, stormwater retention pond and treatment system, and an earthen berm and landscaping to minimize visual impacts.

Survey Methods

A survey of flora at the proposed 6.01 acre Hartley Road Electrical Substation was conducted by Kleinfelder biologists (Jamie Morgan and Steven Finch) on August 30, 2011. The study area (see Figure 4 of Draft Environmental Impact Statement) was traversed in a zig-zag pattern, identifying all species that were encountered as best as could be accomplished given the available identifiable features (flowers, fruits, etc.). Species that were not readily recognized were identified with standard field guides.

Habitat Descriptions

Three main habitat types were observed within the proposed 6.01 acre substation area. These consisted of fallow agricultural field, early stage deciduous forest, and mixed emergent/forested wetland. Species that were observed in the aforementioned habitats are listed in Table 1, Table 2 and Table 3, respectively. All nomenclature follows the United States Department of Agriculture Plants Database.

The fallow fields were dominated by common wormwood (*Artemesia vulgaris*) and wrinkleleaf goldenrod (*Solidago rugosa*) (Photograph 1). The canopy of the forested areas was mainly a monoculture of common buckthorn (*Rhamnus cathartica*) and

1279 Route 300, 2nd Floor, Newburgh, NY 12550 **p** | 845.567.6530 **f** | 845.567.6542

ground layer vegetation was highly variable (Photograph 2). The wetland overstory was predominantly green ash (*Fraxinus pennsylvanica*) with some shrub cover of silky dogwood (*Cornus amomom*) (Photograph 3). Ground layer vegetation was highly variable depending on the degree of previous farming disturbance.

Conclusions

As a result of the work conducted by Kleinfelder, we are confident that no known protected species occur within the proposed project area. If the current project area changes, further survey of those areas will be performed.

We trust you will find this information useful in your review of this issue. We also ask that you provide written concurrence with our findings at your earliest convenience. If you have any questions or require additional information regarding this effort, please feel free to contact me at 845-567-6530, ext 147 or via email at dtompkins@kleinfelder.com.

Sincerely,
Kleinfelder East, Inc.

Jamie M. Morgan
Ecologist

David B. Tompkins, CWB, PWS
Environmental Program Manager

KLEINFELDER 1279 Route 300, 2nd Floor, Newburgh, NY 12550 **p** | 845.567.6530 **f** | 845.567.6542

SPECIES LISTS

Table 1. Species list for fallow field habitat observed at the project site.

Common Name	Scientific Name	NY Status
Trees		
green ash	*Fraxinus pennsylvanica*	not listed
honeylocust	*Gleditsia triacanthos*	not listed
common buckthorn	*Rhamnus cathartica*	not listed
Shrubs/Vines		
multiflora rose	*Rosa multiflora*	not listed
American red raspberry	*Rubus idaeus*	not listed
riverbank grape	*Vitis riparia*	not listed
Herbs		
tall hairy agrimony	*Agrimonia gryposepala*	not listed
annual ragweed	*Ambrosia artemisiifolia*	not listed
common wormwood	*Artemesia vulgaris*	not listed
milkweed	*Asclepias spp.*	NA
smallspike false nettle	*Boehmeria cylindrica*	not listed
hedge false bindweed	*Calystegia sepium*	not listed
Canada thistle	*Circium arvense*	not listed
Queen Anne's lace	*Daucus carota*	not listed
Deptford pink	*Dianthus armeria*	not listed
eastern daisy fleabane	*Erigeron annuus*	not listed
flat-top goldenrod	*Euthamia graminifolia*	not listed
common marsh bedstraw	*Galium palustre*	not listed
false baby's breath	*Gallium mollugo*	not listed
flaxleaf whitetop aster	*Ionactis linariifolius*	not listed
bird's-foot trefoil	*Lotus corniculatus*	not listed
American water horehound	*Lycopus americanus*	not listed
purple loosestrife	*Lythrum salicaria*	not listed
common balm	*Melissa officinalis*	not listed
catnip	*Nepeta cataria*	not listed
common yellow oxalis	*Oxalis stricta*	not listed
ivyleaf groundcherry	*Physalis hederifolia*	not listed
American pokeweed	*Phytolacca americana*	not listed
bitter dock	*Rumex obtusifolius*	not listed
bladder campion	*Silene latifolia*	not listed
Carolina horsenettle	*Solanum carolinense*	not listed
wrinkleleaf goldenrod	*Solidago rugosa*	not listed
calico aster	*Symphyotrichum lateriflorum*	not listed
red cloverr	*Trifolium pratense*	not listed
bird vetch	*Vicia cracca*	not listed

Common Name	Scientific Name	NY Status
Graminoids, Table 1 continued		
fringed brome	*Bromus ciliatus*	not listed
fox sedge	*Carex vulpenoidea*	not listed
quackgrass	*Eymus repens*	not listed
soft rush	*Juncus effusus*	not listed
reed canarygrass	*Phalaris arundinacea*	not listed
yellow foxtail	*Setaria pumila*	not listed
green bristlegrass	*Setaria viridis*	not listed

Table 2. Species list for the early stage deciduous forest habitat observed at the project site.

Common Name	Scientific Name	NY Status
Trees		
shagbark hickory	*Carya ovata*	not listed
green ash	*Fraxinus pennsylvanica*	not listed
honeylocust	*Gleditsia triacanthos*	not listed
eastern cottonwood	*Populus deltoides*	not listed
black cherry	*Prunus serotina*	not listed
pin oak	*Quercus palustris*	not listed
red oak	*Quercus rubrum*	not listed
common buckthorn	*Rhamnus cathartica*	not listed
American elm	*Ulmus americana*	not listed
Shrubs/Vines		
Oriental bittersweet	*Celastrus orbiculatus*	not listed
gray dogwood	*Cornus racemosa*	not listed
Japanese honeysuckle	*Lonicera japonica*	not listed
Morrow's honeysuckle	*Lonicera morrowii*	not listed
Virginia creeper	*Parthenocissus quinquefolia*	not listed
multiflora rose	*Rosa multiflora*	not listed
American red raspberry	*Rubus idaeus*	not listed
wine raspberry	*Rubus phoenicolasius*	not listed
poison ivy	*Toxicodendron radicans*	not listed
summer grape	*Vitis aestivalis*	not listed
Herbs		
tall hairy agrimony	*Agrimonia gryposepala*	not listed
garlic mustard	*Alliaria petiolata*	not listed
common wormwood	*Artemesia vulgaris*	not listed
milkweed	*Asclepias spp.*	NA
smallspike false nettle	*Boehmeria cylindrica*	not listed
Canada thistle	*Circium arvense*	not listed
richweed	*Collinsonia canadensis*	not listed

Common Name	Scientific Name	NY Status
Herbs, Table 2 continued		
Queen Anne's lace	*Daucus carota*	not listed
eastern daisy fleabane	*Erigeron annuus*	not listed
largeleaf avens	*Geum macrophyllum*	not listed
spotted jewelweed	*Impatiens capensis*	not listed
soft rush	*Juncus effusus*	not listed
common motherwort	*Leonurus cardiaca*	not listed
creeping jenny	*Lysmachia nummularia*	not listed
common balm	*Melissa officinalis*	not listed
sensitive fern	*Onoclea sensibilis*	not listed
common yellow oxalis	*Oxalis stricta*	not listed
American pokeweed	*Phytolacca americana*	not listed
Canadian clearweed	*Pilea pumila*	not listed
Pennsylvania smartweed	*Polygonum pensylvanicum*	not listed
jumpseed	*Polygonum virginianum*	not listed
tall rattlesnakeroot	*Prenanthes altissima*	not listed
bitter dock	*Rumex obtusifolius*	not listed
Carolina horsenettle	*Solanum carolinense*	not listed
Canada goldenrod	*Solidago canadensis*	not listed
wrinkleleaf goldenrod	*Solidago rugosa*	not listed
calico aster	*Symphyotrichum lateriflorum*	
Graminoids		
Japanese bristlegrass	*Setaria faberi*	not listed

Table 3. Species list for the mixed emergent/forest wetland habitat observed at the project site.

Common Name	Scientific Name	NY Status
Trees		
green ash	*Fraxinus pennsylvanica*	not listed
Shrubs/Vines		
silky dogwood	*Cornus amomum*	not listed
scaldweed	*Cuscuta gronovii*	not listed
Morrow's honeysuckle	*Lonicera morrowii*	not listed
Virginia creeper	*Parthenocissus quinquefolia*	not listed
multiflora rose	*Rosa multiflora*	not listed
common blackberry	*Rubus allegheniensis*	not listed
poison ivy	*Toxicodendron radicans*	not listed
southern arrowwood	*Viburnum dentatum*	not listed
Herbs		
tall hairy agrimony	*Agrimonia gryposepala*	not listed
annual ragweed	*Ambrosia artemisiifolia*	not listed
purplestem angelica	*Angelica atropurpurea*	not listed

Common Name	Scientific Name	NY Status
Herbs, Table 3 continued		
common wormwood	*Artemesia vulgaris*	not listed
milkweed	*Asclepias spp.*	NA
Canada thistle	*Circium arvense*	not listed
spotted jewelweed	*Impatiens capensis*	not listed
morning glory	*Ipomoea spp.*	NA
northern bugleweed	*Lycopus uniflorus*	not listed
creeping jenny	*Lysmachia nummularia*	not listed
purple loosestrife	*Lythrum salicaria*	not listed
American pokeweed	*Phytolacca americana*	not listed
arrowleaf tearthumb	*Polygonum sagittatum*	not listed
tall rattlesnakeroot	*Prenanthes altissima*	not listed
narrowleaf mountainmint	*Pycnanthemum tenuifolium*	not listed
Canada goldenrod	*Solidago canadensis*	not listed
giant goldenrod	*Solidago gigantea*	not listed
calico aster	*Symphyotrichum lateriflorum*	not listed
New York ironweed	*Vernonia noveboracensis*	not listed
bird vetch	*Vicia cracca*	not listed
Graminoids		
upright sedge	Carex stricta	not listed
yellow nutsedge	Cyperus esculentus	not listed
soft rush	*Juncus effusus*	not listed
rice cutgrass	*Leersia oryzoides*	not listed
reed canarygrass	*Phalaris arundinacea*	not listed

PHOTOGRAPHS

Photograph 1. View north, of the fallow agricultural field that will serve as the main site for the electrical substation. The field was dominated by wrinkleleaf goldenrod and common wormwood.

Photograph 2. View south of the early stage deciduous forest where the right-of-way leading to the substation from Hartley will be located. The canopy was dominated by common buckthorn.

Photograph 3. View south of the mixed emergent/forested wetland where the right-of-way leading to the substation from Hartley Road will be located. The canopy was predominantly green ash, with a variable understory.

APPENDIX E
CMX Tree Survey Data

CMX

MEMORANDUM

TO: **Gwen Keeble, Orange & Rockland Environmental Services**

FROM: **Douglas J. Chabrak** DJC

DATE: **March 11, 2011**

RE: **Outline of Protected Species for the Hartley Road Substation**

CC: **Mike Homenick, O&R**
Diego Morales, O&R
Chuck Utschig, CMX

This memorandum provides an outline of completed tasks and recommendations for next steps relative to threatened and endangered species (i.e. protected species) for the above-referenced project. Conclusions and opinion offered herein are based on site visits, review of existing available information and agency coordination. Protected species on both the State and Federal levels were addressed.

Originally in 2009, on the behalf of Orange & Rockland Utilities, Inc. (O&R), CMX completed an ecological screening for the subject site which included revicwing existing available information prepared by the New York Department of Environmental Conservation (NYDEC) relative to geographic information system (GIS) mapping of protected species and significant natural communities, reviewing the list of Federally listed species prepared by the US Fish and Wildlife Service (USFWS), as well as obtaining written responses concerning protected species from the NYDEC and NYDEC Natural Heritage Program (NHP).

The NYDEC GIS mapping reviewed indicated that the subject site is located outside of an area mapped as containing protected species and any significant natural communities. The written response from the NYDEC dated October 29, 2009 indicated that according to the State's Master Habitat Databank there are no state listed species on or near the subject site and that an Article 11 (Protected Species) permit is not required. The NHP written response dated October 2, 2009 indicated that there are no known records of rare or state listed animals, plants significant natural communities on or in the immediate vicinity of the site. Lastly, the list of Federally protected species for Orange County prepared by the USFWS was reviewed. It was then determined by onsite inspection that the subject site contained potential habitat for the listed Bog Turtle and Indiana Bat.

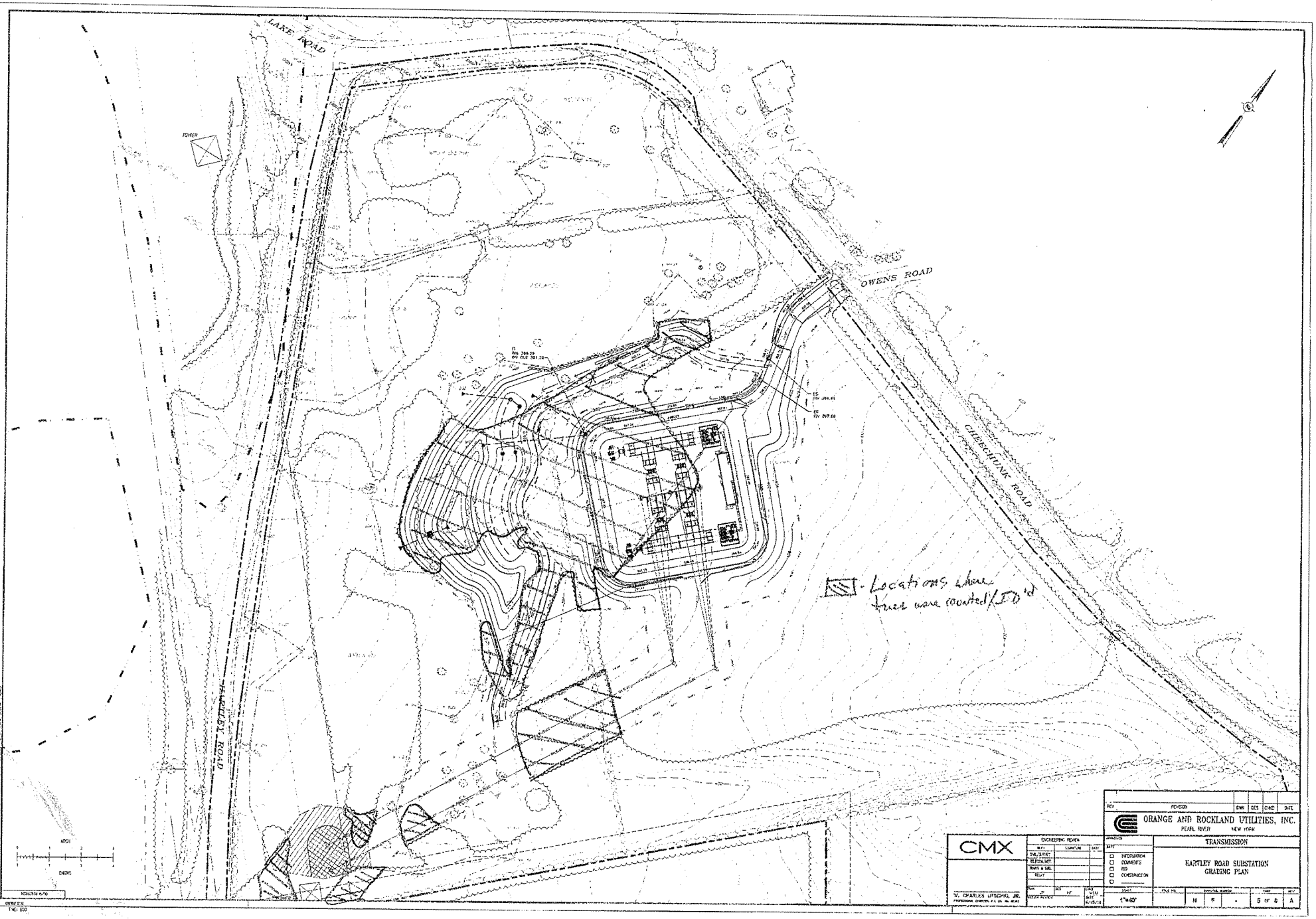
In reaction to the potential onsite presence of Bog Turtle and Indiana Bat habitat, a Phase I Bog Turtle Habitat Evaluation was completed on July 22, 2010 by a USFWS recognized bog turtle surveyor (Scott Angus of Amy Greene Environmental Consultants, Inc.), and CMX identified the trees within the limit of disturbance by cruising the area and listing tree species equal to and greater than 6 inches diameter at breast height (DBH). The Phase I habitat survey

verified that indeed Bog Turtle habitat is present onsite although the habitat is not good quality and it is doubtful that the wetlands support a population of Bog Turtles. Nevertheless, it is the intention of O&R to complete a Phase II Bog Turtle survey which investigates the site for the presence or absence of turtles.

On March 11, 2011, the same GIS mappings were reviewed and the information has not changed as the site is still located outside of an area mapped as containing protected species and any significant natural communities. However, since it is recommended that new written responses be obtained from the NYDEC and NHP, CMX will submit same as soon as possible and the written responses will be forwarded to O&R upon receipt.

In conclusion, it is recommended that new written responses be obtained from the NYDEC and NHP as indicated above. This process is underway and agency responses will be forwarded to O&R upon receipt. Additionally, it is recommended that the results of the Phase II Bog Turtle survey along with the tree identification list be submitted to the USFWS to request technical assistance relative to the Federal Endangered Species Act.

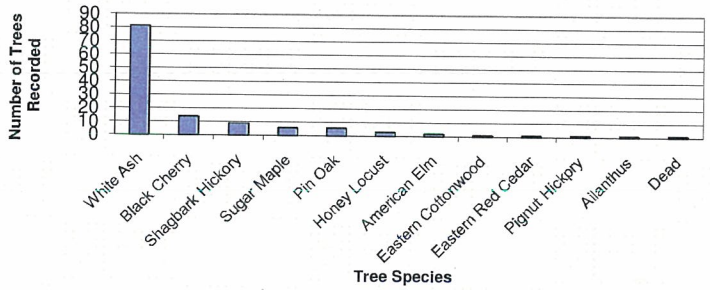
Please feel free to contact me at (908) 497-8900 extension 6105 or at Dchabrak@birdsall.comif you have any questions on the contents of this memorandum.


LAKE ROAD
OWENS ROAD
GILBERTSVILLE ROAD
HARTLEY ROAD
TOWER
= Locations where trees were counted/ID'd
ORANGE AND ROCKLAND UTILITIES, INC.
PEARL RIVER
NEW YORK
TRANSMISSION
HARTLEY ROAD SUBSTATION
GRADING PLAN
CMX
W. CHARLES UTSCHIG, JR.
ENGINEERING REVIEW
APPROVED
INFORMATION
COMMENTS
BID
CONSTRUCTION
1"=40'
5 OF 6
A

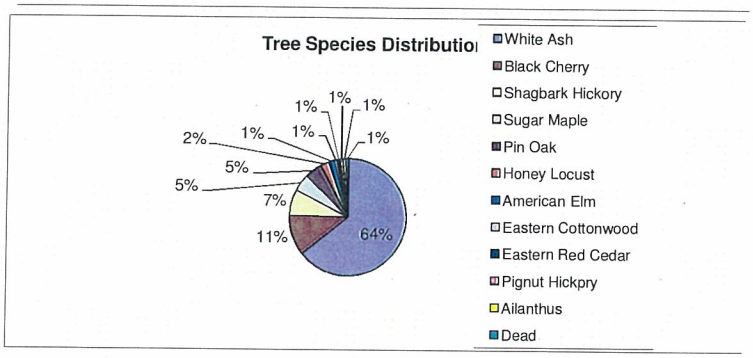
Common Name	Scientific Name	Tree Count
White Ash	*Fraxinus americana*	81
Black Cherry	*Prunus serotina*	14
Shagbark Hickory	*Carya ovata*	9
Sugar Maple	*Acer saccharum*	6
Pin Oak	*Quercus palustris*	6
Honey Locust	*Gleditsia triacanthos*	3
American Elm	*Ulmus americana*	2
Eastern Cottonwood	*Populus deltoides*	1
Eastern Red Cedar	*Juniperus verginiana*	1
Pignut Hickpry	*Carya glabra*	1
Ailanthus	*Ailanthus altissima*	1
Dead	*N/A*	1
total=		126

Size Category	Number of Trees Recorded
5-10" inch DBH	48
11-15" inch DBH	48
16-20" inch DBH	18
21-25"+ inch DBH	12
total=	126

Tree Species Distribution



Tree Size Distribution
Diameter at Breast Height (DHB), inches



Common Name	Scientific Name	Diameter at Breast Height (DBH, inches)	Comments
American Elm	*Ulmus americana*	4	
White Ash	*Fraxinus americana*	12	
White Ash	"	12,14	twin
White Ash	"	6	
White Ash	"	18	
White Ash	"	14	
White Ash	"	14	
White Ash	"	16	
White Ash	"	12	
White Ash	"	6, 6, 8	triple
Black Cherry	*Prunus serotina*	24	
Black Cherry	"	18	
Black Cherry	"	12	
Eastern Cottonwood	*Populus deltoides*	36	
White Ash	*Fraxinus americana*	14	
White Ash	"	16	
Pin Oak	*Quercus palustris*	8	
White Ash	*Fraxinus americana*	16	
White Ash	"	12	
White Ash	"	12	
Honey Locust	*Gleditsia triacnathos*	14	
Pin Oak	*Quercus palustris*	6	
White Ash	*Fraxinus americana*	8	
White Ash	"	8	
White Ash	"	12	
White Ash	"	14	
White Ash	"	12	
White Ash	"	11	
White Ash	"	6	
White Ash	"	12, 12	twin
White Ash	"	12	
White Ash	"	12	
White Ash	"	12	
White Ash		12	
Dead	*N/A*	12	
White Ash	*Fraxinus americana*	14	
Black Cherry	*Prunus serotina*	14	
Black Cherry	"	18	
Black Cherry	"	12	
Black Cherry	"	14	
Shagbark Hickory	*Carya ovata*	12	
Shagbark Hickory	"	16	
Shagbark Hickory	"	18	
Shagbark Hickory	"	14	

Black Cherry	*Prunus serotina*	24	
Black Cherry	"	12	
Honey Locust	*Gleditsia triacnathos*	12	
Honey Locust	"	19	
Shagbark Hickory	*Carya ovata*	24	
Shagbark Hickory	"	24	
Shagbark Hickory	"	24	
White Ash	"	6	
Black Cherry	*Prunus serotina*	8	
Ailanthus	*Ailanthus altissima*	20	
White Ash	*Fraxinus americana*	12	
Sugar Maple	*Acer saccharum*	12	
Black Cherry	*Prunus serotina*	12	
Black Cherry	"	24	
Pignut Hickory	*Carya glabra*	6	
White Ash	*Fraxinus americana*	18	
White Ash	"	6	
White Ash	"	6	
Black Cherry	*Prunus serotina*	20	
Sugar Maple	*Acer saccharum*	14	
Black Cherry	*Prunus serotina*	16	
White Ash	*Fraxinus americana*	6	
White Ash	"	12	
American Elm	*Ulmus americana*	12	
Sugar Maple	*Acer saccharum*	6	
White Ash	*Fraxinus americana*	14	
Shagbark Hickory	*Carya ovata*	6	
Sugar Maple	*Acer saccharum*	36	
Sugar Maple	"	24	
Pin Oak	*Quercus palustris*	6	
Pin Oak	"	12	
Pin Oak	"	6	
White Ash	*Fraxinus americana*	10	
White Ash	"	18	
Sugar Maple	*Acer saccharum*	24	
Sugar Maple	"	8	
Shagbark Hickory	*Carya ovata*	6	
White Ash	*Fraxinus americana*	6	
Pin Oak	*Quercus palustris*	20	
Eastern Red Cedar	*Juniperus virginiana*	16	
White Ash	*Fraxinus americana*	36	
White Ash	"	18	
White Ash	"	24	
White Ash	"	9	
White Ash	"	16	
White Ash	"	6	
White Ash	"	8	

White Ash	"	8	
White Ash	"	6	
White Ash	"	6	
White Ash	"	8	
White Ash	"	6	
White Ash	"	6	
White Ash	"	5	
White Ash	"	6	
White Ash	"	14	
White Ash	"	8	
White Ash	"	6	
White Ash	"	12	
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White Ash	"	6	
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White Ash	"	10	
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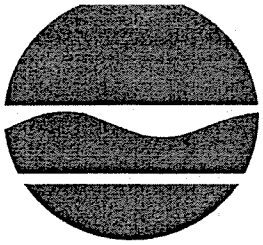
White Ash	"	14	
White Ash	"	12	
White Ash	"	7	
White Ash	"	6	
White Ash	"	14	
White Ash	"	12	
White Ash	"	10	
White Ash	"	14	
White Ash	"	14	
White Ash	"	10, 10	twin
White Ash	"	14	
White Ash	"	12	
White Ash	"	12	

APPENDIX F
Endangered, Threatened, Rare Species Screening Correspondence

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
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

RECEIVED
JUL 27 2011
BY:

July 25, 2011

Casey Tompkins
Kleinfelder East, Inc.
1279 Route 300, 2nd floor
Newburgh, NY 12550

Dear Mr. Tompkins:

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 Orange & Rockland Utilities New Electrical Substation, Project # 09 472 601, site as indicated on the map you provided, located on Cheechunk Road, Town of Goshen, Orange County.

We have no records of rare or state listed animals or plants, significant natural communities or other significant habitats, on or in the immediate vicinity of your site.

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. This information should not be substituted for on-site surveys that may be required for environmental assessment.

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.

This response applies only to known occurrences of rare or state-listed animals and plants, significant natural communities and other significant habitats maintained in the Natural Heritage Data bases. Your project may require additional review or permits; 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,

Jean Pietrusiak

Jean Pietrusiak, Information Services
NYS Department Environmental Conservation

Enc.
cc: Region 3

722

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, Albany, New York 12233-4757
Phone: (518) 402-8935 • FAX: (518) 402-8925

Alexander B. Grannis
Commissioner

October 2, 2009

Douglas J. Chabrak
C M X
20 Waterview Blvd, Bs 5245
Parsippany, NJ 07054

RECEIVED
OCT 05 2009
PARSIPPANY

Dear Mr. Chabrak:

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 Orange & Rockland Utilities, Project 09 472 601, One Substation and 3 Poles, sites as indicated on the map you provided, located on Hartley Road, Town of Goshen, Orange County.

We have no records of known occurrences of rare or state-listed animals or plants, significant natural communities, or other significant habitats, on or in the immediate vicinity of your site.

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 any information which indicates their presence. For most sites, comprehensive field surveys have not been conducted. For these reasons, we cannot provide a definitive statement on the presence or absence of rare or state-listed species, or of significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

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.

This response applies only to known occurrences of rare or state-listed animals and plants, significant natural communities and other significant habitats maintained in the Natural Heritage Data bases. Your project may require additional review or permits; 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, at the enclosed address.

Sincerely,
Tara Salerno
Tara Salerno, Information Services
NY Natural Heritage Program

Enc.
cc:

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 3
21 South Putt Corners Road, New Paltz, New York 12561-1620
Phone: (845) 256-3000 · **FAX:** (845) 255-4659
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

October 29, 2009

DOUGLAS CHABRAK
CMX
20 WATERVIEW BLVD
PO BOX 5245
PARSIPPANY, NJ 07054

RECEIVED
NOV 0 2 2009
PARSIPPANY

RE: DEC Clearinghouse ID #2806
Resource and Jurisdictional Screening
Orange & Rockland Substation
Town of Goshen, Orange County

Dear Mr. Chabrak:

On October 6, 2009 the New York State Department of Environmental Conservation (DEC or Department) received your request for a jurisdictional determination regarding the construction of an Orange & Rockland Utilities, Inc. substation in the Town of Goshen (location map attached). The Department has performed a resource and jurisdictional screening of this proposal and has determined the following:

1. Protection of Waters (Article 15) – The subject parcels contain portions of both the Rio Grande (Water Index # H-139-13-53, Class C) and a tributary to the Rio Grande (Water Index # H-139-13-53-1, Class C). As Class C streams, a Protection of Waters permit is not required for disturbance of their bed or banks. However, please note, that even though a permit is not required you are still responsible for ensuring that work shall not pollute any stream or water body or cause turbidity downstream of the area of work. 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 water body by silt, sediment, fuels, solvents, lubricants, or any other pollutant associated with the project.

2. Freshwater Wetlands (Article 24) - There are no NYS DEC regulated wetlands within the proposed site. Therefore, a Freshwater Wetlands Permit is not required from this Department.

3. State Listed Species (Article 11) - Our review of the State's Master Habitat Databank (MHBD) records indicate that no NYS Listed Species have been documented within or near the proposed site. Therefore, an Article 11 permit is not required from this Department.

4. Compliance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities (GP-0-08-001) – Compliance with this SPDES General Permit is required for construction projects that disturb one or more acres of land. 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. If no other DEC permits are required, the SWPPP must be prepared and the Notice of Intent (NOI) submitted to DEC to obtain coverage. Authorization for coverage under the SPDES general permit is not granted until approval of the SWPPP and issuance of the other necessary DEC permits.

Be advised that regulations applicable to the subject location are occasionally revised and the applicant should verify the need for permits if the project is delayed or postponed. It is possible that the DEC permit requirements noted above may change based upon additional information received or as project modifications occur. This

determination regarding the need for permits will remain effective for a maximum of one year unless you are otherwise notified.

Contact me with any questions or concerns that you may have at (845)256-3096.

Sincerely,

Adam Peterson
Environmental Analyst

Enclosure (Location Map)
Cc: Town of Goshen (w/enclosure)

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 3
21 South Putt Corners Road, New Paltz, New York 12561-1620
Phone: (845) 256-3054 • **FAX:** (845) 255-4659
Website: www.dec.ny.gov

RECEIVED
OCT 0 6 2011
BY:----------

Joe Martens
Commissioner

October 4, 2011

Casey M. Tompkins
Kleinfelder
1279 Route 300, 2nd floor
Newburgh, NY 12550

RE: Jurisdictional Screening Request, **CH 3622**
O&R Electrical Substation, Cheechunk Road
Town of Goshen, Orange County

Dear Mr. /Ms. Tompkins:

Based upon our review of your inquiry dated 7/12/11, we offer the following comments:

PROTECTION OF WATERS

The following stream(s) is(are) located within or near the site you indicated:

	Name	Class	DEC Water Index Number	Status
❑	Tribs of Rio Grande	[C]	H-139-13-53-1	[non-protected]

❑ A permit from the Department of Environmental Conservation is **not** required to disturb the bed or banks of "non-protected" streams. Please note, however, you are 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 **not** within a New York State protected Freshwater Wetland. However, please contact your town officials and the United States Army Corps of Engineers in New York City, telephone (917) 790-8511 (Westchester/Rockland Counties), or (917) 790-8411 (other counties), for any permitting they might require.

STATE-LISTED SPECIES

❑ No records of sensitive resources were identified by this review.

CULTURAL RESOURCES

We have reviewed the statewide inventory of archaeological resources maintained by the New York State Museum and the New York State Office of Parks, Recreation, and Historic Preservation. These records indicate that **the project is located within an area considered to be sensitive with regard to archaeological resources**. For more information, please visit the New York State Office of Historic Preservation website at http://nysparks.state.ny.us/.

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

-OVER PLEASE -

RE: Jurisdictional Screening Request, **CH 3622**
O&R Electrical Substation, Cheechunk Rd, Town of Goshen, Orange County

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

Cc: T/Goshen Planning Board

NOTE: Regarding erosion/sedimentation 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 for proposed 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. 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
Division of Environmental Permits, Region 3
21 South Putt Corners Road, New Paltz, New York 12561-1620
Phone: (845) 256-3054 • **FAX:** (845) 255-4659
Website: www.dec.ny.gov

Joe Martens
Commissioner

April 6, 2011

Orange and Rockland Utilities
EHS Environmental Services
390 West Route 59
Spring Valley, NY 10977

Douglas J. Chabrak
CMX Engineering
1311 Mamaroneck Ave, Suite 50
White Plains, NY 10605

RE: Hartley Road Substation
Town of Goshen, Orange County

Dear Mr. Chabrak:

Based upon our review of your inquiry dated March 14, 2011, we offer the following comments:

PROTECTION OF WATERS

The following stream(s)/pond(s)/waterbody(ies) is(are) located within or near the site you indicated:

Name	Class	DEC Water Index Number	Status
✓ Cheechunk Creek (Tributary of the Rio Grande)	[C]	H-139-13-53-1	[non-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." A permit is not required to disturb the bed or banks of "non-protected" streams.

If a permit is not required, please note, however, you are 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 not within a New York State protected Freshwater Wetland. However, please contact your town officials and the United States Army Corps of Engineers in New York City, telephone (917) 790-8511 (Westchester/Rockland Counties), or (917) 790-8411 (other counties), for any permitting they might require.

STATE-LISTED SPECIES

✓ DEC has reviewed the State's Master Habitat Databank (MHDB) records. We have determined that the site is located within or near record(s) of the following state-listed species: none

-OVER PLEASE -

CULTURAL RESOURCES

- ✓ We have reviewed the statewide inventory of archaeological resources maintained by the New York State Museum and the New York State Office of Parks, Recreation, and Historic Preservation. These records indicate that the project is located within an area considered to be sensitive with regard to archaeological resources. For more information, please visit the New York State Office of Historic Preservation website at http://nysparks.state.ny.us/.

OTHER

Please note that this letter only addresses the requirements for the following permits from the Department:
❒ Protection of Waters ❒ Master Habitat Databank ❒ Freshwater Wetlands
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.

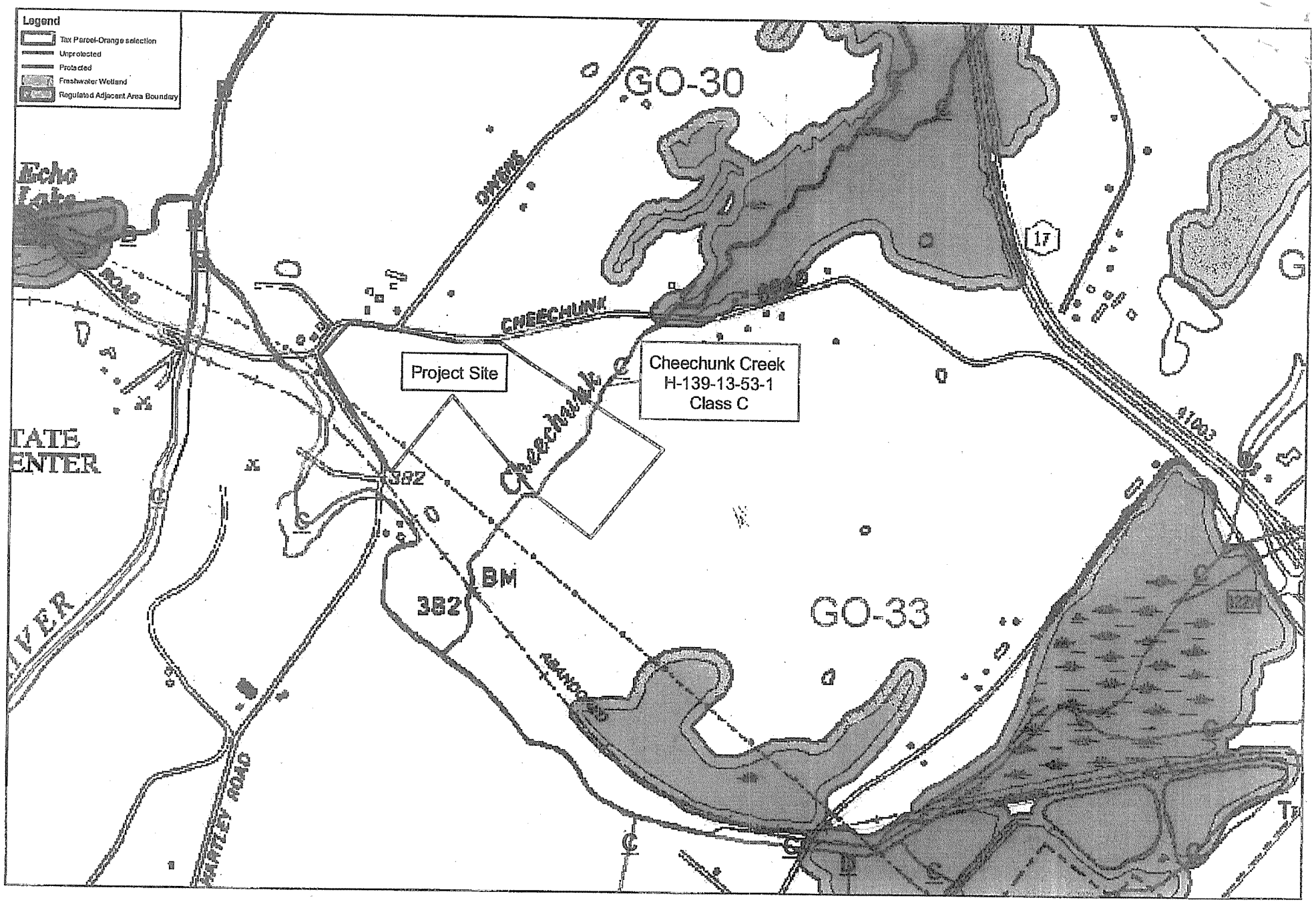
Sincerely,

Jared Pazienza
Division of Environmental Permits
Region 3, Telephone No. 845/256-3054

NOTE: Regarding erosion/sedimentation 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 for proposed 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. 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.



Hartley Road Substation
Goshen, Orange County

DEC Division of Environmental Permits 4/6/11

August 19, 2011

Ms. Robyn Niver
Endangered Species Biologist
United States Fish and Wildlife Service
New York Field Office
3817 Luker Street
Cortland, New York 13045

RE: RARE, THREATENED AND ENDANGERED SPECIES CONSULTATION
ORANGE & ROCKLAND UTILITIES, PROPOSED HARTLEY ROAD
GOSHEN SUBSTATION, NEW YORK
PROJECT #118891

Dear Ms. Niver:

Orange & Rockland Utilities, Inc. (ORU) is proposing a new electrical substation to be located at 157 Cheechunk Road, Goshen, New York. In July of 2010, Amy S. Greene Environmental Consultants conducted a Phase I Bog Turtle (*Glyptemys muhlenbergii*) survey pursuant to the "Bog Turtle (*Clemmys muhlenbergii*), Northern Populations, Recovery Plan" (dated May 15, 2001) and revisions dated April 2006. The results of the Phase I survey indicated that five areas of the site's wetlands (approximately 4± acres) were potentially suitable for bog turtles. Based upon these findings, ORU authorized Kleinfelder to conduct a Phase II survey.

A Phase II Bog Turtle survey was conducted by Kleinfelder and Bagdon Environmental biologists on four separate days, including May 19-20 and June 7-8. The results indicate that the onsite emergent /scrub shrub wetlands lack suitable soils and hydrology, suggesting these locations provide low habitat suitability for bog turtles. Area "E", although not a calcareous fen, is the only location that met all three parameters and that constitutes suitable habitat. Based upon the results of record searches and the extensive survey, it is very unlikely that bog turtles inhabit the wetland areas of the project area. Attached please find the said report for your review and concurrence.

We appreciate your timely review of this request. Please contact Dave Tompkins at (845) 567-6530 extension 147 or via email dtompkins@kleinfelder.com with any questions or concerns.

Respectfully submitted,

David B. Tompkins, CWB, PWS
Senior Principal Professional

Attachments

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KLEINFELDER
Bright People. Right Solutions.

October 14, 2011

Ms. Robyn Niver
Endangered Species Biologist
United States Fish and Wildlife Service
New York Field Office
3817 Luker Street
Cortland, New York 13045

Re: Rare, Threatened and Endangered Species Consultation
Orange and Rockland Utilities, Proposed Hartley Road Substation
Town of Goshen, Orange County, New York
Project # 121733

Dear Ms. Niver:

Orange and Rockland Utilities, Inc. (ORU) is proposing a new electrical substation to be located on 6.31 acres of a 48.73-acre parcel located at 157 Cheechunk Road in the Town of Goshen, Orange County, New York.

Preliminary contacts with both the NYSDEC and USFWS indicated that the site was within the range of known Indiana bat (Myotis sodalis) roosting habitat. Based on our preliminary analysis, the Project is estimated to impact approximately 6.31 acres of successional old field, mixed deciduous hardwoods, and emergent wetlands. On behalf of ORU, Kleinfelder East, Inc. conducted an Indiana Bat Habitat assessment. This report evaluated the suitability of the site for this species. The habitat assessment identified low potential roosting habitat for Indiana bats. Only three suitable trees were identified during the habitat assessment. All three trees are outside of the limits of disturbance and will be protected during site development. This report is appended for your review and concurrence.

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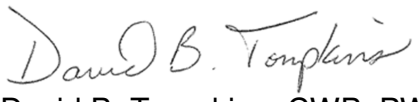
1279 Route 300, 2nd Floor, Newburgh, NY 12550 **p** | 845.567.6530 **f** | 845.567.6542

We appreciate your timely review of this request. Please contact Dave Tompkins at (845) 567-6530 extension 147 or via email at dtompkins@kleinfelder.com with any questions or concerns.

Respectfully submitted,



David B. Tompkins, CWB, PWS
Senior Principal Professional

Attachments

Copy: Lisa Masi, NYSDEC w/attachments
Gwen Keeble, Orange & Rockland Utilities w/attachments

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KLEINFELDER 1279 Route 300, 2nd Floor, Newburgh, NY 12550 **p** | 845.567.6530 **f** | 845.567.6542

APPENDIX G
Phase I Habitat Survey for Bog Turtle

AMY S. GREENE
ENVIRONMENTAL
CONSULTANTS, INC.

PHASE I HABITAT SURVEY

for

BOG TURTLE (*Glyptemys {Clemmys} muhlenbergii*)

for the

ORANGE & ROCKLAND UTILITIES
HARTLEY ROAD SITE

Town of Goshen, Orange County
New York

September 21, 2010

Prepared For:

Birdsall Engineering, Inc.
65 Jackson Drive
Cranford, NJ 07016
Attn: Douglas J. Chabrak

Sponsor:

Orange and Rockland Utilities, Inc.
One Blue Hill Plaza
Pearl River, New York 10965

Prepared By:

AMY S. GREENE ENVIRONMENTAL CONSULTANTS, INC.
4 Walter E. Foran Boulevard, Suite 209
Flemington, New Jersey 08822
ASGECI Project #3282

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Introduction

On July 22, 2010, in accordance with methodologies outlined in the US Fish and Wildlife Service's (USFWS) "Bog Turtle *(Glyptemys {Clemmys} muhlenbergii)* Northern Population Recovery Plan (May 2001, rev. March 2006)", Amy S. Greene Environmental Consultants, Inc. (ASGECI) conducted a Phase I Bog Turtle Habitat Survey for the Orange and Rockland Utilities, Inc. (O&R), Hartley Road Site. Wetlands located on and within 300 feet of the site were investigated for potential bog turtle habitats. Scott Angus, ASGECI staff USFWS Recognized Qualified Bog Turtle Surveyor for the Hudson/Housatonic Recovery Unit surveyed the wetlands within and adjacent to the project area.

The project area is located in the Town of Goshen, Orange County, New York; a county and township known to support populations of bog turtles (Appendix A- Figures). Photographs of the project area are included in Appendix B.

Purpose of Study

The bog turtle's northern population has been listed as threatened by the USFWS pursuant to Section 7 of the Endangered Species Act of 1973. USFWS guidelines require that surveys for bog turtle habitat (Phase I Bog Turtle Habitat Survey) be performed to determine if potential bog turtle habitat occurs in the vicinity of or within a proposed project limit, in a region where bog turtle habitat is known to be present. If potential bog turtle habitat is present then the USFWS may require a visual bog turtle survey (Phase II Bog Turtle Survey).

Survey Methodology

Analysis of aerial photography, county soil surveys and USFWS National Wetlands Inventory mapping were used to survey for potential bog turtle habitat. As mentioned above, an onsite field survey was also conducted. The entire project area was traversed on foot. Searches upstream and downstream at least 300 feet or to the greatest extent possible of the tributaries were conducted on foot to determine if there are any wetlands that could be classified as potential bog turtle habitats. A copy of the USFWS/PAFBC Bog Turtle Habitat Field Data Sheets is included in Appendix C.

Bog Turtle Range and Habitat

Bog turtles occur discontiguously in their northern population range in western, central and southern New York, adjacent counties in Connecticut and Massachusetts, New Jersey, Pennsylvania, northern Delaware and Maryland. In the southern population range they are found in southwestern Virginia, eastern Tennessee, northern Georgia, northwestern South Carolina and western North Carolina (Conant 1975). In New York, bog turtle populations may occur in Albany, Columbia, Dutchess, Genesee, Orange, Oswego, Putnam, Seneca, Sullivan, Ulster, and Westchester Counties. Historic records come from Albany, Monroe, Onondoga, Rensselaer, Rockland, Sullivan, Warren and Wayne Counties. Populations in Otsego and Tompkins Counties are thought to be extirpated.

Habitat for bog turtles includes sunlit marshy meadows, spring seeps, bogs, and fens, usually with clear, shallow slow-moving rivulets or brooks (Conant 1975; Behler and King 1979; Ernst et al. 1994). Vegetation can include cattails (*Typha latifolia, T. angustifolia*), tussock sedge (*Carex stricta)*, other sedge species *(Carex* spp., *Cyperus* spp., *Dulichium* spp.), rushes (*Juncus* spp.), bulrushes (*Scirpus* spp.), spikerushes (*Eleocharis* spp.), spotted jewelweed (*Impatiens capensis*), alders (*Alnus* spp.), skunk cabbage (*Symplocarpus foetidus*), arrow-leaved tearthumb (*Polygonum sagittatum*), rice cut-grass (*Leersia oryzoides*), and other open canopy wetland species (Cromartie, et al. 1982). Other elements listed in habitat descriptions include soft mucky substrates for burrowing and hibernation; an interspersion of wet and dry areas within sites, often with the presence of muskrat and meadow vole runways for travel corridors and cryptic basking sites; a mosaic of habitats present such as uplands, shallow water and muck, and deeper water; and a predominantly open canopy, with scattered areas of shrubs and small trees (USFWS 1997).

Site Description

The site is located in a rural section of the Town of Goshen, Orange County, New York. The surrounding land use is former agricultural late successional fields, an overhead power line utility right of way and rural residential.

Road frontage of the site is Hartley Road along the eastern edge and Cheechunk Road along the northern edge. The additional undeveloped O&R properties are found on the southern and western sides of the site.

In the northern portion of the site the topography slopes from north to south and flattens out prior to reaching Hartley Road. Along Hartley Road the topography is generally flat and continues south offsite to the Cheechunk Creek.

Two wetland areas are located on the site (See Appendix A - Figure 4). The first wetland (Wetland A) encompasses most of the northeastern portion of the site and contains a matrix of freshwater forested wetlands, interspersed with emergent and scrub/shrub wetlands. A second wetland (Wetland B) is found in the western portion of the site and is associated with the Cheechunk Creek and its floodplain.

The Cheechunk Creek drains within the site from north to south, offsite to the Wawayanda Creek approximately 2000 feet northwest of the site. The Wawayanda Creek eventually drains to the Wallkill River which flows north to the Hudson River.

The remainder of the natural communities on the site includes early successional fields, successional and mature mixed deciduous forests and hedgerows.

Discussion and Results

Wetland A

Wetland A is located in the northeastern portion of the site and is within the Action Area (as defined on the USFWS/PAFBC Bog Turtle Habitat Field Data Sheet included in Appendix C) of a substation that O&R proposes to construct.

Wetland A is a matrix of wetland communities containing forested wetlands, contiguously interspersed with emergent and scrub/shrub wetlands.
The most of the forested wetlands contained tight, solid soils although the hydrology appears to be groundwater fed at least in part. A small portion of the forested wetland contains and area of mucky groundwater fed substrates although the canopy cover was nearly 100% closed. This portion of the wetland feeds a portion of the emergent and scrub/shrub wetland which is located along Hartley Road. Forested portions of Wetland A contained skunk cabbage, spicebush, swamp white oak, multiflora rose and red maple.

Additional groundwater seepages within a potion of the emergent, scrub/shrub wetland feeds other portions of Wetland A. This area contains soft mucky substrates and nearly 100% open canopy.

The emergent, scrub/shrub portion of Wetland A is dominated by sedges (including tussock sedge), rushes, skunk cabbage, silky and red-panicled dogwood, common reed, royal, cinnamon and marsh fern, broad-leaved cattail, purple loosestrife and numerous other forb species.

Portions of Wetland A are classified as potential bog turtle habitat where soft mucky substrates and groundwater hydrology occur and were emergent, scrub/shrub vegetation dominates. The wetland meets the minimum criteria to be classified as bog turtle habitat, although it is poor quality and it is doubtful that bog turtles would be found in Wetland A.

Wetland B (outside Action Area)

Wetland B is outside the Action Area (as defined on the USFWS/PAFBC Bog Turtle Habitat Field Data Sheet included in Appendix C) and is located in the western portion of the site. Wetland B contains wetlands associated with the Cheechunk Creek and its floodplain.

Wetland B is generally forested and is dominated by swamp white oak, red maple, and green ash with an understory of lizard-tail, cardinal flower, pickerel weed and winged monkey flower.

The Cheechunk Creek drains within the site from north to south, offsite to the Wawayanda Creek approximately 2000 feet northwest of the site. The Wawayanda Creek eventually drains to the Wallkill River which flows north to the Hudson River.

Wetland B does not contain soft mucky substrates or groundwater fed hydrology. The entire wetland is forested, riverine and no suitable potential bog turtle habitat was identified within or adjacent to Wetland B.

Conclusion

ASGECI has determined that Wetland A contains areas of potential bog turtle habitat where the soils are soft and mucky; the hydrology is groundwater fed and except a small portion of forested wetlands the vegetation is emergent and/or scrub/shrub. Some of these areas of potential habitat are located within the Action Area of the proposed substation.

ASGECI does not characterize Wetland B as potential bog turtle habitat based upon the absence of soft, mucky substrates and unsuitable hydrology. In addition most of Wetland B is forested with an 85 to nearly 100% canopy cover.

Herptile species encountered during the investigation include pickerel frog (*Lithobates palustris*) and green frog (*Lithobates clamitans melanotus*).

Although the site contains wetlands that meet the USFWS criteria to be classified as potential bog turtle habitat it does not contain good quality habitat and it is doubtful that the site supports a bog turtle population.

It is anticipated that a Phase II Bog Turtle Visual Survey will be required to allow the project to progress, but it is understood that the final decision is under the jurisdiction of the USFWS.

References

Behler, J. L., and F. W. King. 1979. The Audubon Society Field Guide to North American Reptiles and Amphibians. Alfred A. Knopf, New York. 744 pp.

Conant, R. 1975. A Field Guide of Reptiles and Amphibians of Eastern and Central North America, second edition. Houghton Mifflin Company, Boston. 429 pp.

Cromartie, J. (ed.). 1982. New Jersey's Endangered and Threatened Plants and Animals – Second Symposium on Endangered Plants and Animals of New Jersey. Center for Environmental Research, Stockton State College, Pomona, New Jersey.

Ernst, C. H., J. E. Lovich, and R. W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, 578 pp.

U.S. Fish and Wildlife Service. 1997. Final rule to list the northern population of the bog turtle as threatened and the southern population as threatened due to similarity of appearance. Federal Register November 4, 1997. Vol.62, No. 213.

U.S. Fish and Wildlife Service. May 2001. Bog Turtle (*Clemmys muhlenbergii*) Northern Population Recovery Plan.

U.S. Fish and Wildlife Service April, 2006. Guidelines for Bog Turtle Surveys (Revised).

U.S. Army Corps of Engineers, Baltimore District. 2008a. Revision to the Pennsylvania State Programmatic General Permit (PASPGP-3) Bog Turtle Habitat Clearance Process. Special Public Notice #08-22. April 22, 2008.

U.S. Army Corps of Engineers, Baltimore District. 2008b. Revision to the Pennsylvania State Programmatic General Permit (PASPGP-3) Bog Turtle Habitat Clearance Process and Nationwide Permit Regional Condition. Special Public Notice #08-69. October 20, 2008.

APPENDIX A

FIGURES

Figure 1 – USGS Topographic Map
Figure 2 – SSURGO Soils Map
Figure 3 – NWI and NYDEC Wetlands Map
Figure 4 – Wetland Identification and Photograph

APPENDIX B

PHOTOGRAPHS

Photo A - View north of the scrub/shrub portion of Wetland A. Only portions of this wetland exhibited soft mucky substrates.

Photo B - View north of early successional forest along the edge of Wetland A.

Photo C - View southeast of an emergent portion of Wetland A. This area exhibited soft mucky substrates and was fed by groundwater from the area in the next photo (Photo D).

Photo D - View north of a freshwater seepage within the forested portion of Wetland A. This area is dominated by skunk cabbage and drains to the more open canopy wetlands along Hartley Road.

Photo E - View east of Wetland A were common reed dominates the vegetative layer. Where accessable this portion of thc wetland exhibited mucky soils and was fed by groundwater from a spring in the forest on the left side of the photo.

Photo F - View southwest of emergent wetland on the opposite side of Hartley Road from the site. This wetland exhibited soft mucky substrates and apparent ground water hydrology. This adjacent wetland is classified as potential bog turtle habitat.

Photo G - View east of a broad-leaved cattail dominated portion of Wetland A. The portion of the wetland exhibited soft mucky substrates and groundwater hydrology.

Photo H - View southwest of emergent wetland dominated by broad-leaved cattail within Wetland A. This portion of the wetland exhibited soft mucky soils and groundwater hydrology.

Photo I - View southwest of early successional field located onsite.

Photo J - View southwest looking at the moist meadow portion of Wetland A, which is adjacent to some of the potential bog turtle habitat. Soils here are heavy and tight.

Photo K - View east of successional forest which dominates most of the eastern side of the site.

Photo L - View east, of Wetland B, where an opening in the forested wetland of an emergent area dominated by pickerel weed (Pontederia cordata). Although the vegetation was emergent there was ponded water below the plants and not soft muck.

Photo M - View north, of Wetland B. The Cheechunk Creek is dominated within its banks by lizard's tail (Saururus cernus).

APPENDIX C

USFWS/PAFBC BOG TURTLE HABITAT FIELD FORMS

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form[1]

(revised 06/01/2006)

Project/Property Name: Hartley Road Site

Project type: Utitlity Substation

Applicant/Landowner Name: Orange and Rockland Utilities, Inc.

County: Orange Quad: Goshen, NY Township/Municipality: Town of Goshen

PNDI # N/A Potential conflict with USFWS species? ☐ Y ☒N

ACTION AREA[2]

Action area size: 300' from proposed substation Does the Phase 1 survey include all wetlands in the action area? ☒ Y ☐ N[3]

WETLAND ID: A **PHOTOS TAKEN:** ☒ **Yes** ☐ **No** **WETLAND SIZE:** _____ **acres**

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☐ 0.1-0.5 acre ☐ >0.5 to <1 acre ☐ 1-2 acres ☐ 2-4 acres ☒5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 41.411348 Long -74.372752.

(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 7/22/10 Time In: 7:30 am Time Out: 2:30 pm

Last precipitation: ☐ < 24 hours ☐ 1-7 days ☒> 1 week ☐ unknown Drought conditions? ☒Y ☐N ☐ Unknown

How much of this wetland is located *off-site* (*i.e.*, outside the property boundaries or right-of-way)?

☒ none of it – the entire wetland is within the property boundaries (skip next 2 questions)

☐some of it – _____ of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☐ all of it ☐ part of it (____% or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (*e.g.*, from the subject property or from a public road)?

☐ all of it ☐part of it (at least ___ acres) ☐ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☒Y** ☐N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☒Y ☐N ☐ Unknown

** Across Hartley Road to the east.

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.): Rural residential, early successional fields, forests, hedgerows.

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 35% ☒PSS 30 % ☒ PFO 35% ☐POW 0%

☒Y ☐ N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe Both Cheechunk Road and Hartley Road have impacted the wetlands on the site.

☒Y ☐N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe The overhead utility right-of-way is maintained. Invasive plant species are present.

Project Name Hartley Road Site *Wetland A (con't)*

Hydrology

☒ Y ☐ N Springs or seeps ☒ visible or ☐ likely ? Watercress present? ☐ Yes ☒ No
☐ Y ☒ N Spring houses in or adjacent to wetland?
☒ Y ☐ N Saturated soils present? If yes, year-round? ☒ Likely ☐ Unlikely ☐ Unknown
☒ Y ☐ N Water visible on surface? Check all that apply: ☒ small puddles/depressions (3-6 " deep)
☒ rivulets (3" deep) ☐ larger pools/ponds (__" deep) ☐ stream (_" deep)
☐ Y ☒ N Evidence of flooding? If yes, describe indicators:

Soils – PEM Portion of Wetland			
Mucky[4]*?* ☒ YES ☐ NO	How much of it (PEM) is **mucky**? ☐ <10% ☐ 10-29% ☒ 30-49% ☐ 50-70% ☐ >70%	**Mucky** soils range in depth from: 5 to 12"	**Most** of the **mucky part(s)** of the wetland can be probed[5]: ☐ 3-5" ☒ 6-8" ☐ 9-11" ☐ ≥12"
Non-mucky[6]*?* ☒ YES ☐ NO	How much of it (PEM) is **non-mucky**? ☐ <10% ☐ 10-29% ☒ 30-49% ☐ 50-70% ☐ >70%		
Soils – PSS and PFO Portions of Wetland			
Mucky[4]*?* ☒ YES ☐ NO	How much of it is **mucky**? ☐ <10% ☐ 10-29% ☐ 30-49% ☐ 50-70% ☐ >70% ☒ None	**Mucky** soils range in depth from: 5 to 12"	**Most** of the **mucky part(s)** of the wetland can be probed[5]: ☐ 3-5" ☒ 6-8" ☐ 9-11" ☐ ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also **BOLD** if dominant (≥ 20% coverage).
☒ **sedges** ☒ **rushes** ☒ **skunk cabbage** ☒ **cattail** ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
☒ sensitive fern ☐ rice cutgrass ☒ tearthumb ☐ reed canary grass ☒ *Phragmites* ☒ purple loosestrife
☒ alder ☒ **dogwood** ☒ **red maple** ☐ willow ☐ poison sumac ☒ multiflora rose ☒ **swamp white oak**
Additional dominant species: _____

Herptiles

Were any bog turtles observed? ☐ YES[7] ☒ NO If yes, how many? _____
Other herptiles ☒ observed ☐ previously observed: green frog, pickerel frog

Additional Comments/Observations: (use additional sheets if necessary) _____.

INVESTIGATOR'S OPINION

☒ YES ☐ NO ☐ UNSURE The hydrology criterion[8] for bog turtle habitat is met.
☒ YES ☐ NO ☐ UNSURE The soils criterion[8] for bog turtle habitat is met.
☒ YES ☐ NO ☐ UNSURE The vegetation criterion[8] for bog turtle habitat is met.
☒ YES ☐ NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Scott Angus _____ 3/18/10
Investigator's Name (print) Investigator's Signature Date

Contact info: Amy S. Greene Environmental Consultants, Inc. (908) 788-9676 (x22)

ENDNOTES – Bog Turtle Habitat Evaluation Form

1 Non-agency field form, to be used by consultants with training and expertise in Phase 1 bog turtle surveys.

2 The action area includes all areas that will be affected directly or indirectly by the action and not merely the immediate area involved in the action. For example, if the proposed action is a wetland fill to accommodate access to a proposed development, then the development is included in the action area.

3 The Phase 1 survey should include all wetlands in the action area. Contact the USFWS if you have questions about the extent of the action area for a particular project.

4 Soils are considered "mucky" if one can probe them to a depth of ≥ 3".

5 Probing is done with an approximately 1" diameter, blunt-ended pole (*e.g.*, a wooden broom handle).

6 Soils are considered "non-mucky" if one can probe them to a depth of < 3".

7 Report observations of bog turtles to the USFWS and PFBC within 48 hours.

8 See "BOG TURTLE HABITAT CRITERIA" (below)

BOG TURTLE HABITAT CRITERIA

Compare your Phase 1 survey observations to the habitat criteria below.

Suitable hydrology. Bog turtle wetlands are typically spring-fed with shallow surface water or saturated soils present year-round, although in summer the wet area(s) may be restricted to near spring head(s). Typically these wetlands are interspersed with dry and wet pockets. There is often subsurface flow. In addition, shallow rivulets (less than 4 inches deep) or pseudo-rivulets are often present. In some cases, the source of a wetland's hydrology is difficult to determine because springs and seeps are not visible. However, the *influence* of springs and seeps will be apparent (*e.g.*, presence of saturated soils year-round).

Suitable soils. Usually a bottom substrate of permanently saturated organic or mineral soils. These are often soft, mucky-like soils (this does not refer to a technical soil type); you will usually sink to your ankles (3-5 inches) or deeper, although in degraded wetlands or summers of dry years this may be limited to areas near spring heads or drainage ditches. In some portions of the species' range, the soft substrate consists of scattered pockets of peat instead of muck. In the areas of the wetland where saturated soils are present, you will be able to probe them to a depth of at least 3 inches, but pockets of 5 to 12 inches are likely to be present. During drought conditions, the extent and depth of mucky soils may be dramatically reduced over non-drought conditions, with soft, saturated soils being limited to areas near springs or seeps.

Suitable vegetation. Dominant vegetation of low grasses and sedges (in emergent wetlands), often with a scrub-shrub wetland component. Common emergent vegetation includes, but is not limited to: tussock sedge (*Carex stricta*), soft rush (*Juncus effusus*), rice cut grass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), tearthumbs (*Polygonum* spp.), jewelweeds (*Impatiens* spp.), arrowheads (*Saggitaria* spp.), skunk cabbage (*Symplocarpus foetidus*), panic grasses (*Panicum* spp.), other sedges (*Carex* spp.), spike rushes (*Eleocharis* spp.), grass-of-Parnassus (*Parnassia glauca*), shrubby cinquefoil (*Dasiphora fruticosa*), sweet-flag (*Acorus calamus*), and in disturbed sites, reed canary grass (*Phalaris arundinacea*) or purple loosestrife (*Lythrum salicaria*). Common scrub-shrub species include alder (*Alnus spp.*), red maple (*Acer rubrum*), willow (*Salix spp.*), tamarack (*Larix laricina*), and in disturbed sites, multiflora rose (*Rosa multiflora*). Some forested wetland habitats are suitable given hydrology, soils and/or historic land use. These forested wetlands include red maple, tamarack, and cedar swamps.

USFWS / PFBC Bog Turtle Habitat Evaluation Field Form[1]

(revised 06/01/2006)

Project/Property Name: Hartley Road Site

Project type: Utitlity Substation

Applicant/Landowner Name: Orange and Rockland Utilities, Inc.

County: Orange Quad: Goshen, NY Township/Municipality: Town of Goshen

PNDI # N/A Potential conflict with USFWS species? ☐ Y ☒N

ACTION AREA[2]

Action area size: 300' from proposed substation Does the Phase 1 survey include all wetlands in the action area? ☐ Y ☒N[3]

WETLAND ID: B **PHOTOS TAKEN:** ☒ Yes ☐ No **WETLAND SIZE:** _____ **acres**

Wetland size estimation – If actual acreage is not known at time of investigation, check one:

☐ < 0.1 acre ☐ 0.1-0.5 acre ☐ >0.5 to <1 acre ☐ 1-2 acres ☐ 2-4 acres ☒5+ acres ☐ 10+ acres

WETLAND LOCATION: Lat 41.409948 Long -74.366186

(approximate center of wetland) GPS Datum (check one): ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

SURVEY CONDITIONS & LIMITATIONS

Date of survey: 7/22/10 Time In: 7:30 am Time Out: 2:30 pm

Last precipitation: ☐ < 24 hours ☐ 1-7 days ☒> 1 week ☐ unknown Drought conditions? ☒Y ☐N ☐ Unknown

How much of this wetland is located *off-site* (*i.e.*, outside the property boundaries or right-of-way)?

☐ none of it – the entire wetland is within the property boundaries (skip next 2 questions)

☒some of it – 90 % (it is a stream corridor with wetlands) of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the *off-site portion* was surveyed (on foot)?

☐ none of it ☐ all of it ☒ part of it (10 % or _____ acres of the off-site portion)

How much of the *off-site portion* of this wetland is visible (*e.g.*, from the subject property or from a public road)?

☐ all of it ☐ part of it (at least ___ acres) ☒ none of it

Are there any wetlands located off-site and close enough to be affected by this project? ☐Y ☒ N ☐ Unknown

If yes, *could* they be potential bog turtle habitat? ☐Y ☐N ☐ Unknown

Describe surrounding landscape (wetlands, forest, subdivision, agricultural field, fallow field, etc.): Adjacent to. Rural residential, early successional field, dairy/beef farm.

WETLAND CHARACTERISTICS

Wetland type(s) present and % cover: ☒ PEM 35% ☒PSS % ☒ PFO 65% ☐POW 0%

☐Y ☒N Are there any signs of disturbance to *hydrology* (ditching, filling, ponds, roads, etc.)? If yes, describe _

☐Y ☒N Are there any signs of disturbance to *vegetation* (mowing, pasturing, burning, etc.)? If yes, describe _

Project Name Hartley Road Site *Wetland B (con't)*

Hydrology

☐Y ☒N Springs or seeps ☒ visible or ☐ likely ? Watercress present? ☐ Yes ☒ No
☐Y ☒N Spring houses in or adjacent to wetland?
☒Y ☐N Saturated soils present? If yes, year-round? ☒Likely ☐ Unlikely ☐ Unknown
☒Y ☐N Water visible on surface? Check all that apply: ☐small puddles/depressions (_" deep)
☐rivulets (_" deep) ☒larger pools/ponds (9 " deep) ☒stream (12" deep)
☐Y ☒N Evidence of flooding? If yes, describe indicators:

Soils – PEM Portion of Wetland			
Mucky[4]? ☐ YES ☒NO	How much of it (PEM) is **mucky**? ☐ <10% ☐10-29% ☐30-49% ☐ 50-70% ☐ >70%	**Mucky** soils range in depth from: "	**Most** of the **mucky part(s)** of the wetland can be probed[5]: ☐ 3-5" ☐6-8" ☐ 9-11" ☐ ≥12"
Non-mucky[6]? ☒YES ☐ NO	How much of it (PEM) is **non-mucky**? ☐ <10% ☐10-29% ☐ 30-49% ☐ 50-70% ☒>70%		
Soils – PSS and PFO Portions of Wetland			
Mucky[4]? ☐YES ☒NO	How much of it is **mucky**? ☐ <10% ☐10-29% ☐ 30-49% ☐ 50-70% ☐ >70% ☒None	**Mucky** soils range in depth from:	**Most** of the **mucky part(s)** of the wetland can be probed[5]: ☐ 3-5" ☐6-8" ☐ 9-11" ☐ ≥12"

Wetland Vegetation (characterize the wetland as a whole)

Check (X) if present (≥ 5% areal coverage), and also **BOLD** if dominant (≥ 20% coverage).
☐ sedges ☐rushes ☐skunk cabbage ☐cattail ☐ sweet flag ☐ jewelweed ☐ sphagnum moss
☒ sensitive fern ☐ rice cutgrass ☒ tearthumb ☐ reed canary grass ☐*Phragmites* ☐purple loosestrife
☐alder ☐dogwood ☒**red maple** ☐ willow ☐ poison sumac ☐ multiflora rose ☒ **swamp white oak**
Additional dominant species: **lizard-tail**, cardinal flower, winged monkeyflower.

Herptiles

Were any bog turtles observed? ☐ YES[7] ☒NO If yes, how many? _____
Other herptiles ☒observed ☐ previously observed: green frog, pickerel frog

Additional Comments/Observations: (use additional sheets if necessary) _____

INVESTIGATOR'S OPINION

☐YES ☒NO ☐ UNSURE The hydrology criterion[8] for bog turtle habitat is met.
☐YES ☒NO ☐ UNSURE The soils criterion[8] for bog turtle habitat is met.
☐YES ☒NO ☐ UNSURE The vegetation criterion[8] for bog turtle habitat is met.
☐YES ☒NO ☐ UNSURE This wetland is potential bog turtle habitat.

I certify that to the best of my knowledge, all of the information provided herein is accurate and complete.

Scott Angus _____ 3/18/10
Investigator's Name (print) Investigator's Signature Date

Contact info: Amy S. Greene Environmental Consultants, Inc. (908) 788-9676 (x22)

ENDNOTES – Bog Turtle Habitat Evaluation Form

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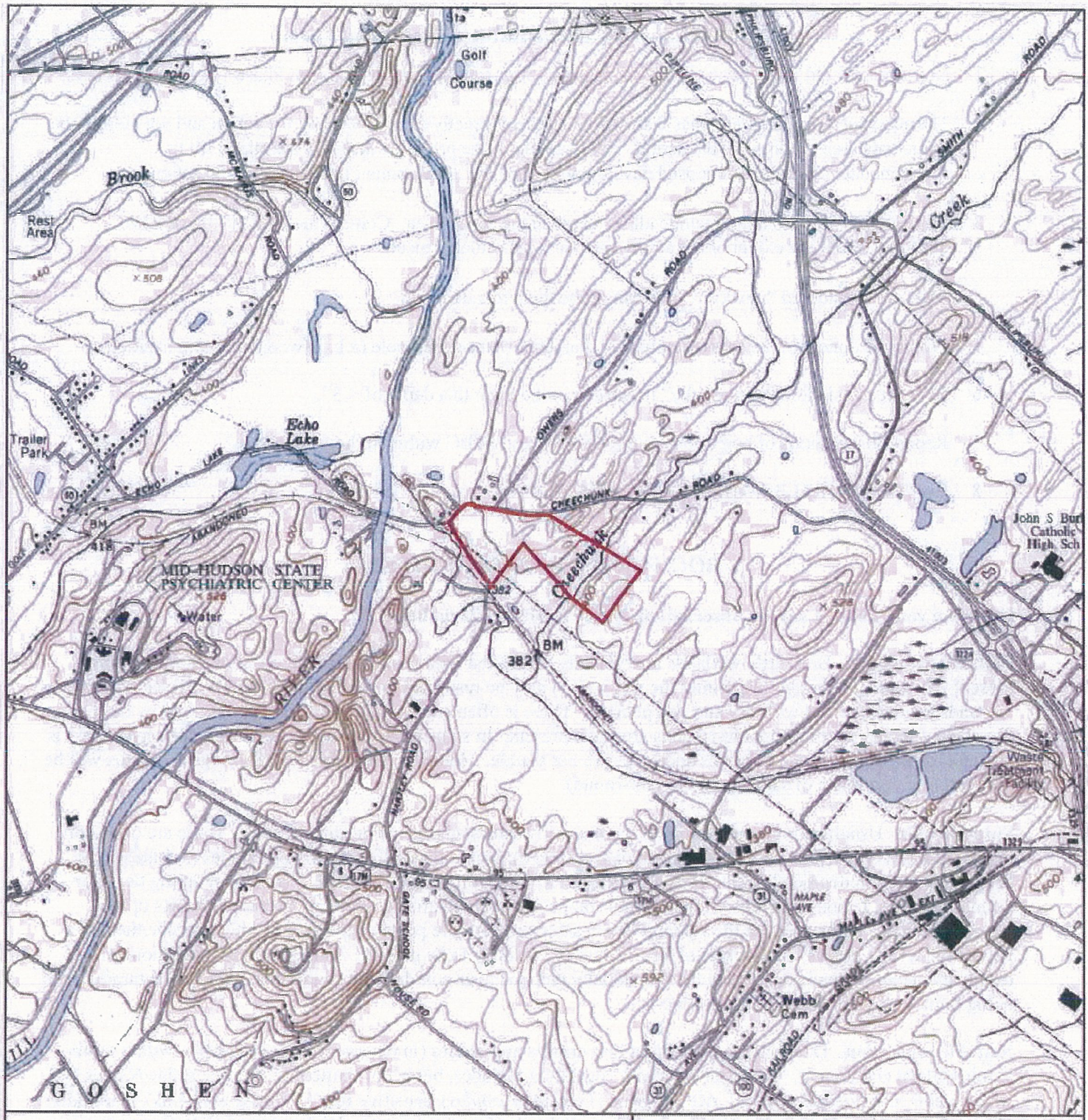
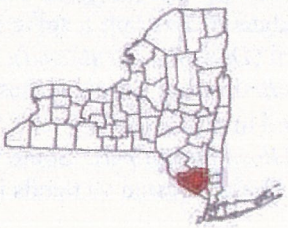


Legend

Project Area



Latitude and Longitude Coordinates in NAD83
for the approximate center of project area -

N: 41° 24' 37.6" / W: 74° 22' 08.1"

Sources:
NYS Department of Transportation Raster Quadrangle. Goshen and Middletown NY USGS quadrangle updated by NYSDOT, NYSDOT edition 1990.

Figure 1
USGS Topographic Map

Hartley Road Site
Orange & Rockland Utilities, Inc.
Town of Goshen
Orange County, New York

ASGECI Project # 3282

N
W E
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2,000
Feet

AMY S. GREENE ENVIRONMENTAL CONSULTANTS

Legend

Project Area

SOILS LIST:

- AdB - Allard silt loam, 3 to 8 percent slopes
- BnC - Bath-Nassau channery silt loams, 8 to 15 percent slopes
- CnB - Chenango gravelly silt loam, 3 to 8 percent slopes
- ErA - Erie gravelly silt loam, 0 to 3 percent slopes
- ErB - Erie gravelly silt loam, 3 to 8 percent slopes
- Ma - Madalin silt loam
- MdB - Mardin gravelly silt loam, 3 to 8 percent slopes
- MdC - Mardin gravelly silt loam, 8 to 15 percent slopes
- Pg - Pits, gravel
- RSD - Rock outcrop-Nassau complex, hilly
- SXC - Swartswood and Mardin very stony soils, sloping
- UnB - Unadilla silt loam, 0 to 8 percent slopes

Sources:
Soil Survey Geographic (SSURGO) database for Orange County, New York, U.S. Department of Agriculture, Natural Resources Conservation Service, Fort Worth, Texas, 2004.
Orange County 24 inch Natural Color Ortho-imagery, NYS Digital Orthoimagery Program (NYSDOP), NYS Cyber Security & Critical Infrastructure Coordination, 2007.

Figure 2
SSURGO Soils Map

Hartley Road Site
Orange & Rockland Utilities, Inc.
Town of Goshen
Orange County, New York

ASGECI Project # 3282

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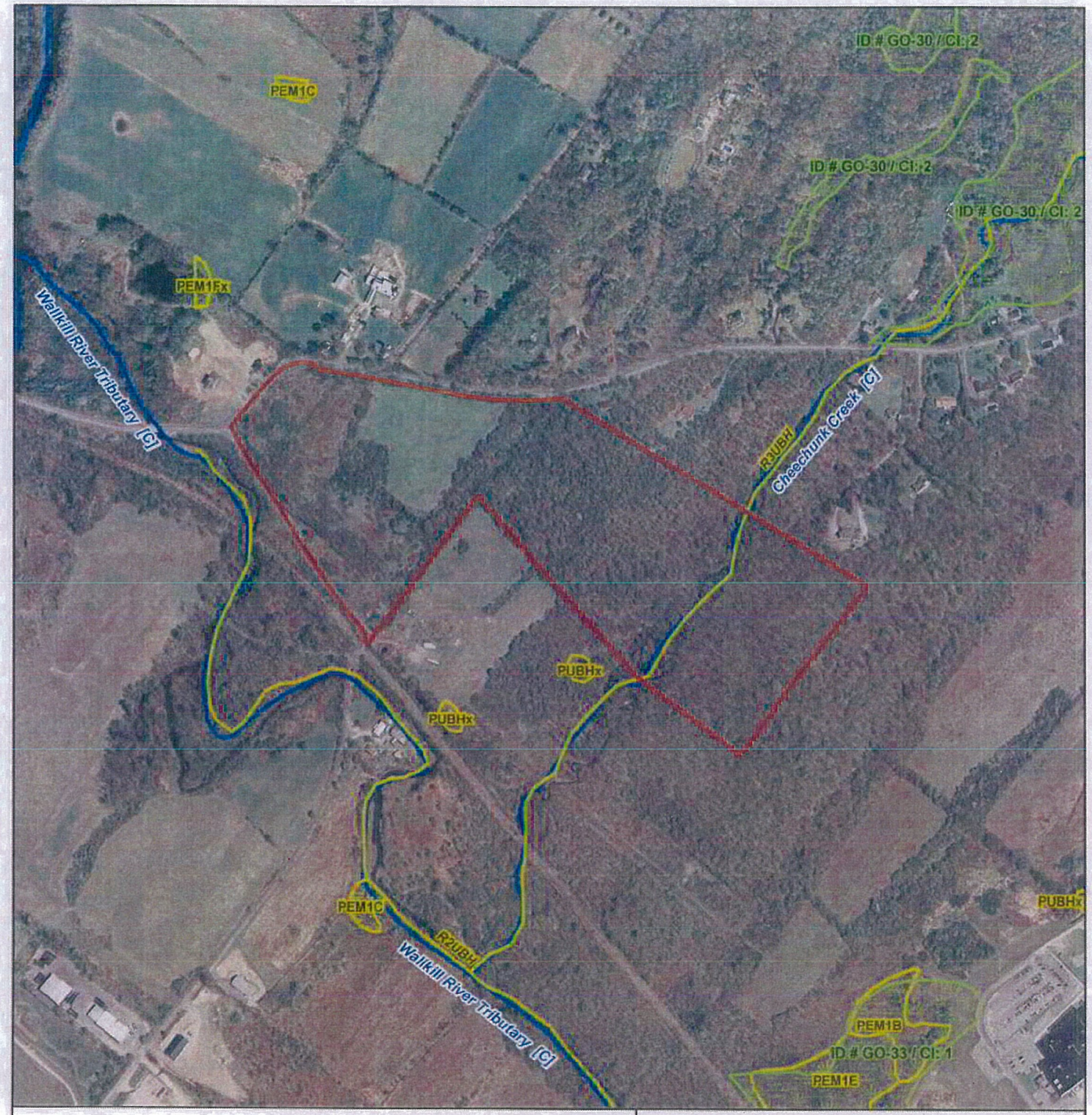
AMY S. GREENE ENVIRONMENTAL CONSULTANTS



Legend

- Project Area
- Stream
- NWI Wetlands
- NWI Linear Wetlands
- NYSDEC Wetlands

WETLAND CLASSIFICATIONS:
R2UBH: Riverine, Lower Perennial, Unconsolidated Bottom, Diked/Impounded
R3UBH: Riverine, Upper Perennial, Unconsolidated Bottom, Diked/Impounded
PUBHx: Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated

Sources:
National Wetlands Inventory Map, U.S. Fish and Wildlife Service, National Wetlands Inventory, St. Petersburg, Florida, 1981-2006
New York State Regulatory Freshwater Wetlands For Orange County, New York State Department of Environmental Conservation (NYSDEC), Latham, NY, 1999.
Water Quality Classifications (WQC) - NYS (NYSDEC), NYS Department of Enviromental Conservation, Division of Water, Bureau of Flood Protection and Dam Safety, vector digital data, NYSDEC, Albany, New York, December 2007.
Orange County 24 inch Natural Color Ortho-imagery, NYS Digital Orthoimagery Program (NYSDOP), NYS Cyber Security & Critical Infrastructure Coordination, 2007.

Figure 3
NWI & NYSDEC Wetlands Map

Hartley Road Site
Orange & Rockland Utilities, Inc.
Town of Goshen
Orange County, New York

ASGECI Project # 3282

N W E S

600
Feet

AMY S. GREENE ENVIRONMENTAL CONSULTANTS

Legend

- Project Area
- Delineated Wetlands
- Photo Locations with direction

Sources:
Photo Locations provided by Amy S. Greene Environmental Consultants Inc. based on fieldwork conducted July 2010.
Delineated Wetlands taken from Wetland Delineation Plan, CMX Engineering, White Plains, New York, December 2009.
Orange County 24 inch Natural Color Ortho-imagery, NYS Digital Orthoimagery
Program (NYSDOP), NYS Cyber Security & Critical Infrastructure Coordination, 2007.

Figure 4
Wetland Identification & Photo Location Map

Hartley Road Site
Orange & Rockland Utilities, Inc.
Town of Goshen
Orange County, New York

ASGECI Project # 3282

N
W E
S

400
Feet

AMY S. GREENE
ENVIRONMENTAL
CONSULTANTS.

APPENDIX H
Phase II Bog Turtle Surveys

Phase 2 Bog Turtle Surveys
Hartley Road Substation
Town of Goshen, Orange County, New York

Prepared for:

Kleinfelder
1279 Route 300, Second Floor
Newburgh, NY 12550
845.567.6530 x147

Contact: David B. Tompkins, Certified Wildlife Biologist
Regional Environmental Practice Leader

Prepared by:

Bagdon Environmental
25 Delaware Avenue
Delmar, New York 12054
(518) 439-8588

Contact: Norbert Quenzer Jr., Certified Wildlife Biologist
www.bagdonenvironmental.com

July 2011

Phase 2 Bog Turtle Surveys
Hartley Road Substation
Town of Goshen, Orange County, New York

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2.4 Phase 2 Search Protocol and Methodology 2
2.5 Phase 2 Search Personnel 3
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Table 2 - Weather Conditions (Air/Water/Substrate Temp, Cloud Cover and Wind Speed)

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1.0 Introduction

Bagdon Environmental was retained by Kleinfelder to jointly conduct Phase 2 Surveys for the State listed *Endangered* and Federally listed *Threatened* bog turtle (Glyptemys muhlenbergii) on the Orange & Rockland Hartley Road Substation site. The site is located in the Town of Goshen, Orange County, New York, as shown on the attached location map (Figure 1).

A Phase I habitat assessment of the site was conducted by Amy S. Greene Environmental Consultants in July 2010 pursuant to the "Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan" (dated May 15, 2001) and revisions dated April 2006 (Phase I included as Appendix B). The purpose of the habitat assessment was to determine the suitability of the habitat onsite to support bog turtles.

The conditions of the site and vicinity are described in this report, relative to the quality of existing habitat and known occurrences of bog turtles in the area. The Phase I survey results were discussed with Kleinfelder personnel prior to initiating the surveys for Phase 2. The results of the Phase 1 survey indicated that five areas of the site's wetlands (approximately 4± acres) were potentially suitable for bog turtles. Based on these findings, Orange & Rockland Utilities authorized Kleinfelder to conduct a Phase 2 survey.

Kleinfelder and Bagdon Environmental biologists conducted the Phase 2 surveys on four separate days including May 19-20 and June 7-8.

2.0 Evaluation and Search Methods

2.1 Phase 1 Habitat Evaluation Review

The identification and evaluation of potential bog turtle habitat on the site was based on specific physical, biological and chemical characteristics described in the USFWS Recovery Plan and Section 3 of this report. In general, wetlands that are contiguous to or near known occupied sites should be evaluated thoroughly to determine bog turtle presence and potential use. A field survey conducted by a qualified biologist is required for a thorough site evaluation. The key components of bog turtle habitat are suitable hydrology, soils and vegetation. Habitat assessments should focus on emergent and mixed emergent/scrub-shrub wetlands due to the propensity of bog turtles to utilize open canopy wetlands in the spring. Adjacent forested wetlands are also evaluated if they contain suitable soils and hydrology.

In conducting this assessment, Kleinfelder biologists traversed the site wetlands in early April 2011 to determine if suitable bog turtle habitat conditions were present. Based on their findings, the site did contain areas of suitable habitat within a fairly large wetland matrix on and adjacent to the site. The potential habitat areas identified in the Phase 1 survey are shown on Figure 2. These areas are located within a 10± acre area of upland forest, old-field and forested wetland. The phase 1 assessment expanded beyond the site boundaries to adequately document potential contiguous habitat. A small area (Area "E") on the west side of Hartley Road was added to the Phase 2 search area.

Bagdon Environmental validated Kleinfelder's Phase 1 findings during the phase 2 surveys. Vegetation cover types and plant species composition were documented along with observed soil and hydrological conditions during the phase 2 surveys.

2.2 Resource Review

Resources reviewed prior to conducting the fieldwork (in addition to resources listed in the Reference Section) include the following:

- New York Natural Heritage Program (NYNHP) records of rare wildlife, plants, and significant habitats in the vicinity of the site.
- Site map and topographic survey (1"=100').
- Aerial photo (2009 True Color – Digital ortho-corrected)
- National Wetland Inventory maps
- Orange County Soil Survey
- NYSDEC Freshwater Wetland maps
- U.S.G.S. topographic map
- Endangered, Threatened, and Special Concern Species of NYS (ECL Section 11-0535)
- Federal Endangered and Threatened Wildlife and Plants (50 CFR 17.11 and 17.12).

2.3 Agency and Consultant Contacts

The following people were contacted to discuss the potential for bog turtles to occur onsite:

- New York Natural Heritage Program – letter dated January 21, 2011
- Robyn A. Niver, USFWS – Endangered Species Biologist

Bagdon Environmental met with *Kleinfelder* to discuss the known records of bog turtles in the area and to review Phase I site assessment of the site. Site conditions were discussed in detail including site photos, aerial photographs and topographic maps. The approximate limits of the Phase 2 survey were discussed during this meeting and also by telephone.

2.4 Phase 2 Search Protocol and Methodology

The following search protocol was utilized for completing the bog turtle surveys in the designated survey areas identified in the Phase I bog turtle assessment:

- The site contains approximately 4± acres of emergent and mixed emergent scrub-shrub wetland that constitutes potential bog turtle habitat for nesting and thermoregulation. Based on the Phase I bog turtle assessment, most of the project site and adjacent lands do not constitute suitable habitat. Therefore, most of the search effort was focussed on the areas of the site identified as potential bog turtle habitat. Forested wetlands adjacent to the proposed search area on the site were searched to a lesser degree due to the propensity of bog turtles to utilize open canopy areas in the spring.
- Conduct searches on at least four (4) separate site visits within the period of April 15 to June 15. Ideally, surveys conducted in May are done at least three days apart. However,

logistics did not allow a three–day separation and both May and June surveys were conducted on concurrent days.

- Each site visit entailed five (5) biologists searching (random and transect search) over a 1-day period with an average search effort of 20-25 person hours/day. The search effort was conducted on 4 separate days for a total search effort of 95 person hours. (Note: The recommended search effort is 64-96 person *hours, based* upon Guidelines for Bog Turtle Surveys (Revised April 2006) which recommends 4-6 person hours/acre of designated habitat/visit with 4 visits minimum.)
- Searches were conducted under favorable weather conditions (air temperature >55° F to maintain the validity of the survey effort. Surveys may be done when it is sunny or cloudy. Surveys can be conducted during and after light rain, provided air temperatures are>65° F.
- Surveys were conducted at least one hour after sunrise and one hour prior to sunset.
- Searches were supervised by Senior Ecologist Norbert Quenzer, possessor of a NYSDEC Scientific Collector License for bog turtles and a USFWS approved bog turtle surveyor.
- Transect and random search methods were utilized with GPS tracking during all searches (to facilitate a documented record of search).
- Any bog turtle found during the surveys would have been appropriately documented including photographed, marked (shell-notch) and pertinent information recorded (sex, age, carapace length and width, weight and abnormalities). All locations of observed turtle(s) would be mapped using a sub-meter hand-held GPS.

The site was surveyed using standard techniques in the Recovery Plan and 2006 Revisions. These include traversing the site using visual and tactile search methods. The tactile search effort was enhanced by use of small hand-held rakes and probes that helped facilitate searching under tussocks and other vegetation. These tools also proved useful in exploring exposed muck areas, sediments and algae pools.

Random search methods were used during the first three days of surveys. Transect searches were conducted on the 4th day of survey. Table 1 presents the search effort summary with participants, dates and length of surveys. The total survey effort for the phase 2 was 95.0 search hours. Table 2 contains the weather data for each survey.

2.5 Phase 2 Search Personnel

Norbert Quenzer Jr., CWB - Bagdon Environmental
Vice President/Senior Ecologist – Supervising Phase 2 Surveys

Willow Eyres - Bagdon Environmental
Ecologist

David B. Tompkins, CWB - Kleinfelder
Regional Environmental Practice Leader

David MacDougal, AWB - Kleinfelder
Biologist/Wetland Scientist

Steve Finch - Kleinfelder

Biologist/Wetland Scientist

Laura Cheney- Kleinfelder
Biologist

Jamie Morgan - Kleinfelder
Biologist

Evan Renwick - Kleinfelder

Julia Craner – Kleinfelder

Eric Chastain – Kleinfelder

3.0 Bog Turtle Status and Habitat Requirements

Bog turtle fact sheets, prepared by the NYSDEC and USFWS, are attached as Appendix A. These fact sheets present some of the basic information on the bog turtle including its description, distribution, seasonal activities and habitat requirements. More specific information is contained in the references listed at the end of this report.

In summary, the bog turtle is considered by many to be the rarest turtle species in North America. It is currently listed as endangered in New York State and threatened throughout its range by the U.S. Fish and Wildlife Service. Extant populations in New York State occur principally in Dutchess, Columbia, Putnam and Orange Counties.

Habitat destruction and illegal collecting have decimated many historical bog turtle sites. These factors, combined with a disjunct distribution in many areas and a low reproductive capacity, threaten the bog turtle with extinction throughout its range. The USFWS has prepared a *Bog Turtle Recovery Plan* that aids agency personnel in protecting known sites throughout the New York State and other portions of its range. Cooperative agreements with landowners through conservation easements or land purchase are paramount to protecting the bog turtle.

The New York Natural Heritage Program (NYNHP) assigns the rarity rank of G3S2 with the following explanation of ranks:

> G3 = Either rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because of other factors.
>
> S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.

Bog turtles are usually found in association with fens. Fens are wetlands dominated by herbaceous vegetation that receive calcareous groundwater discharge through seepage and small streams

(rivulets). These wetlands typically contain deep muck soils needed for predator escape, aestivation during hot weather and winter hibernation. Equally important is the presence of elevated hummocks of sphagnum moss or emergent vegetation, such as tussock sedge (*Carex stricta*), for thermoregulation, egg laying and incubation in the spring. Other habitats where bog turtles are found include wet meadows, cow pastures, shrub swamps and forested wetlands with emergent wetland openings. As with fens, these wetlands usually have small rivulets fed by groundwater, deep muck soils and emergent vegetation with exposure to the sun.

4.0 Site Description

Bog turtles have been documented in the general region of the site by the NYSDEC, however no bog turtles are known to occur on or in close proximity to the site. Due to the potential for illegal collection and destruction of bog turtle habitat, the exact location of known sites reviewed with the NYSDEC Endangered Species Unit is not presented in this report.

With the exception of the existing powerline, the site is undeveloped with areas of mature forest, successional forest, old-field, mowed areas (powerline ROW) and wetland. Wetlands onsite include Palustrine (USFWS Classification, Cowardin, et. al.) forested wetland, emergent wetland and shrub/scrub wetland.

A perennial stream (Cheechunk Creek) is located on the southwest side of Hartley Road adjacent to Area "E". Two intermittent streams originate from the wetlands onsite and flow from the site into the Cheechunk Creek. The creek empties into the Wallkill River approximately 1,300 feet downstream of the site.

Soils mapped within the survey area by NRCS are primarily Mardin gravely silt loam (somewhat well-drained) and Erie gravelly silt loam (somewhat poorly drained). Small areas of the site contain well-drained Unadilla silt loam and pits/gravel. The parent material for Mardin gravely silt loam consists of loamy till derived mainly from acid sedimentary rock. Erie gravelly silt loam is derived from siltstone, sandstone, shale, and limestone.

The results of the Phase 1 survey indicated that areas of wetland (See Figure 2) contained some of the components of bog turtle habitat including mucky soils, spring-fed rivulets and open emergent and scrub-shrub cover types. These areas of potential habitat are designated "A" through "E".

A variety of wetland herbaceous species were present in the phase 2 area, however, there were no strong calciphites present that are typical of fens. Calciphites are indicative of strong alkaline conditions with a pH greater than 8.0. A hand-held pH meter was used to determine the pH of surface water in each potential habitat area. The pH of surface waters in the phase 2 area was circum-neutral to slightly alkaline ranging from 6.8 to 8.0.

A list of plant and wildlife species observed in wetland areas "A" through "E" during the phase 2 search is provided in Appendix C. Photographs of the site are included as Appendix D.

Examples of emergent plants in the wetlands include purple loosestrife (*Lythrum salicaria*), cattail (*Typha* sp.), reed canary grass (*Phalaris arundinacea*), sedges (*Carex stipata, C. crinita, C. stricta,*

and *C. vulpinoidea*), soft rush (*Juncus effusus*), rough-stemmed goldenrod (*Solidago patula*), turtlehead (*Chelone glabra*), giant goldenrod (*Solidago gigantea*), sensitive fern (Onoclea sensibilis) and iris (*Iris versicolor*).

The scrub-shrub wetlands contain silky dogwood (*Cornus amomum*), gray dogwood (*Cornus foemina*), northern arrowwood (*Viburnum recognitum*), pin oak (*Quercus palustris*), elderberry (*Sambucus canadensis*), and willow (*Salix* sp.).

Common woody species in the forested wetland include red maple, American elm (*Ulmus americana*), pin oak , red ash (*Fraxinus pennsylvanicus*), spicebush (*Lindera benzoin),* winterberry holly (*Ilex verticillata)* and northern arrowwood. Examples of herbaceous species in the forested wetlands include cinnamon fern (*Osmunda cinnamomea*), royal fern (*O. regalis*), sensitive fern (*Onoclea sensibilis*), tussock sedge (*Carex stricta*), calico aster (*Aster lateriflorus*) and skunk cabbage (*Symplocarpus foetidus*).

4.1 Area Descriptions

Area "A' Description

Open canopy emergent/shrub-scrub wetland with pockets of shallow mucky soils typical of wet meadows. Circum-neutral pH with seasonal surface flow and groundwater discharge. Most of the mucky soils and surface/groundwater was present in a small drainage shown in photos 1-3 and 33-34. Firm mineral soils predominate in this area.

This area is relatively poor habitat overall due to lack of deep muck soils and perennial groundwater seepage (resulting in seasonally dry conditions); and limited basking/egg laying habitat.

Area "B' Description

Open canopy emergent/shrub-scrub wetland with deeper areas of standing and flowing water. Contains some small pockets of shallow mucky soils. Circum-neutral pH with seasonal surface flow and groundwater discharge. Most of the mucky soils and surface/groundwater was present in a small drainage ditch that parallels the existing berm shown in photos 9-11. Firm mineral soils predominate in other portions of this area. A small intermittent stream originates in this area and flows to Area "E".

This area is relatively poor habitat overall due to lack of deep muck soils and perennial groundwater seepage (resulting in seasonally dry conditions); and limited basking/egg laying habitat.

Area "C' Description

Sloping emergent wetland formed by groundwater seepage. This area contains shallow mucky soils over firm mineral soils. The hydrology is primarily seasonal groundwater discharge with

surface flow during typical high-flow periods. A small intermittent stream originates in this wetland and flows into Area "E". Substantially dryer conditions were observed during the June surveys compared to the May surveys. Area "C" is shown in photos 13-16. The small intermittent stream is shown in photo 15.

This area is unsuitable habitat due to lack of the following: deep muck soils; perennial groundwater seepage (resulting in seasonally dry conditions); and elevated hummocks or tussocks for basking and egg laying.

Area "D' Description

Emergent and scrub-shrub wetland in the vicinity of the maintained powerline corridor. This area has no apparent groundwater discharge and is wet due to seasonal ponding and surface flow. Soils are primarily shallow muck over firm mineral soils. Seasonally dry conditions were evident during the June surveys.

This area constitutes unsuitable habitat due to lack of the following: deep muck soils; perennial groundwater seepage (resulting in seasonally dry conditions); and limited elevated hummocks or tussocks for basking and egg laying.

Area "E' Description

This area has more of a typical open "fen-like" character with mucky soils (3-8" deep) and groundwater seepage. Groundwater discharge and surface run-off from the site maintain perennial wet conditions. While no strong calciphites were present, the pH was 8.0 indicating slightly alkaline groundwater discharge. Tussock sedge (*Carex stricta*) was also present resulting in suitable basking and egg laying habitat.
This area, shown in photos 28 and 29, is considered suitable habitat due to the presence of perennial groundwater discharge, deep muck soils and elevated tussocks.

4.2 Wildlife

A variety of wildlife species were observed during the surveys, however, the intent of the study was to document the presence or absence of bog turtles. The following reptile and amphibian species were noted in the wetlands anecdotally during the survey.

The shell of a painted turtle (*Chrysemys picta*) hatchling was found in a cattail-dominated portion of the search area. No other turtle species were found within the search area. Pickerel frogs (*Rana palustris*), green frogs (*Rana clamitans*) and gray tree frogs (*Hyla versicolor*) were common throughout the wetlands. Common garter snakes (*Thamnophis sirtalis*) were also observed during the surveys.

5.0 Summary of Findings and Conclusions

Only a portion of the wetlands on and adjacent to the site (approximately 4± acres) were identified as potentially suitable emergent/scrub-shrub wetland habitat for bog turtles in the Phase 1 report prepared by Amy S. Greene Environmental Consultants. These areas of potential habitat were investigated and searched during the phase 2 survey.

The level of effort for the Phase 2 was at the high range of recommended search time under the 2006 guidelines. Ninety-five (95) person hours were expanded while the recommended range of search time is 64-96 hours based on the available potential habitat.

Based on Phase 1 and Phase 2 surveys and discussions with NYSDEC/USFWS personnel, Bagdon Environmental presents the following conclusions and observations:

- The emergent/scrub shrub wetlands in the survey area contain some of the requisite bog turtle habitat components. However, upon detailed investigation during the Phase 2 surveys it was determined that most of the wetlands onsite are not suitable bog turtle habitat. The absence of suitable soils and hydrology in these wetlands are not conducive to bog turtle inhabitance. Given the low habitat suitability of these wetlands, bog turtles are very unlikely to be present.

- Area "E" was the only area that met all three primary habitat components. Although it is not a calcareous fen, the optimal and preferred habitat, it does constitute suitable habitat.

- No bog turtles were found during the Phase 2 surveys, nor is there any record of bog turtles on or in the site vicinity.

- It is very unlikely that bog turtles inhabit the site or contiguous wetlands based on the habitat assessment and extensive searches conducted this spring.

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Table 1
Phase 2 Search Effort Summary

Search Dates	Surveyors [1]	Search Times	Search Hours (Person Hours)
5-19-11	NQ, WE, DT, LC, EC	11:30 – 4:30	5.0 X 5 = 25 hrs
5-20-11	NQ, WE, LC, JM, DM	9:30 – 2:30	5.0 X 5 = 25 hrs
6-7-11	NQ, WE, EC, SF, DT	10:00 – 3:00	5.0 X 5 = 25 hrs
6-8-11	NQ, WE, ER, JC, LC	8:30 – 12:30	4.0 X 5 = 20 hrs
			Total Search Hours = 95.0

[1] NQ = Norbert Quenzer
WE = Willow Eyres
DM = Dave McDougall
EC = Eric Chastain
DT = Dave Thompkins
LC = Laura Cheney
JM = Jamie Morgan
ER = Evan Renwick
SF = Steve Finch
JC = Julia Craner

Table 2
Weather Conditions - Phase 2

Date	Air Temp	Water Temp	Substrate Temp	Cloud Cover	Wind Speed
5-19-11	68 – 70°F	67°F	65°F	>70%	Calm
5-20-11	66 – 74°F	59°F	67°F	< 80%	Calm- light breeze
6-7-11	74 – 87°F	53°F	NA°F	< 50%	Hazy
6-8-11	72 – 87°F	NA°F	NA°F	10%	Light breeze

NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Bog Turtle Fact Sheet

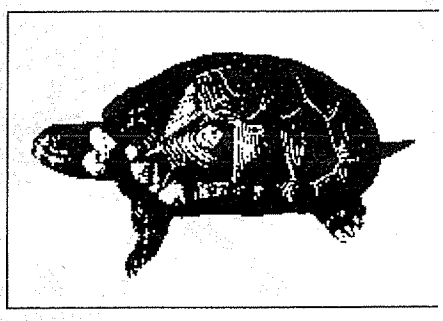
Bog Turtle

Clemmys muhlenbergii

New York Status: Endangered

Federal Status: Threatened

Description



The bog turtle is New York's smallest turtle, reaching a maximum length of 4.5 inches. It is one of seventeen species of turtles found in New York State, including marine turtles. A bright yellow or orange blotch on each side of its head and neck are a distinctive feature of this species. The body color is dark with an orange-red wash on the inside of the legs of some individuals. The carapace (upper shell) is domed and somewhat rectangular, often with prominent rings on the shell plates (scutes). In some older individuals, or those that burrow frequently in coarse substrates, the shell may become quite smooth and polished. Although generally black, the carapace is sometimes highlighted by a chestnut sunburst pattern in each scute. The plastron (lower shell) is hingeless, with a pattern of cream and black blotches. As with most turtles, the plastron of the male is slightly concave while the female's is flat.

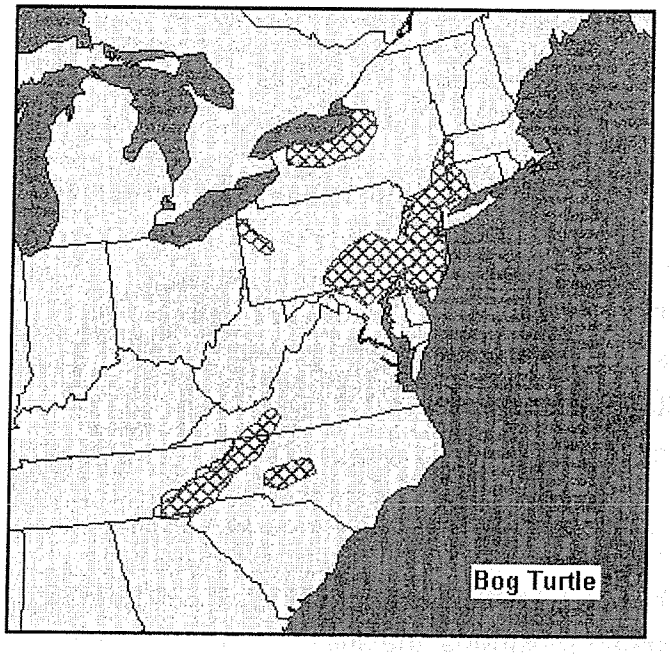
Life History

In New York, the bog turtle emerges from hibernation, often spent in an abandoned muskrat lodge or other burrow, by mid-April. In New York bog turtles often hibernate communally with other bog turtles and with spotted turtles (*Clemmys guttata*). Generally both the air and water temperature must exceed 50 degrees F for the turtle to become active. Mating occurs primarily in the spring but may also occur in the fall and may be focused in or near the hibernaculum (winter shelter). In early to mid-June, a clutch of two to four eggs is laid in a nest which is generally located inside the upper part of an unshaded tussock. The eggs hatch around mid-September. Some young turtles spend the winter in the nest, emerging the following spring. The adults enter hibernation in late October. Sexual maturity may be reached at eight years or as late as eleven. A bog turtle may live for more than 30 years.

Although generally very secretive, the bog turtle can be seen basking in the open, especially in

the early spring just after emerging from hibernation. It is an opportunistic feeder, eating what it can get, although it prefers invertebrates such as slugs, worms, and insects. Seeds, plant leaves, and carrion are also included in its diet.

Distribution and Habitat



The bog turtle is found in the eastern United States scattered in disjunct colonies from New York and Massachusetts south to southern Tennessee and Georgia. This is a semi-aquatic species, preferring habitat with cool, shallow, slow-moving water, deep soft muck soils, and tussock-forming herbaceous vegetation. In New York, the bog turtle is generally found in open, early successional types of habitats such as wet meadows or open calcareous boggy areas generally dominated by sedges (*Carex spp.*) or sphagnum moss. Like other cold-blooded or ectothermic species, it requires habitats with a good deal of solar penetration for basking and nesting. Plants such as purple loosestrife (*Lythrum salicaria*) and reed (*Phragmites australis*) can quickly invade such areas resulting in the loss of basking and nesting habitat.

Status

More than half of the 74 historic bog turtle locations in New York still contain apparently suitable habitat. Only one quarter of these sites, however, are known to support extant populations, primarily in southeastern New York.

The primary threats to this species are loss or degradation of habitat and illegal collecting. In New York, development and natural succession are the major threat to bog turtle habitat. As sites deteriorate, bog turtles normally move out of their old sites to new areas where fire, beavers agriculture or other causes have created an open wet meadow type habitat. Development, especially roads, residential, commercial and reservoir construction inhibits the species' ability to move to new, potential habitat. Consequently new populations are not being established as old sites deteriorate.

Collection of the bog turtle without a permit is prohibited in all states where it occurs. It was listed as threatened in 1997 by the U. S. Fish and Wildlife Service, and has been listed in

CITES Appendix I, (Convention of International Trade in Endangered Species) since 1975. Unfortunately, illegal collection still goes on threatening this long-lived, slow reproducing turtle.

Contamination by pesticides, agricultural run-off and industrial discharge may negatively affect the bog turtle and its habitat directly. Contaminates may also accumulate in or adversely affect the turtle's invertebrate food supply.

Management and Research Needs

Since 1976, the New York State Department of Environmental Conservation has been conducting field surveys of historic and potential bog turtle sites to document current populations and habitat suitability. Some currently inhabited bog turtle sites and some historic sites are under the ownership of the State or conservation organizations. Many of the best remaining sites are still in private ownership and efforts continue to acquire or otherwise protect theses areas.

Information is being gathered on reproductive potential, daily and seasonal movements, nesting and hibernation areas, and habitat use through the tracking of animals tagged with radio transmitters. Since the bog turtle is sensitive to habitat changes that are the result of natural succession, studies are underway that will monitor the responses of a bog turtle population to habitat manipulations.

Techniques for breeding and raising bog turtles in captivity have been developed and a study has begun to investigate the effectiveness of releasing young or adult turtles into the wild.

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Map adapted from Conant and Collins (1998),Ernst, Lovich and Barbour (1994) and Harding (1997)

Bog Turtle Project Review Fact Sheet
Hudson/Housatonic Recovery Unit
New York Field Office
February 2006

The following fact sheet is intended to provide information to assist with the review of projects which occur within the likely range of the bog turtle (*Clemmys muhlenbergii*) (within the Hudson/Housatonic Recovery Unit) within State of New York. The bog turtle is Federally-listed as threatened and State-listed as an endangered species.

Bog turtles prefer open canopy wetlands with soft, saturated soils such as fens or sedge meadows fed by seeps and springs of cold groundwater that has been in contact with calcium-rich bedrock or soils. In New York, bog turtles are very often found in or near rivulets having deep mucky substrate, but where above-surface water depths are very shallow – usually only a few inches deep at most. Plant species commonly associated with bog turtle habitats include tamarack (*Larix laricina*), cinquefoil (*Potentilla* spp.), alders (*Alnus* spp.), willows (*Salix* spp.), sedges (*Carex* spp.), sphagnum moss (*Sphagnum* sp.), jewelweed (*Impatiens capensis*), rice cut-grass (*Leersia oryzoides*), tearthumb (*Polygonum sagittatum*), arrow arum (*Peltandra virginica*), red maple (*Acer rubrum*), skunk cabbage (*Symplocarpus foetidus*), rushes (*Juncus* spp.), and bulrushes (*Scirpus* spp.).

The U.S. Fish and Wildlife Service (Service) recommends that an evaluation be completed of any existing wetland habitat that would be disturbed, directly or indirectly, by the project, and its potential to support the bog turtle (Phase 1 survey). Information on surveys can be found at http://www.fws.gov/northeast/nyfo/es/btsurvey.pdf.

The Service and New York State Department of Environmental Conservation (NYSDEC) should be sent a copy of the Phase 1 survey results for review and comment including a USGS topographic map indicating location of site; project design map, including location of wetlands and streams; color photographs of the site; surveyors name; date of visit; opinion on potential/not potential habitat; description of the hydrology, soils, and vegetation.

If the Phase 1 survey identifies any wetlands with potentially suitable habitat, an evaluation is needed to determine whether the proposed project will completely avoid all direct and indirect effects to the wetlands, in consultation with the Service and the NYSDEC. Information to assist with the evaluation of potential impacts on bog turtles can be found in Appendix A - Bog Turtle Conservation Zones of the Bog Turtle (*Clemmys muhlenbergii*) Northern Population Recovery Plan (U.S. Fish and Wildlife Service 2001) which can be found at http://www.fws.gov/northeast/nyfo/es/btconszone.pdf. If impacts cannot be avoided, a Phase 2 survey should be completed. The purpose of the Phase 2 survey is to determine the likely presence of bog turtles at the site in potentially suitable habitat. Please see detailed instructions regarding survey protocols at http://www.fws.gov/northeast/nyfo/es/btsurvey.pdf. Also, please contact this office before conducting any Phase 2 surveys.

Please note that the New York Field Office is currently developing a list of surveyors whom we have determined are capable of conducting both Phase 1 and Phase 2 surveys in New York. You can contact our office for a copy of the list in spring 2006.

The project's environmental documents should identify project activities that might result in adverse impacts to the bog turtle or their habitat. Information on any potential impacts and the results of any recommended habitat analyses or surveys for the bog turtle should be provided to this office and they will be used to evaluate potential impacts to the bog turtle or their habitat, and to determine the need for further coordination or consultation pursuant to the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

References:

U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

GUIDELINES FOR BOG TURTLE SURVEYS[1]

(revised April 2006)

RATIONALE

A bog turtle survey (when conducted according to these guidelines) is an attempt to determine presence or probable absence of the species; it does not provide sufficient data to determine population size or structure. Following these guidelines will standardize survey procedures. It will help maximize the potential for detection of bog turtles at previously undocumented sites at a minimum acceptable level of effort. Although the detection of bog turtles confirms their presence, failure to detect them does not absolutely confirm their absence (likewise, bog turtles do not occur in all appropriate habitats and many seemingly suitable sites are devoid of the species). Surveys as extensive as outlined below are usually sufficient to detect bog turtles; however, there have been instances in which additional effort was necessary to detect bog turtles, especially when habitat was less than optimum, survey conditions were less than ideal, or turtle densities were low.

PRIOR TO CONDUCTING ANY SURVEYS

If a project is proposed to occur in a county of known bog turtle occurrence (see attachment 1), contact the U.S. Fish and Wildlife Service (Service) and/or the appropriate State wildlife agency (see attachment 2). They will determine whether or not any known bog turtle sites occur in or near the project area, and will determine the need for surveys.

- If a wetland in or near the project area is *known* to support bog turtles, measures must be taken to avoid impacts to the species. The Service and State wildlife agency will work with federal, state and local regulatory agencies, permit applicants, and project proponents to ensure that adverse effects to bog turtles are avoided or minimized.

- If wetlands in or adjacent to the project area are *not* known bog turtle habitat, conduct a bog turtle habitat survey (Phase 1 survey) if:

    1. The wetland(s) have an emergent and/or scrub-shrub wetland component, or are forested with suitable soils and hydrology (see below), *and*

    2. Direct and indirect adverse effects to the wetland(s) cannot be avoided.

    See *Bog Turtle Conservation Zones*[2] for guidance regarding activities that may affect bog turtles and their habitat. In addition, consult with the Fish and Wildlife Service and/or appropriate State wildlife agency to definitively determine whether or not a Phase 1 survey will be necessary.

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[1] These guidelines are a modification of those found in the final "Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan" (dated May 15, 2001). Several minor revisions were made to facilitate survey efforts and increase searcher effectiveness. As additional information becomes available regarding survey techniques and effectiveness, these survey guidelines may be updated and revised. Contact the Fish and Wildlife Service or one of the state agencies listed in Attachment 1 for the most recent version of these guidelines.

[2] See Appendix A of the "Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan" (dated May 15, 2001).

BOG TURTLE HABITAT SURVEY (= Phase 1 survey)

The purpose of this survey is to determine whether or not the wetland(s) are *potential* bog turtle habitat. These surveys are performed by a recognized, qualified bog turtle surveyor (contact the Service or the appropriate State wildlife agency to receive a list of recognized, qualified bog turtle surveyors). The following conditions and information apply to habitat surveys.

- Surveys can be performed any month of the year (except when significant snow and/or ice cover is present). This flexibility in conducting Phase 1 surveys allows efforts during the Phase 2 survey window to be spent on wetlands most likely to support bog turtles (*i.e.*, those that meet the criteria below).

- Potential bog turtle habitat is recognized by three criteria *(not all of which may occur in the same portion of a particular wetland)*:

    1. **Suitable hydrology**. Bog turtle wetlands are typically spring-fed with shallow surface water or saturated soils present year-round, although in summer the wet area(s) may be restricted to near spring head(s). Typically these wetlands are interspersed with dry and wet pockets. There is often subsurface flow. In addition, shallow rivulets (less than 4 inches deep) or pseudo-rivulets are often present.

    2. **Suitable soils**. Usually a bottom substrate of permanently saturated organic or mineral soils. These are often soft, mucky-like soils (this does not refer to a technical soil type); you will usually sink to your ankles (3-5 inches) or deeper in muck, although in degraded wetlands or summers of dry years this may be limited to areas near spring heads or drainage ditches. In some portions of the species' range, the soft substrate consists of scattered pockets of peat instead of muck.

    3. **Suitable vegetation**. Dominant vegetation of low grasses and sedges (in emergent wetlands), often with a scrub-shrub wetland component. Common emergent vegetation includes, but is not limited to: tussock sedge (*Carex stricta*), soft rush (*Juncus effusus*), rice cut grass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), tearthumbs (*Polygonum* spp.), jewelweeds (*Impatiens* spp.), arrowheads (*Saggitaria* spp.), skunk cabbage (*Symplocarpus foetidus*), panic grasses (*Panicum* spp.), other sedges (*Carex* spp.), spike rushes (*Eleocharis* spp.), grass-of-Parnassus (*Parnassia glauca*), shrubby cinquefoil (*Dasiphora fruticosa*), sweet-flag (*Acorus calamus*), and in disturbed sites, reed canary grass (*Phalaris arundinacea*) or purple loosestrife (*Lythrum salicaria*). Common scrub-shrub species include alder (*Alnus spp.*), red maple (*Acer rubrum*), willow (*Salix spp.*), tamarack (*Larix laricina*), and in disturbed sites, multiflora rose (*Rosa multiflora*). Some forested wetland habitats are suitable given hydrology, soils and/or historic land use. These forested wetlands include red maple, tamarack, and cedar swamps.

Suitable hydrology and soils are the critical criteria (*i.e.*, the primary determinants of potentially suitable habitat).

- Suitable hydrology, soils and vegetation are necessary to provide the critical wintering sites (soft muck, peat, burrows, root systems of woody vegetation) and nesting habitats (open areas with tussocky or hummocky vegetation) for this species. It is very important to note,

however, that one or more of these criteria may be absent from portions of a wetland or wetland complex supporting bog turtles. Absence of one or more criteria does not preclude bog turtle use of these areas to meet important life functions, including foraging, shelter and dispersal.

- If these criteria (suitable soils, vegetation and hydrology) are present in the *wetland*, then the *wetland* is considered to be potential bog turtle habitat, regardless of whether or not that portion of the wetland occurring within the project boundaries contains all three criteria. If the *wetland* is determined to be potential habitat and the project will directly or indirectly impact *any portion* of the wetland (see *Bog Turtle Conservation Zones*), then either:

  - Completely avoid all direct and indirect effects to the wetland, in consultation with the Service and appropriate State wildlife agency, OR

  - Conduct a Phase 2 survey to determine the presence of bog turtles.

- The Service and appropriate State wildlife agency (see list) should be sent a copy of survey results for review and comment including: a USGS topographic map indicating location of site; project design map, including location of wetlands and stream and delineation of wetland type (PEM, PSS, PFO, POW) and "designated survey areas"[3]; color photographs of the site; surveyor's name; date of visit; opinion on potential/not potential habitat; a description of the hydrology, soils, and vegetation. A phase 1 report template and field form are available from the States and Service.

BOG TURTLE SURVEY (= Phase 2 survey)

If the wetland(s) are identified as potential bog turtle habitat (see Phase 1 survey), and direct and indirect adverse effects cannot be avoided, conduct a bog turtle survey in accordance with the specifications below. Note that this is *not* a survey to estimate population size or structure; a long-term mark/recapture study would be required for that.

Prior to conducting the survey, contact the appropriate State agency (see attached list) to determine whether or not a scientific collector's permit valid for the location and period of the survey will be required.

The Phase 2 survey will focus on the areas of the wetland that meet the soils, hydrology and vegetation criteria, as defined under the Phase 1 survey guidelines. Those areas that meet the criteria are referred to as "designated survey areas" for Phase 2 and Phase 3 survey purposes.

1. Surveys should only be performed during the period from April 15-June 15. For the Lake Plain Recovery Unit (see Recovery Plan), surveys should only be performed during the period from May 1 to June 30. This coincides with the period of greatest annual turtle activity (spring emergence and breeding) and before vegetation gets too dense to accurately survey. While turtles may be found outside of these dates, a result of no turtles would be considered inconclusive. Surveys beyond June also have a higher likelihood of disruption or destruction of nests or newly hatched young.

[3] "Designated survey areas" are those areas of the wetland that meet the soils, hydrology and vegetation criteria for potential bog turtle habitat. These areas may occur within the emergent, scrub-shrub or forested parts of the wetland.

2. Ambient air temperature at the surface in the shade should be ≥ 55° F.

3. Surveys should be done during the day, at least one hour after sunrise and no later than one hour before sunset.

4. Surveys may be done when it is sunny or cloudy. In addition, surveys may be conducted during and after light rain, provided air temperatures are ≥ 65° F.

5. At least one surveyor must be a recognized qualified bog turtle surveyor[4], and the others should have some previous experience successfully conducting bog turtle surveys or herpetological surveys in wetlands. To maintain survey effort consistency and increase the probability of encountering turtles, the same surveyors should be used for each wetland.

6. A minimum of four (4) surveys per wetland site are needed to adequately assess the site for presence of bog turtles. At least two of these surveys must be performed in May. From April 15 to April 30, surveys should be separated by six or more days. From May 1 to June 15, surveys should be separated by three or more days. The shorter period between surveys during May and June is needed to ensure that surveys are carried out during the optimum window of time (*i.e.*, before wetland vegetation becomes too thick).

   Note that bog turtles are more likely to be encountered by spreading the surveys out over a longer period. For example, erroneous survey results could be obtained if surveys were conducted on four successive days in late April due to possible late spring emergence, or during periods of extreme weather because turtles may be buried in mud and difficult to find.

   Because this is solely a presence/absence survey, survey efforts at a particular wetland may cease once a bog turtle has been found.

7. Survey time should be at least four (4) to six (6) person-hours per acre of designated survey area per visit. Additional survey time may be warranted in wetlands that are difficult to survey or that have high quality potential habitat. The designated survey area includes all areas of the wetland where soft, mucky-like soils are present, regardless of vegetative cover type. This includes emergent, scrub-shrub, and forested areas of the wetland.

   If the cover is too thick to effectively survey using Phase 2 survey techniques alone (*e.g.*, dominated by multiflora rose, reed canary grass, *Phragmites*), contact the Service and State wildlife agency for guidance on Phase 3 survey techniques (trapping) to supplement the Phase 2 effort. In addition, Phase 3 (trapping) surveys may also be warranted if the site is in the Lake Plain-Prairie Peninsula Recovery Unit. Check with the Service or State wildlife agency for further guidance.

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[4] Searching for bog turtles and recognizing their habitat is a skill that can take many months or years of field work to develop. This level of expertise is necessary when conducting searches in order to ensure that surveys are effective and turtles are not harmed during the survey (*e.g.*, by stepping on nests). Many individuals that have been recognized as qualified to conduct bog turtle surveys obtained their experience through graduate degree research or employment by a state wildlife agency. Others have spent many years actively surveying for bog turtles as amateur herpetologists or consultants.

8. Walk quietly through the wetland. Bog turtles will bask on herbaceous vegetation and bare ground, or be half-buried in shallow water or rivulets. Walking noisily through the wetland will often cause the turtles to submerge before they can be observed. Be sure to search areas where turtles may not be visible, including under mats of dead vegetation, shallow pools, underground springs, open mud areas, vole runways and under tussocks. Do not step on the tops of tussocks or hummocks because turtle nests, eggs and nesting microhabitat may be destroyed. Both random opportunistic searching and transect surveys should be used at each wetland.

   The following survey sequence is recommended to optimize detection of bog turtles:

   - Semi-rapid walk through the designated survey area using visual encounter techniques.

   - If no bog turtles are found during visual survey, while walking through site identify highest quality habitat patches. Within these highest quality patches, begin looking under live and dead vegetation using muddling and probing techniques.

   - If still no bog turtles are found, the rest of the designated survey area should be surveyed using visual encounter surveys, muddling and probing techniques.

9. Photo-documentation of each bog turtle located will be required; a macro lens is highly recommended. The photos should be in color and of sufficient detail and clarity to identify the bog turtle to species and individual. Therefore, photographs of the carapace, plastron, and face/neck markings should be taken of each individual turtle. Do not harass the turtle in an attempt to get photos of the face/neck markings; if gently placed on the ground, most turtles will slowly extend their necks if not harassed. If shell notching is conducted, do the photo-documentation after the notching is done.

10. The following information should be collected for each bog turtle: sex, carapace length-straight line and maximum length, carapace width, weight, and details about scars/injuries. Maximum plastron length information should also be collected to differentiate juveniles from adults as well as to obtain additional information on recruitment, growth, and demography.

11. Each bog turtle should be marked (*e.g.*, notched, PIT tagged) in a manner consistent with the requirements of the appropriate State agency and/or Service. Contact the appropriate State wildlife agency prior to conducting the survey to determine what type of marking system, if any, should be used.

12. All bog turtles must be returned to the point of capture as soon as possible on the same day as capture. They should only be held long enough to identify, measure, weigh, and photograph them, during which time their exposure to high temperatures must be avoided. No bog turtles may be removed from the wetland without permission from the Service and appropriate State agency.

13. The Fish and Wildlife Service and appropriate State agency should be sent a copy of survey results for review and concurrence, including the following: dates of site visits; time spent

per designated survey area per wetland per visit; names of surveyors; a site map including wetlands and delineations of designated survey areas; a table indicating the size of each wetland, the designated survey area within each wetland, and the survey effort per visit; a description of the wetlands within the project area (*e.g.*, acreage, vegetation, soils, hydrology); an explanation of which wetlands or portions of wetlands were or were not surveyed, and why; survey methodology; weather per visit at beginning and end of survey (air temperature, wind, and precipitation); presence or absence of bog turtles, including number of turtles found and date, and information and measurements specified in item 10 above; and other reptile and amphibian species found and date.

ADDITIONAL SURVEYS / STUDIES

Proper implementation of the Phase 2 survey protocol is usually adequate to determine species presence or probable absence, especially in small wetlands lacking invasive plant species. Additional surveys, however, may be necessary to determine whether or not bog turtles are using a particular wetland, especially if the Phase 2 survey results are negative but the quality and quantity of habitat are good and in a watershed of known occurrence. In this case, additional surveys (Phase 2 and/or Phase 3 (trapping) surveys), possibly extending into the following field season, may be recommended by the Service or appropriate State agency.

If bog turtles are documented to occur at a site, additional surveys/studies may be necessary to characterize the population (*e.g.*, number, density, population structure, recruitment), identify nesting and hibernating areas, and/or identify and assess adverse impacts to the species and its habitat, particularly if project activities are proposed to occur in, or within 300 feet of, wetlands occupied by the species.

CONTACT AGENCIES - BY STATE

(April 2006)

STATE	FISH AND WILDLIFE SERVICE	STATE AGENCY
Connecticut	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, NH 03301	Department of Environmental Protection Env. & Geographic Information Center 79 Elm Street, Store Floor, Hartford, CT 06106 *(info about presence of bog turtles in or near a project area)* Department of Environmental Protection Wildlife Division, Sixth Floor 79 Elm Street, Store Floor, Hartford, CT 06106 *(to get a Scientific Collectors Permit or determine what type of marking system to use)*
Delaware	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, MD 21401	Nongame & Endangered Species Program Delaware Division of Fish and Wildlife 4876 Hay Point Landing Road Smyrna, DE 19977
Maryland	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, MD 21401	Maryland Department of Natural Resources Wildlife & Heritage Division PO Box 68, Main Street Wye Mills, MD 21679
Massachusetts	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, NH 03301	Division of Fisheries and Wildlife Dept. Fisheries, Wildlife and Env Law Enforcement Rt. 135 Westboro, MA 01581
New Jersey	U.S. Fish and Wildlife Service New Jersey Field Office 927 North Main Street, Bldg. D-1 Pleasantville, NJ 08232	New Jersey Division of Fish and Wildlife Endangered and Nongame Species Program 143 Van Syckels Road Hampton, NJ 08827
New York	U.S. Fish and Wildlife Service 3817 Luker Road Cortland, NY 13045	New York Natural Heritage Program Department of Environmental Conservation 700 Troy-Schenectady Road Latham, NY 12110-2400 *(info about presence of bog turtles in or near a project area)* NY Department of Environmental Conservation Special Licenses Unit 50 Wolf Road, Albany, NY 12233 *(for endangered species permit applications)*
Pennsylvania	U.S. Fish and Wildlife Service Pennsylvania Field Office 315 South Allen Street, Suite 322 State College, PA 16801	Natural Diversity Section Pennsylvania Fish and Boat Commission 450 Robinson Lane Bellefonte, PA 16823

Attachment 2

BOG TURTLE COUNTIES OF OCCURRENCE OR LIKELY OCCURRENCE[1]
(April 2006)

STATE	COUNTY	
Connecticut	Fairfield	Litchfield
Delaware	New Castle	
Maryland	Baltimore Carroll	Cecil Harford
Massachusetts	Berkshire	
New Jersey	Burlington Gloucester Hunterdon Middlesex Monmouth Morris	Ocean Salem Somerset Sussex Union Warren
New York	Albany Columbia Dutchess Genesee Orange Oswego Putnam	Seneca Sullivan Ulster Wayne Westchester
Pennsylvania	Adams Berks Bucks Chester Cumberland Delaware Franklin	Lancaster Lebanon Lehigh Monroe Montgomery Northampton Schuylkill York

[1] *This list is valid for one year from the date indicated. It may, however, be revised more frequently if new counties of occurrence are documented. Updates to this list are available from the Service upon request.*

Hartley Road
Plant List Bog Turtle Phase 2
5/19-20/2011

	Scientific Name	Common Name
Open Meadow	*Agrimonia sp.*	agrimony
	Aster novae-anglii	New England aster
	Barbarea vulgaris	yellow rocket
	Carex lasiocarpa	woolyfruit sedge
	Carex stipata	fringed sedge
	Carex stricta	tussock sedge
	Circium arvense	Canada thistle
	Cornus foemina	grey dogwood
	Erigeron annus	daisy fleabane
	Fraxinus pensylvanica	green ash
	Impatiens capensis	jewelweed
	Juncus effusus	softrush
	Lycopus americana	horehound
	Lythrum salicaria	purple loosestrife
	Onoclea sensibilis	sensitive fern
	Poa pratense	Kentucky bluegrass
	Solanum dulcamara	climbing nightshade
	Solidago gigantea	giant goldenrof
	Solidago rugosa	wrinkleleaf goldenrod
	Symplocarpa foetidus	skunk cabbage
	Toxicodendron radicans	poison ivy
	Ulmus americana	American elm
	Verbena hastata	vervain
	Vernonia noveboracensis	New York ironweed
	Veronica serpyllifolia	thyme-leaf speedwell
	Viburnum recognitum	arrowood
	Vicia cracca	bird vetch
Emergent Wetland near end of Hartley	*Acorus calamus*	sweetflag
	Amphicarpaea bracteata	hog peanut
	Angelica purpurea	purple stem angelica
	Aster puniceus	purple stemmed aster
	Chelone glabra	turtlehead
	Cornus amomum	silky dogwood
	Osmunda cinnamonea	cinnamon fer
	Osmunda regalis	royal fern
	Rosa palustris	swamp rose
	Sambucus canadensis	elderberry
	Solidago patula	roundleaf goldenrod
	Thelypteris palustris	marsh fern

Area E	*Acorus calamus*	sweet flag
	Angelica purpurea	angelica
	Aster puniceus	purple stemmed aster
	Barbarea vulgaris	yellow rocket
	Cardamine sp.	spring cress
	Carex stipata	awlfruit sedge
	Carex stricta	tussock sedge
	Cornus amomum	silky dogwood
	Cornus foemina	gray dogwood
	Dryopteris cristata	wood fern
	Dryopteris spinulosa	spinulose wood fern
	Equisetum fluviata	horsetail
	Eupatorium perfoliatum	boneset
	Impatiense capensis	jewelweed
	Lythrum salicaria	purple loosestrife
	Onoclea sensibilis	sensitive fern
	Osmunda cinnamonea	cinnamon fern
	Scenesio arueus	golden ragwort
	Solanum dulcamara	climbing nightshade
	Solidago canadensis	Canada goldenrod
	Solidago patula	roundleaf goldenrod
	Solidago rugosa	wrinkleleaf goldenrod
	Symplocarpa foetidus	skunkcabbage
	Thelypteris palustris	marsh fern
	Urtica gracillis	nettle
	Viburnum recognitum	arrowood

Kleinfelder Hartley Rd Bog Turtle Survey- Site Photographs

5-19-11 001

5-19-11 002

5-19-11 003

5-19-11 004

5-19-11 005

5-19-11 006

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6-8-11 041

6-8-11 042

BAGDON
environmental

NORBERT QUENZER JR.

EDUCATION

B.S., Forest Biology-Wildlife, 1979, State University of New York, College of Environmental Science and Forestry, Syracuse, NY.

A.S., Forest Management, 1977, Columbia-Greene Community College, Hudson, NY.

EMPLOYMENT HISTORY

Vice President/Senior Ecologist - Bagdon Environmental, Delmar, New York. January 1986 to present.

Mr. Quenzer is responsible for managing and conducting wetland studies at Bagdon Environmental. Duties include state and federal wetland delineation; mitigation and restoration plan development; permit application preparation; client/regulatory liaison; and expert testimony. As Senior Ecologist, Mr. Quenzer conducts and supervises ecological evaluations; wildlife/vegetation inventory and analysis; endangered species surveys; and habitat evaluations. Mr. Quenzer has been principal investigator and supervisor of hundreds of wetland and ecological projects during his tenure at Bagdon Environmental.

Interpretive Naturalist - New York State Department of Environmental Conservation, Albany, New York. 1985.

Developed and presented educational programs on the ecological, cultural and historic attributes of the New York State Forest Preserve.

Environmental Biologist - Jason M. Cortell and Associates, Inc., Gladstone, New Jersey. 1982 to 1985.

Primary responsibilities were wetland assessment and wildlife/vegetation inventory and analysis. Additional duties included: aquatic vegetation surveys, macroinvertebrate analysis, electrofishing, field monitoring and analysis of water quality, air quality, noise and meteorological data.

Wildlife Research Assistant - Cornell University, Department of Natural Resources, Highland, New York. 1980 to 1981.

Organized and directed field studies for pine vole (*Microtus pinetorum*) control project in Hudson Valley apple orchards.

PROFESSIONAL MEMBERSHIPS

Association of State Wetland Managers
Ecological Society of America
New York State Wetlands Forum - Chair (1994-1996) and Founding Member
Society of Wetland Scientists – Professional Certification Standards Committee
The Wildlife Society

PROFESSIONAL CERTIFICATION AND TRAINING

Certified Professional Wetland Scientist, Society of Wetland Scientists
Certified Ecologist, Ecological Society of America
Certified Wildlife Biologist, The Wildlife Society
Certified Habitat Evaluation Procedures, U.S. Fish and Wildlife Service
Federal Wetland Identification and Delineation Techniques

PROFESSIONAL LICENSES

New York State Department of Environmental Conservation

- Scientific Collectors License - #LCP01-183
- Endangered Species amendment for Bog Turtles (*Clemmys muhlenbergii)* in Dutchess, Orange, Putnam and Westchester Counties

LICENSE

Under the Environmental Conservation Law (ECL)

Licensee Information

License Issued To:
NORBERT QUENZER JR
BAGDON ENVIRONMENTAL
25 DELAWARE AVE
DELMAR, NY 12054

(518) 439-8588

DEC Contact Information

DIVISION OF FISH, WILDLIFE AND MARINE RESOURCES
SPECIAL LICENSES UNIT
625 BROADWAY, ALBANY, NEW YORK 12233-4752
PHONE: (518) 402-8985 FAX: (518) 402-8925
WEBSITE: www.dec.state.ny.us

License Authorizations

Endangered/Threatened Species: Scientific
License # 149

New License Effective Date: 11/2/2010 Expiration Date: 11/1/2011

NYSDEC Approval

By acceptance of this license, the licensee agrees that the license is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this license.

License Regulations

6 NYCRR Part 182
6 NYCRR Part 175
ECL 11-0536
ECL 11-0535

Issued License

ENDANGERED/THREATENED SPECIES: SCIENTIFIC - LICENSE CONDITIONS

1. Collection from the Wild: Authorized Species, Specific The licensee is authorized to collect and possess the following species: Bog turtle (Clemmys muhlenbergii)

2. Scientific Collection - Authorized Activities The licensee is authorized to possess the collected species for the following activity(ies): Collection of Biological Information

3. Scientific Collection - Location The licensee is authorized to collect species from the following locations only:
Dutchess, Orange, Putnam and Westchester Counties.

4. Scientific Collection –Temporary Possession and Release The licensee shall possess the listed animal(s) only for the minimum time necessary for the collection of biological data. The licensee shall immediately release the listed animals unharmed at the point of original capture following the collection of biological data.

5. Scientific Collection – Removal of Species from the Wild Prohibited The licensee shall not remove the listed animals from the wild.

6. Scientific Collection – Authorized Collection Equipment General The licensee shall only collect authorized species using: Hand capture and turtle traps.

7. Scientific Collection - Authorized Turtle Marking Technique The licensee is authorized to mark captured turtles for the purpose of future identification. Marking may be accomplished by file notching marginal scutes. Care shall be taken to minimize stress to turtles during the process of capture and marking.

8. Scientific Collection - Notch Codes The licensee shall provide the Endangered Species Unit with all notch codes used within thirty (30) days of marking.

Endangered Species Unit
NYSDEC HEADQUARTERS
625 BROADWAY
ALBANY, NY12233

9. Scientific Collection – Gear Marking and Monitoring The licensee shall mark all gear deployed with the licensee's name, resident address and license type and number. All traps and nets shall be checked no less than once every twenty-four (24) hours.

10. Scientific Collection - Law Enforcement Notification The licensee shall notify the appropriate Regional Environmental Conservation Officer at least 48 hours prior to conducting activities pursuant to this license and within 24 hours upon the loss or theft of any collecting gear.

11. Scientific Collection – Endangered/Threatened Species Incidental Mortality and Mandatory Specimen Submission The licensee shall, if any endangered or threatened species is inadvertently killed,

place the specimen in a small container and deliver it within 3 days to the NYSDEC Endangered Species Unit, 625 Broadway, Albany, NY 12233 along with the date, location, name(s) of person(s) involved with the mortality and an explanation of the reason(s) for the mortality.

12. Scientific Collection - Federal and Local Licensing Requirements The licensee shall determine if a corresponding Federal or local Permit is required to exercise the authority granted in this license. If a corresponding Federal or local Permit is required, the licensee shall obtain a valid Federal or local Permit before conducting any activity pursuant to this license.

13. Scientific Collection - Authority to Designate Agents The licensee is authorized to designate agents to assist the licensee with the listed animals while conducting activities authorized pursuant to this license provided that:

a. the licensee submits a written request to the NYSDEC Special Licenses Unit at the address listed on the front of this license containing the:
   i) name
   ii) address
   iii) age
   iv) phone number of the person he or she is nominating as a designated agent, and;

b. the licensee receives an amended license from the Special Licenses Unit listing the designated agents he or she has nominated before that person can conduct activities authorized by this license.

14. Scientific Collection - Reporting Requirement - Prior to Expiration The licensee shall file a written annual report prior to the expiration date of this license. Such annual report shall contain: a) name of the licensee, b) license number, c) common name of the listed animals collected, d) location(s) of collection, e) date(s) of collection, f) biological data collected and g) final disposition of collected animals. The licensee shall send this report to the NYSDEC Special Licenses Unit 625 Broadway, Albany, NY 12233-4752.

GENERAL CONDITIONS - Apply to ALL Authorized Licenses

1. GC – Licensee Shall Read All Conditions The licensee shall read all license conditions prior to conducting any activities authorized pursuant to this license.

2. GC – Reasons for Revocation This license may be revoked for any of the following reasons:

i. licensee provided materially false or inaccurate statements in his or her application, supporting documentation or on required reports;
ii. failure by the licensee to comply with any terms or conditions of this license;
iii. licensee exceeds the scope of the purpose or activities described in his or her application for this license;
iv. licensee fails to comply with any provisions of the NYS Environmental Conservation Law, any other State or Federal laws or regulations of the department directly related to the licensed activity;
v. licensee submits a check, money order or voucher for this license or application for this license that is subsequently returned to the department for insufficient funds or nonpayment after the license has been issued.

3. GC – Licensee Shall Carry Copy of License The licensee shall carry a copy of this license or a document provided by the department, if relevant, when conducting activities pursuant to this license.

4. GC – Licensee Shall Notify of Change of Address The licensee shall notify the Special Licenses Unit in writing, by mail or email, within five (5) days of the official change of residence.

5. GC – License is Not Transferrable This license is not transferrable and is valid only for the person identified as the licensee.

6. GC – Licensee is Liable for Designated Agents If designated agents are authorized pursuant to this license, the licensee shall be liable and responsible for any activities conducted by designated agents pursuant to this license or any actions by designated agents resulting from activities authorized by this license.

7. GC – Licensee Renewal The licensee shall submit a written request for the renewal of this license prior to the expiration date listed on the license. The licensee shall include accurate and complete copies of any required reports with their renewal request. This renewal paperwork shall be sent to:

NYSDEC
Special Licenses Unit
625 Broadway
Albany, NY 12233-4752.

This license is deemed expired on the date of expiration listed on the license.

NOTIFICATION OF OTHER LICENSEE OBLIGATIONS

MN– Licensee is Liable
The licensee shall be liable and responsible for any activities conducted under the authority of this license or any actions resulting from activities authorized by the license.

MN – Access by Law Enforcement
The licensee shall allow representatives of the NYS DEC Division of Law Enforcement to enter the licensed premises to inspect his or her operations and records for compliance with license conditions.

Trespassing Prohibited
This license is not a license to trespass. The licensee shall obtain permission from the appropriate landowner/land manager prior to conducting activities authorized pursuant to this license

LICENSE

Under the Environmental Conservation Law (ECL)

Licensee Information

License Issued To:
NORBERT QUENZER JR
BAGDON ENVIRONMENTAL
25 DELAWARE AVE
DELMAR, NY 12054

(518) 439-8588

DEC Contact Information

DIVISION OF FISH, WILDLIFE AND MARINE RESOURCES
SPECIAL LICENSES UNIT
625 BROADWAY, ALBANY, NEW YORK 12233-4752
PHONE: (518) 402-8985 FAX: (518) 402-8925
WEBSITE: www.dec.state.ny.us

License Authorizations

License to Collect or Possess: Scientific
License # 881

New License Effective Date: 8/24/2010 Expiration Date: 8/23/2011

NYSDEC Approval

By acceptance of this license, the licensee agrees that the license is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this license.

License Regulations

6 NYCRR Part 175
ECL 11-0515 (1)

LICENSE TO COLLECT OR POSSESS: SCIENTIFIC - LICENSE CONDITIONS

1. **Scientific Collection - Authorized Species, General** The licensee is authorized to collect and possess:
Mammals (Class Mammalia) Amphibians (Class Amphibia) Reptiles (Class Reptilia) Fresh water fish species (Class Actinopterygii) Fresh water macro-invertebrates (NY Indigenous)
as listed on the licensee's application on file with the Special Licenses Unit.

2. **Scientific Collection: Authorized Activities** The licensee is authorized to possess the collected species for the following activity(ies): Species Presence Survey

3. **Scientific Collection: Location** The licensee is authorized to collect species from the following locations only: DEC Regions 3,4,5,6,7,8 and 9 in All counties within region 3,4,5,6,7,8 and 9 County(ies).

4. **Scientific Collection –Temporary Possession and Release** The licensee shall possess the listed animal(s) only for the minimum time necessary for the collection of biological data. The licensee shall immediately release the listed animals unharmed at the point of original capture following the collection of biological data.

5. **Scientific Collection – Removal of Species from the Wild Prohibited** The licensee and/or designated agents shall not remove the listed animals from the wild.

6. **Scientific Collection - Mammal authorization and trapping** Mammal shall mean small mammals only, authorized trapping equipment sherman and or other live traps.

7. **Scientific Collection - Gear marking** The licensee shall mark all gear with the licensee's name and resident address.

8. **Scientific Collection - Trap Checking** The licensee shall check all traps at least once within a twenty-four (24) hour period.

9. **Scientific Collection - Incidnetal Take** The licensee shall either deposit any specimens not surviving capture with the New York State Museum or dispose of specimens by either incineration or burying.

10. **Scientific Collection - Biosafety Protocol** The licensee shall conform with all guidelines contained in the NYS DEC Bureau of Fisheries Sampling, Survey, Boat and Equipment and Biosecurity Protocols, attached to this license as Appendix I. Any questions regarding the protocols may be directed to the Regional Fisheries Manager at:

Regional Fisheries Manager
NYSDEC REGION 4 STAMFORD SUB-OFFICE
65561 ST RTE 10
STAMFORD, NY12167 -9503

11. **Scientific Collection - Federal and Local Licensing Requirements** The licensee shall determine if a corresponding Federal or local Permit is required to exercise the authority granted in this license. If a

corresponding Federal or local Permit is required, the licensee shall obtain a valid Federal or local Permit before conducting any activity pursuant to this license.

12. **Scientific Collection - LCP - No Endangered or Threatened Species** No endangered/threatened species may be collected or possessed pursuant to this license.

13. **Scientific Collection - Authority to Designate Agents** The licensee is authorized to designate agents to assist the licensee with the listed animals while conducting activities authorized pursuant to this license provided that:

a. the licensee submits a written request to the NYSDEC Special Licenses Unit at the address listed on the front of this license containing the:
   i) name
   ii) address
   iii) age
   iv) phone number of the person he or she is nominating as a designated agent, and;

b. the licensee receives an amended license from the Special Licenses Unit listing the designated agents he or she has nominated before that person can conduct activities authorized by this license.

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i. licensee provided materially false or inaccurate statements in his or her application, supporting documentation or on required reports;
ii. failure by the licensee to comply with any terms or conditions of this license;
iii. licensee exceeds the scope of the purpose or activities described in his or her application for this license;
iv. licensee fails to comply with any provisions of the NYS Environmental Conservation Law, any other State or Federal laws or regulations of the department directly related to the licensed activity;
v. licensee submits a check, money order or voucher for this license or application for this license that is subsequently returned to the department for insufficient funds or nonpayment after the license has been issued.

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NYSDEC
Special Licenses Unit
625 Broadway
Albany, NY 12233-4752.

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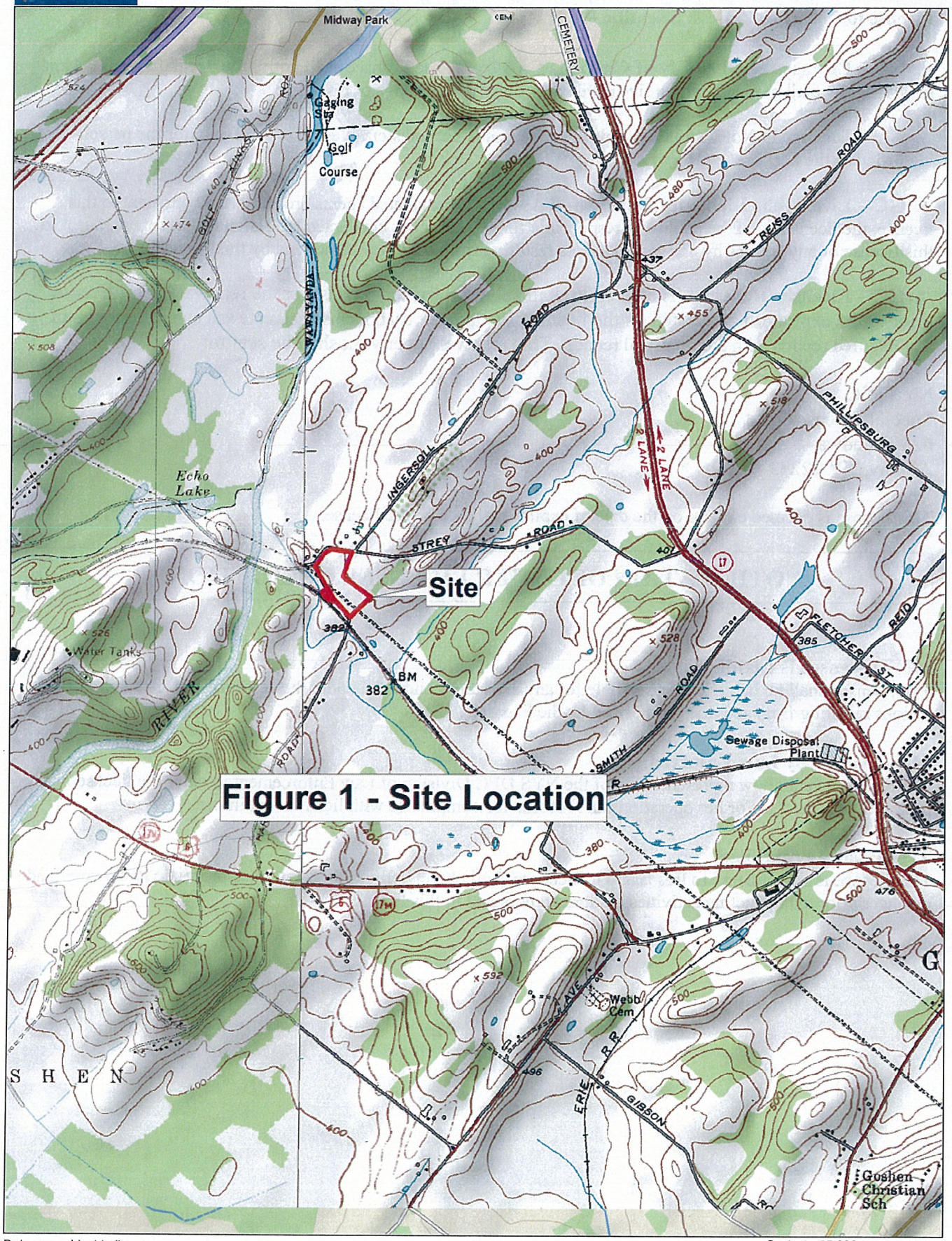
Trespassing Prohibited
This license is not a license to trespass. The licensee shall obtain permission from the appropriate landowner/land manager prior to conducting activities authorized pursuant to this license



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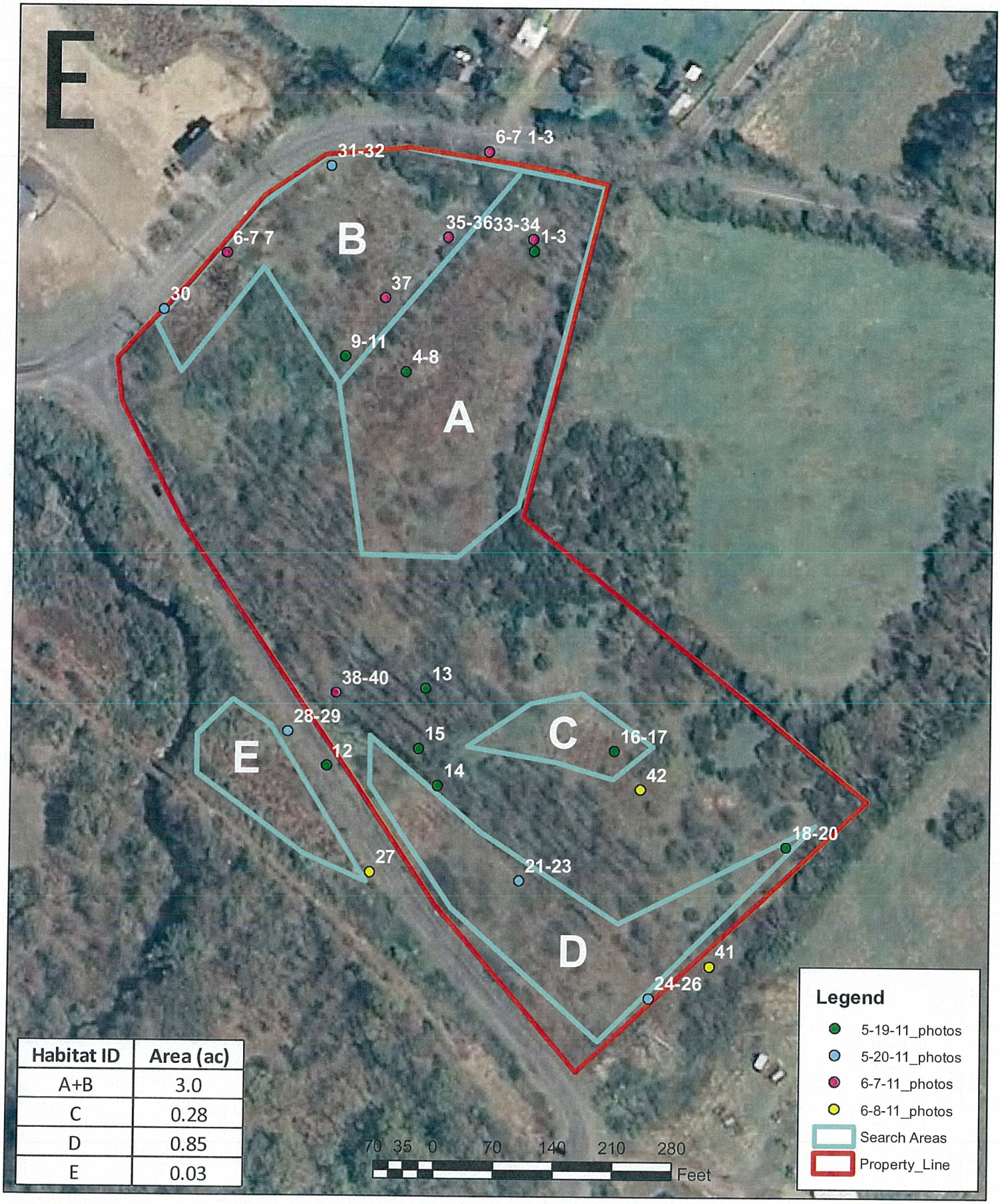
www.delorme.com

TN
MN (13.1°W)

Scale 1 : 25,000
1" = 2,083.3 ft
Data Zoom 13-0



Habitat ID	Area (ac)
A+B	3.0
C	0.28
D	0.85
E	0.03

BAGDON Environmental
25 Delaware Ave.
Delmar, New York 12054
(518) 439-8588

FIG 2. Phase 2 Search Areas and Photo Locations on 2007 Aerial Photograph
Kleinfelder Hartley Rd Bog Turtle Survey
Town of Goshen, Orange County, New York

APPENDIX I
Indiana Bat Habitat Assessment

INDIANA BAT HABITAT ASSESSMENT REPORT

Proposed Hartley Road Electrical Substation
Hartley and Cheechunk Road
Goshen, Orange County, New York

October 2011

Prepared for:
Orange and Rockland Utilities
390 West Route 59
Spring Valley, New York 10977-5300

Prepared by:

Kleinfelder East, Inc.
1279 Route 300, 2nd Floor
Newburgh, New York 12550
p | 845-567-6530 **f** | 845-567-6542

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Figure 1 Project Location Map
Figure 2 Bat Habitat Evaluation Areas

APPENDICES

Appendix A Agency Correspondence
Appendix B Photographic Log
Appendix C Bat Survey Datasheets
Appendix D Key Staff Resumes

1.0 INTRODUCTION

On behalf of Orange and Rockland Utilities (ORU), Kleinfelder East, Inc. (Kleinfelder), conducted a habitat assessment to evaluate potential Indiana bat (*Myotis sodalis*) habitat as part of the planning and permitting process for a proposed electrical utility substation. The entire parcel is approximately 48.73 acres in size and is located on the corner of Cheechunk and Hartley Road in Goshen, Orange County, New York. However, this assessment evaluated only the proposed project area (6.31 acres) and its immediate vicinity.

1.1 SITE LOCATION

The street address is 157 Cheechunk Road and the tax map designation for the Site is Section 12, Block 1, Lot 1.7. Cheechunk Road abuts the property to the north and west. Hartley Road abuts the property along the southwestern edge of the property. Eastern portions of the property abut private lands. Figure 1 illustrates the proposed project location. Figure 2 shows the survey area for the site.

1.2 PURPOSE

The purpose of this investigation is to determine whether the proposed development may impact suitable roosting and/or foraging habitat for the Indiana bat. Specifically, this study evaluated potential roosting habitat within the onsite boundaries of the proposed disturbed project area (approximately 6.31 acres) where tree removal could occur and its immediate vicinity. The study also addresses potential impacts to adjacent lots and, where applicable, describes appropriate measures to protect this species and its habitat.

1.3 AGENCY REVIEW

On July 25, 2011, the New York State Department of Environmental Conservation (NYSDEC) Natural Heritage Program provided written documentation indicating that the project did not have any known records of rare or state listed animals or plants, significant natural communities on or within the immediate vicinity of the project area (Appendix A). However, due to known research and the presence of known Indiana bat

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summer roosting areas within the general Orange County area and their potential range, a habitat survey was conducted on the parcel, with the study concentrated within the proposed site development plans. Therefore, as part of the site development process, ORU requested a habitat assessment of the site to evaluate suitability of the site for Indiana bats. This report details the results of the habitat assessment.

2.0 EXISTING CONDITIONS

2.1 SITE DESCRIPTION

The proposed project area consists of three community types which include successional old field, mixed deciduous hardwoods, and emergent wetlands. The surrounding area is characterized as a combination of single-family residential homes, agricultural land, vacant fallow land, and wooded land. Residential properties exist along Cheechunk Road to the north and west of the Site. Agricultural land exists to the north. Vacant fallow land exists to the south, southwest, and southeast. Forested land exists to the southwest, south, southeast, east, and northeast of the site. A transmission line runs from northwest to southeast on the south side of the site. Additionally, the Orange County Heritage (Walking) Trail is located across Hartley Road to the southwest of the Site.

3.0 INDIANA BAT ECOLOGY

This section provides background information about the endangered Indiana bat, its life history, and preferred habitat.

3.1 SPECIES DESCRIPTION

The Indiana bat is a medium sized bat that is closely related to the little brown bat (*Myotis lucifugus*). It has dull gray or chestnut fur and the basal portion of the hairs is a dull lead color. The underside of this bat is pink or cinnamon in color and the hind feet are smaller and more delicate than those of the little brown bat. The head and body are 1.6 to 1.9 inches long and the wingspan is approximately eight inches. Individuals weigh approximately 0.25 ounce. The most characteristic feature of the Indiana bat is the keel on the heels of the feet and the rear edge of the tail membrane (USFWS, 1999).

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3.2 LIFE HISTORY

Female Indiana bats enter hibernation in early autumn, shortly before the males. They hibernate in clusters ranging in population from several hundred to several thousand (Schwartz and Schwartz, 1986). Both males and females emerge from hibernation in early spring and begin migrating to summer roosting and foraging areas. Many males remain near the hibernation caves, however, winter and summer habitats may be as much as 300 miles apart (USFWS, 2004). Indiana bats return to the same roosting and hibernation locations year after year. They generally mate during mid August to late October. Young are born in late June and litters consist of one bat. Indiana bats reach sexual maturity at six months and live for 14 to 20 years (DeFraaf and Yamasaki, 2001).

3.3 HABITAT

Indiana bats typically forage in treetops along streams and riparian forests and floodplains, but also can be found in upland forests, fields and pastures. They are entirely insectivorous, foraging mostly on moths, mosquitoes, and aquatic insects. They hibernate in mines or caves in the winter, and roost under bark or in tree crevices in the spring, summer, and fall (USFWS, 2004). Suitable roosting habitat includes dead, dying or live trees greater than five inches in diameter at breast height (DBH) with exfoliating or defoliating bark, cracks, or crevices. Indiana bats generally do not hibernate or roost in man-made houses or structures.

Maternity roosting habitat is usually characterized by the presence of trees greater than nine inches DBH, where females group under the loose bark or crevices for shelter. A maternity colony may consist of as many as 100 individuals. Other indicators of potential roosting habitat include trees with heights in excess of 50 feet, direct (i.e. southern facing) solar exposure on the potential roosting tree and close proximity of water sources and foraging areas such as open fields. Bats prefer larger trees because they have a greater capacity for heat retention and promote more efficient thermoregulation than smaller trees. In general, bats prefer dead or dying deciduous species of hickory (*Carya* spp.), ash (*Fraxinus* spp.), oak (*Quercus* spp.), elm (*Ulmus* spp.), poplar (*Populus* spp.), and maple (*Acer* spp.) (Kurta, 2005).

During the spring, summer and fall, bats may use primary or alternate roosting habitat. Primary roosting habitat includes trees at the edge of a forest stand that receive

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relatively high levels of solar exposure. Alternate roosting sites provide shelter at higher temperatures or during significant precipitation events and tend to support fewer individuals. These trees are usually located in the interior of a forest stand where temperatures are cooler and water is less likely to encroach into the roost (USFWS, 1999).

4.0 METHODOLOGY

4.1 FIELD SURVEY

Biologists from Kleinfelder conducted a field survey at the proposed study area on August 30, 2011, to evaluate potential bat roosting habitat in the proposed 6.31-acre area of disturbance. Prior to field work, aerial photographs and a recent tree survey were reviewed to determine the areas of forested habitat present onsite. During the field survey, tree characteristics and the forested habitats located within the boundaries of the proposed project area were evaluated. Qualifiers used to evaluate potential summer roosting habitat included the amount of peeling bark, cracks, crevices, broken limbs, and solar exposure for each area. Bats prefer roosting habitat with an open canopy, moderately vegetated understory, and direct sun exposure. A closed canopy, thickly vegetated understory, lack of dead trees, snags, or trees with broken limbs, peeling bark and/or cavities may place the habitat into the marginal or poor class. The individual trees Indiana bats use during summer roosting are dynamic structures with varying degrees of peeling bark and limb breakage. Trees lacking favorable characteristics for summer roosting may exhibit these characteristics in subsequent seasons with the advent of broken limbs, tree death, lightning strikes, etc. The reviewed areas are described in the following section and depicted in Figures 1 and 2. Appendices B and C provide photos and field data forms, respectively, for each bat habitat area. Key Staff resumes are provided in Appendix D.

5.0 BAT HABITAT AREA DESCRIPTIONS

Area 1 is a flat (0 to 2 percent slope) successional old field with surrounding hedgerow and forest edge. Tree canopy was moderately to partially closed and included shagbark and pignut hickory (*Carya ovata, C. glabra*), Norway and sugar maples (*Acer platanoides, A. saccharum)*, black cherry (*Prunus serontina*), and pin and white oak (*Quercus palustris, Q. alba*) ranging primarily 8-12 inches DBH with scattered larger

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trees ranging primarily 12-16 inches DBH (Photos 1 and 2). The subcanopy was moderately closed and consisted of saplings and shrubs of species listed above along with buckthorn (*Rhamnus* spp.) and staghorn sumac (*Rhus typhina*). Three suitable roost trees were identified in this area including an 18-inch DBH and a 30-inch DBH shagbark hickory, and a 12-inch DBH American elm snag (*Ulmus Americana*) (Photos 3, 4, 5). These trees are identified on the tree survey (performed by others) as tree 197, 219, and 252, respectively. The trees possess exfoliating bark which had direct sunlight from the east and/or south. Based on the proposed site plan, all three trees are outside of the 6.31-acre area of disturbance and will not be impacted by site development. Overall, the area provides poor to marginal bat roosting habitat as most trees do not exhibit exfoliating bark, and most of the snags are covered with poison ivy (*Toxicodendron radicans*).

Area 2 was a flat (0 to 2 percent slope) consists of mix deciduous hardwoods and a small shallow emergent/ successional old field. The dominant canopy was dense and consisted primarily of green and white ash (*Fraxinus pennsylvanica, F. americana*), and honey locust (*Gleditsia triacanthos*) ranging in size from 8-12 inches DBH. The subdominant canopy was moderately dense and consisted of shrubs and saplings of listed above including hawthorn and multiflora rose (*Rosa multiflora*) The area lacked tree species with exfoliating bark and snags and provides poor to marginal bat roosting habitat. (Photos 6).

6.0 CONCLUSION

The two areas (Area 1 and 2) described above generally lack overall suitable roosting habitat due to one or more of the following reasons: a high percentage of canopy cover, thick understory vegetation, limited sun exposure, lack of dead trees, or lack of trees with snags, broken limbs or peeling bark and/or cavities. Only three individual trees exhibit characteristics for potential suitable summer roosting. These three trees are outside of the 6.31-acre area of disturbance and will not be impacted during site development.

7.0 RECOMMENDATIONS

Based on the habitat evaluation conducted as part of this project review, Kleinfelder does not believe the proposed site offers a suitable habitat for Indiana bats. Only three

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individual trees were identified that could be used as maternity or roost trees. The site does offer potential as foraging habitat due to the open fields and adjacent wetlands. The proposed substation will not impact these three potential roosting trees for Indiana bats. While consultation with the USFWS and NYSDEC may be required, no further field studies are warranted.

8.0 LITERATURE CITED

DeFraaf, R. M. and Yamasaki, M., 2001. New England Wildlife. University Press of New England.

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U.S. Fish and Wildlife Service, 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. Fort Snelling, Minnesota. 258 pp.

U.S. Fish and Wildlife Service, July 2004. *Indiana Bat.* http://www.fws.gov/northeast/pdf/indianabat.fs.pdf

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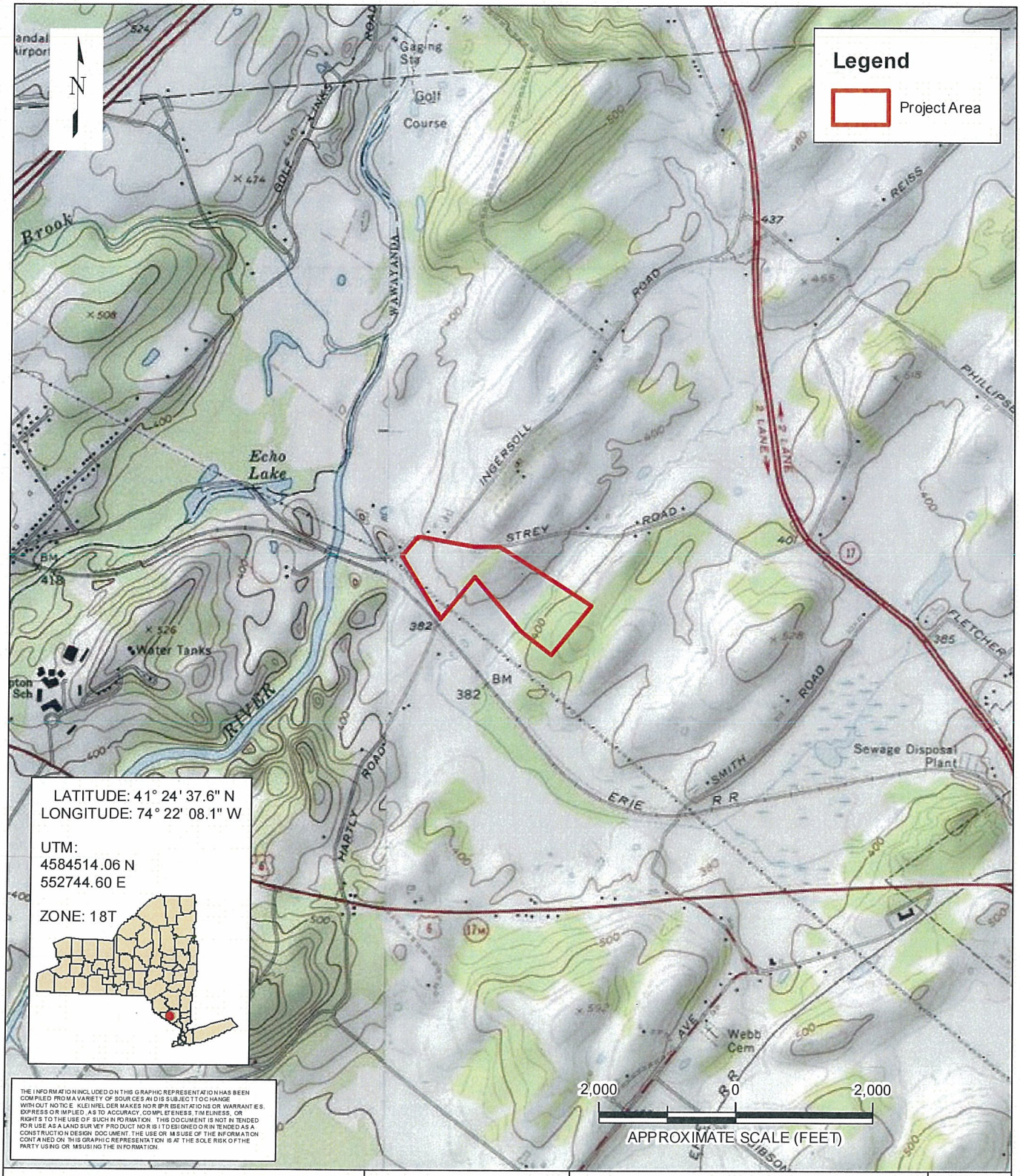
FIGURES



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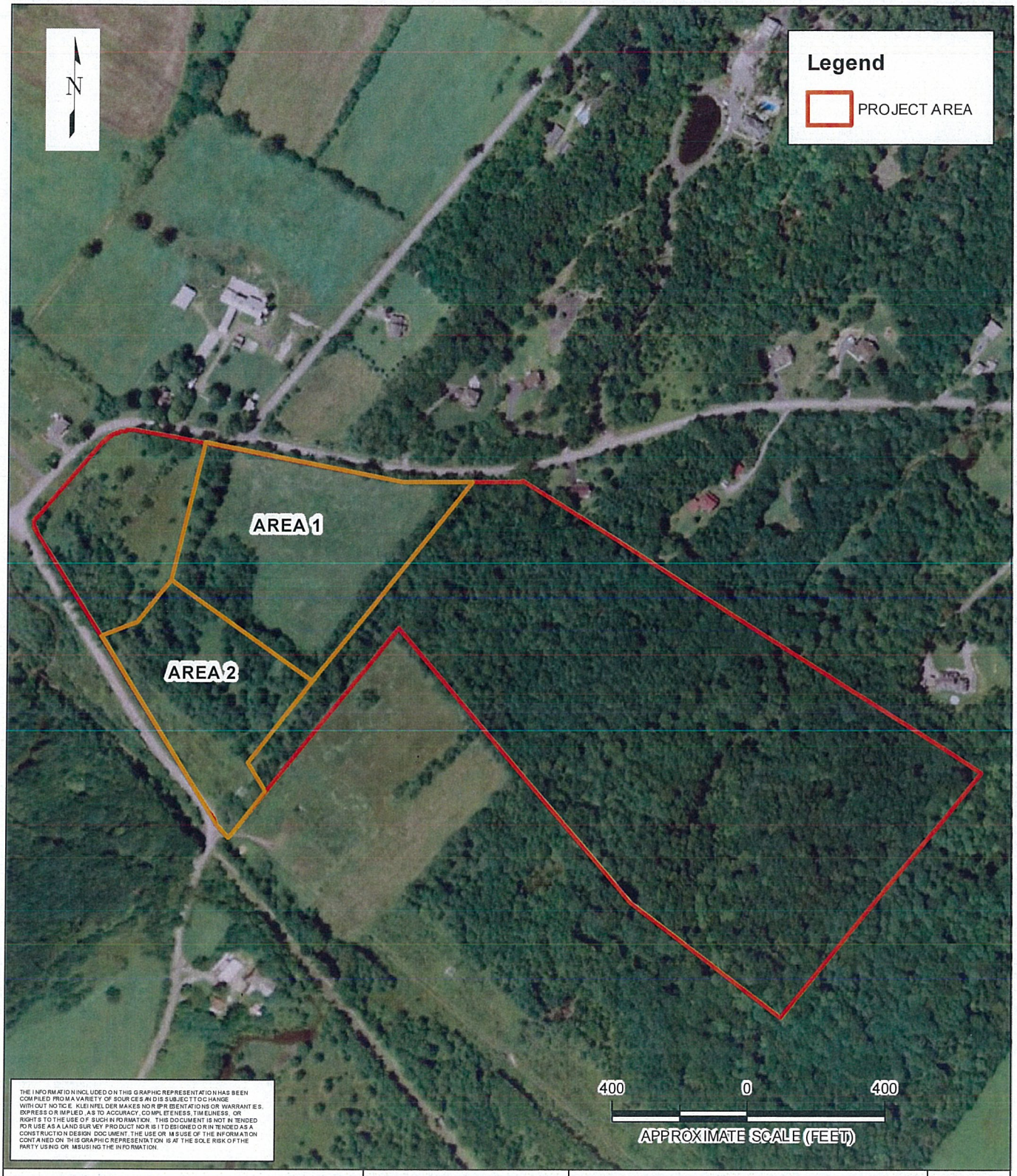
PROJECT NO.	119978
DRAWN:	06/24/11
DRAWN BY:	CTH
CHECKED BY:	JGC
FILE NAME:	119978F1.MXD

FIGURE 1
USGS TOPOGRAPHIC MAP

HARTLEY ROAD SITE
ORANGE & ROCKLAND UTILITIES, INC.
TOWN OF GOSHEN
ORANGE COUNTY, NEW YORK

FIGURE:
1



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DRAWN:	09/09/11
DRAWN BY:	CTH
CHECKED BY:	JGC
FILE NAME:	119978F2BAT.MXD

FIGURE 2
BAT HABITAT EVALUATION AREAS

HARTLEY ROAD SITE
ORANGE & ROCKLAND UTILITIES, INC.
TOWN OF GOSHEN
ORANGE COUNTY, NEW YORK

FIGURE:
2

APPENDIX A
AGENCY CORRESPONDENCE

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

RECEIVED
JUL 27 2011
BY:

Joe Martens
Commissioner

July 25, 2011

Casey Tompkins
Kleinfelder East, Inc.
1279 Route 300, 2nd floor
Newburgh, NY 12550

Dear Mr. Tompkins:

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 Orange & Rockland Utilities New Electrical Substation, Project # 09 472 601, site as indicated on the map you provided, located on Cheechunk Road, Town of Goshen, Orange County.

We have no records of rare or state listed animals or plants, significant natural communities or other significant habitats, on or in the immediate vicinity of your site.

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. This information should not be substituted for on-site surveys that may be required for environmental assessment.

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.

This response applies only to known occurrences of rare or state-listed animals and plants, significant natural communities and other significant habitats maintained in the Natural Heritage Data bases. Your project may require additional review or permits; 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,

Jean Pietrusiak, Information Services
NYS Department Environmental Conservation

Enc.
cc: Region 3

722

APPENDIX B
PHOTOGRAPHIC LOG

Photograph No. 1
View facing east of northern hedgerow between the proposed project area and Cheechunk Road. No tree removal will occur in this area.

Photograph No. 2
View facing south of tree line along the western portion of the proposed development.

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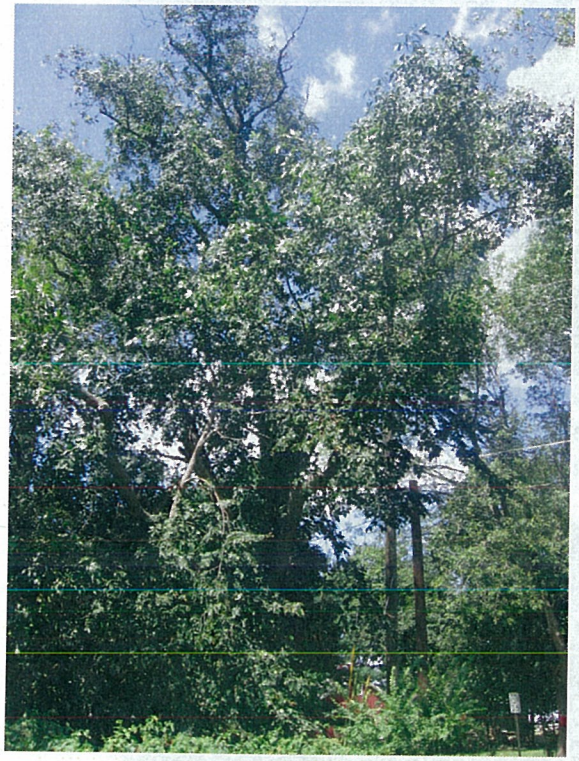

Photograph No. 3
View facing northwest of shagbark hickory located near proposed entrance of substation. The tree receives good eastern to southern sun exposure. Identified as Tree 219 in Tree Survey by others.

Photograph No. 4
View facing southwest of shagbark hickory located near proposed maintenance access road for the substation. The tree receives good eastern to southeastern sun exposure. Identified as Tree 197 in Tree Survey by others.

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Photograph No. 5
View facing northeast of dead American elm along hedgerow adjacent to Cheechunk Road. The tree receives good eastern to southern sun exposure and possesses exfoliating bark. Identified as Tree 252 in Tree Survey by others.

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Photograph No. 6
View facing east of proposed transmission connection to the existing line. Ash trees dominate the foreground. Area did not possess suitable bat habitat.

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APPENDIX C
BAT SURVEY DATASHEETS

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Habitat Field Data Form

Kleinfelder , Inc.
1279 Route 300, 2nd Floor
Newburgh, NY 12550

Area 1

Project/Site: Hartley Rd. Project Name: Hartley substation Date: 8/30/11
Applicant/Owner: O&R County, State: Orange, NY
Investigator(s): S. Finch Section, Township, Range: Goshen
Latitude: N Longitude: W USGS Quad:
Distance to closest water source (meters): Type of water source:
Water source name: Size:

Water source characteristics:

Elevation: Aspect: % Slope:

Vegetation:

Dominant Canopy Species (dbh):	Subdominant Canopy Species (dbh):
Norway maple * Dead A. Elm 12"	Buckthorn
Sugar maple	Staghorn Sumac
✓ shagbark Hickory 30" dbh	T. Honeysuckle
white Ash	
Pin oak	
Estimated dbh range: Lg: 10" Sm: 8	Estimated dbh range: Lg: 4" Sm: 4"

Estimated canopy closure: ✓ Closed ___ Moderate ___ Open
Roost tree potential consists of: 1 Large Trees 1 Snags ___ Both ___ Neith
Roost potential comments: one large shag. Hick 30"; 1 dead elm 12 DBH w/ goex) cashew to southern 50% exposure, 1 shag hick 18" dbh
Subcanopy clutter: ___ Closed ✓ Moderate ___ Open
Subcanopy compromised largely of:
✓ Lower branches of canopy trees ✓ Saplings ✓ Shrubs

Habitat Description/Remarks: Hedgerow between old field; (Cheechunk RJ. Old field dominated) by Canadian goldenrod

Check all that apply:

___ Mature Upland Forest	___ Pine Plantation	___ Emergent Wetland	___ Other
___ Young Upland Forest	✓ Woodlot/Forest Edge	___ Forested Swamp	___
___ Mature Lowland Forest	✓ Old Field	___ Shrub/scrub swamp	___
___ Young Lowland Forest	___ Crop/Pasture land	___ Vernal Pool	
___ Recently Logged Forest	___ Stream/River	___ Deepwater lake/Pond	

Herbaceous cover: ___ Sparse ___ Moderate ✓ Dense → IN old field

Habitat Field Data Form

KLEINFELDER
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Kleinfelder, Inc.
1279 Route 300, 2nd Floor
Newburgh, NY 12550

Area 2

Project/Site: Hartley Rd Project Name: Hartley Subdivision Date: 8/30/11

Applicant/Owner: O&R County, State: Orange, NY

Investigator(s): S. Finch Section, Township, Range: Goshen

Latitude: N Longitude: W USGS Quad:

Distance to closest water source (meters): Type of water source:

Water source name: Size:

Water source characteristics:

Elevation: Aspect: % Slope:

Vegetation:

Dominant Canopy Species (dbh):	Subdominant Canopy Species (dbh):
White Ash	Buckthorn
Green Ash	multiflora Rose
hemlock	Tatarian honeysuckle
Bl cherry	

Estimated dbh range: Lg: 14 Sm: 8 Estimated dbh range: Lg: 4 Sm: 1

Estimated canopy closure: ___ Closed ✓ Moderate ___ Open

Roost tree potential consists of: ___ Large Trees ___ Snags ___ Both ✓ Neith

Roost potential comments: Trees do not exhibit characteristics suitable for bat roosting

Subcanopy clutter: ___ Closed ✓ Moderate ___ Open

Subcanopy compromised largely of:

___ Lower branches of canopy trees ✓ Saplings ✓ Shrubs

Habitat Description/Remarks: Very dense veg in areas. Very shaded by surroundings. Trees species usually not associated by w/ bats. Very few snags NOT taller than surrounding trees. Some PEM wetland w/in study area.

Check all that apply:

___ Mature Upland Forest	___ Pine Plantation	✓ Emergent Wetland	___ Other
___ Young Upland Forest	___ Woodlot/Forest Edge	___ Forested Swamp	___
___ Mature Lowland Forest	___ Old Field	___ Shrub/scrub swamp	___
✓ Young Lowland Forest	___ Crop/Pasture land	___ Vernal Pool	
___ Recently Logged Forest	___ Stream/River	___ Deepwater lake/Pond	

Herbaceous cover: ___ Sparse ✓ Moderate ___ Dense

APPENDIX D
KEY STAFF RESUMES

KLEINFELDER
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STEVEN FINCH

Wetland Scientist/Biologist
Staff Professional

Education

- Wildlife Management, State University of New York, College of Agriculture & Technology at Cobleskill, New York, 2000

Certifications/Training

- OSHA 40-Hour HAZWOPER,
- Asbestos Inspector, No. 07-10859,
- CPR and First Aid certification,
- Loss Prevention System Training Certification

Summary of Experience

Mr. Finch has over 9 years of experience providing wetland and ecological consulting services to private and governmental clients. His experience includes wetland delineations and mitigations, permitting, ecological investigations, endangered, threatened, and rare species investigations, bat surveys, turtle trapping, wildlife management, and water quality sampling. In addition, Mr. Finch had performed Phase I environmental site assessments, soil and water (surface and groundwater) sampling, and exit surveys. Mr. Finch is also a New York State certified Asbestos Inspector and has conducted numerous site inspections in New Jersey and New York State.

Recent development projects have included the assessment of impacts to ETR species. Species of concern have included vascular plants, northern cricket frogs, Indiana bats, turtles (bog, Blanding's, spotted, box, and wood), and migratory birds. Specific tasks have included nesting evaluations, mist-netting, and habitat assessments. He has also conducted numerous ecological surveys to identify resident and migratory wildlife species, including fish surveys (electro-shocking) and benthic sampling in streams, lakes, and rivers.

Mr. Finch has participated in numerous ornithology studies over the years. Studies have ranged from waterfowl and game birds, to migratory shorebirds and song birds. Studies have included population counts, collar identification, species inventorying, and mist netting.

Select Project Experience

NYSSF - Route 300 25-Acre Property - Wallkill, New York
The project included the delineation of wetlands on a 25-acre property.

Minuta - Old Plank Road Property - Newburgh, New York
The project included the delineation of wetlands and a limited habitat assessment on a 0.625 acre property.

Allendale - 20-Acre Property - Allendale, New Jersey
This project included a delineation of wetlands on a 20-acre property.

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STEVEN FINCH
Wetland Scientist/Biologist
Staff Professional

Liberty Crossing - Stonington, Connecticut
This project included a detailed delineation of vegetative community types of a large isolated wetland. An amphibian breeding study was also conducted.

Harvard Woods - Harvard, Massachusetts
This project included a wetland delineation on an approximately 1-mile pedestrian corridor.

GHA West Haven - West Haven, Connecticut
This project included a wetland delineation on an approximately 25-acre property.

Williams Lake - Rosendale, New York
This project included a detailed habitat inventory of flora and fauna on an approximately 820-acre property.

JLL - Springfield Event Site - East Springfield, New York
This project included a spring bird survey in the Town of East Springfield

Taconic Farms –Town of Germantown - New York
Coordinated and supervised construction and monitoring of restoration efforts on an approximately 750 linear feet of Camp Creek and its riparian area. Daily correspondence with staff and subcontractors along with weekly inspections through construction and post construction. Documentations and reports were submitted to the ACOE.

Dutchess County Airport Landfill - Wappingers Falls, New York
Remediation efforts at this site required the delineation of wetlands and ecological resources to minimize and compensate for impacts. Subsequently, wetland delineation was performed; permitting documents were prepared for submittal to the USCOE and Town, which included the preparation of approximately 2 acres of compensatory wetlands to be established after remediation was completed.

Silo Ridge Ecological Study – Village of Amenia, Dutchess County, New York
Ecological and wetland study including studies on potential endangered, threatened, and rare species on a 628-acre parcel inventorying vegetation, birds, mammals, reptiles and amphibians. Helped conduct Indiana bat surveys using mist nets. Conducted a tree survey on all proposed development areas.

Hudson Heritage Ecological Study – City of Poughkeepsie, Dutchess County, New York
Ecological study including studies on potential endangered, threatened, and rare species on a 158-acre parcel inventorying vegetation, birds, mammals, reptiles and amphibians.

Lake Carvel – Town of Pine Plains/Milan, Dutchess County, New York
Ecological studies including Blanding's turtle trapping using round nets and Indiana bat surveys using mist nets. Conducted fish inventory of streams using electroshocking technique. Conducted stream and lake water quality, macroinvertebrate, and phytoplankton sampling

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STEVEN FINCH
Wetland Scientist/Biologist
Staff Professional

Hamlet On The Hudson - Northern Harrier and Short-Eared Owl Study – Town of Coxsackie, Greene County, New York
Northern harrier and short-eared owl study on an approximately 500-acre parcel and the surrounding area. The study includes point counts of raptors using sight and sound. Owl surveys conducted by sight, callbacks, and spotlighting.

Migratory Bird Studies – U.S. Fish and Wildlife Service, Rainwater Basin District, Kearney, Nebraska
Conducted collar identification on geese. Estimated population counts of waterfowl and sandhill cranes on multiple waterfowl management areas throughout south-central Nebraska. Conducted whooping crane surveys by sight and sound. Conducted shorebird surveys on several management areas.

Bobwhite Quail and Songbird Studies – Georgia University, Waynesboro, Georgia
Bobwhite Quail Initiative Program: Conducted count studies by sight and sound of Bobwhite quail coveys and songbirds on over 20 farmland locations in eastern Georgia.

Esopus Lake Property, Town Of Esopus, Ulster County, New York
Threatened and endangered species study on a 361-acre site on northern cricket frogs using sight and sound and Indiana bats using mist nets.

Titusville Sewer Trunk Line – City of Titusville, Dutchess County, New York
Conducted study on the State Endangered eastern narrow leaf sedge survey along proposed sewer corridor. Prepared a habitat conservation plan for the town for protection of the sedge during construction.

Graterford Prison, Skippack Township, Montgomery County, Pennsylvania
Conducted natural resource inventory on 280-acre study area. Included studies of ecological communities, flora and fauna, and potential ecological impacts.

CVS- Little Ferry - New Jersey
Conducted Phase I field study on 3.27-acre site consisting of an active warehouse. This included a visual inspection of the site to assist in identifying the presence or likely presence of hazardous substances or petroleum hydrocarbons under conditions that indicate an existing release, a past release, or material threat of release into structures, soil, groundwater, or surface water at the site.

Vornado - Edison - New Jersey
Assisted in site inspection for ISRA Preliminary Assessment and associated Site Investigation. This included a visual inspection of the building and surrounding property to assist in identifying the presence or likely presence of hazardous substances or petroleum hydrocarbons under conditions that indicate an existing release, a past release, or material threat of release into structures, soil, groundwater, or surface water at the site. Assisted in collecting soil samples along rail spur for PCBs and hydrocarbons.

Vornado - East Hanover - New Jersey
Conducted exit study Building 406. This included a visual inspection of the interior and exterior of the building to assist in identifying the presence of hazardous substances or petroleum hydrocarbons under conditions that indicate an existing release, a past release, or material threat of release into the structure, soil, groundwater, or surface water at the site.

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STEVEN FINCH
Wetland Scientist/Biologist
Staff Professional

Exxon Mobil - Northern New Jersey
Ongoing groundwater sampling at various Exxon Mobil gas stations throughout northern New Jersey. Sampling of groundwater is conducted under NJDEP regulations for petroleum hydrocarbons.

Vornado - Asbestos Surveys
Conducted ACM surveys on various properties owned by the client throughout northern New Jersey and downstate New York.

Chesapeake Energy - Pennsylvania
Ongoing feasibility studies, wetland delineations, and ecological studies for proposed natural gas gathering lines and compressor stations throughout north-central Pennsylvania.

BET Investments, North Greenbush
Prepared ACOE/NYSDEC Joint Permit Application for wetland impacts on a proposed retail site located in upstate New York.

Buckeye Pipeline - JFK Airport, NYC
Prepared joint permit application with ACOE/NYSDEC/NYCDEP/Port Authority regarding the restoration of an inlet bank exposing an existing gas pipeline.

9W Commercial Site - Town of Newburgh, NY
This project included a wetland delineation on an approximately 5-acre parcel.

Central Hudson Gas and Electric - Town of Lloyd, NY
Conducted groundwater/surface water samples, sediment samples, and wetland delineation on a NY State regulated wetland on an existing utility storage site for contaminents including PCBs and hydrocarbons. Project will include continual sampling and restoration

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DAVID B. TOMPKINS, CWB, PWS

Regional Environmental Permitting & Practice Lead

Education

- BS Environmental Science and Geography, Univ. of New York : Plattsburgh, New York
- MS Wildlife Ecology, West Virginia University

Registrations

- Professional Wetland Scientist
- Certified Wildlife Biologist/Wildlife Society
- Certified Subsurface Evaluator DEP, NJ

Professional Affiliations

- Assoc. of State Wetland Managers
- SETAC-North Atlantic Chapter
- National Registry of Environmental Professionals

Certifications/Training

- OSHA 40-hour Hazardous Waste Operations
- OSHA 8-hour Supervisor, Endangered and Threatened Species
- Freshwater Wetlands Construction Techniques
- Hydric Soils
- Wetland Evaluation Technique (WET II), Wetland Training Institute

Summary of Experience

Mr. Tompkins has 25 years of experience conducting and managing biological and environmental investigations and providing wetland consulting services. His work has included environmental impact statements, hazardous waste remediation projects, wetland delineations, permitting and mitigation, hazardous waste sampling analyses, biological monitoring, endangered species studies and permitting for hazardous waste and commercial development projects. He is well versed in regulatory permitting, regulatory negotiations, and compensatory mitigation. Graduate research involved the natural re-vegetation of abandoned mines in West Virginia.

Select Project Experience

HABITAT/BIODIVERSITY EVALUATION

Indiana Bat Evaluations, Various Clients, Eastern Pennsylvania and Hudson Valley, NY
Supervised and performed over 50 habitat evaluations for Indiana Bats focused on identifying roost and maternity trees for nesting females. Activities have also included mist netting (6 locations) and radio tracking. Project work is routinely reviewed by USFWS and NYSDEC staff. Also performed exit counts and roost tree identification using radio telemetry as part of NYSDEC Hudson Valley monitoring program. Supervised project requiring the establishment of mitigative measures for a development project located near a known nesting population of Indian Bats.

LCP Chemical Superfund Site, Ecological Survey, Habitat Assessment, and Biota Sampling, Linden, NJ
Mr. Tompkins designed and conducted various ecological surveys at the subject site to assist Brown and Caldwell with the characterization of the ecological community as well as to provide food chain pathway analysis and raw data for the analysis of wildlife contaminant uptake and bioaccumulation. Species of concern included fish, benthics, birds and mammals. The habitat assessment was designed to identify species which may have been impacted from land uses changes and not former site activities. Project reports were included in the RIFS documents submitted to USEPA.

Karner Blue Butterfly And Blue Lupine Surveys, Habitat Conservation Plan, National Grid, Albany, Schenectady, Saratoga, And Warren Counties, NY
Directed surveys along all National Grid utility right-of-ways (ROWs) within sand plain areas of New York State. Surveys consisted of transecting ROWs and mapping populations of blue lupine (*Lupinus perennis*), and any associated Karner blue butterflies (*Lycaeides Melissa smauelis*) or frosted elfins (*Callophrys irus*) using Trimble GPS units. Currently directing the preparation of a habitat conservation plan and incidental take permit for National Grid, for management operations along these ROWs, in

consultation with the US Fish and Wildlife Service and the New York State Department of Environmental Conservation. This includes completing necessary documentation under NEPA and SEQRA.

Plant Surveys, Various Locations, New York State
As part of the site development review process and various stand alone projects, rare plant and general botanical surveys were conducted on over 250 sites for a variety of plants occurring in New Jersey and New York State (and to a lesser degree other states). Habitats included rocky summits, sand plains/pine barrens, forested wetlands and meadows, deep interior forests, and various other habitats.
Additional expertise has been acquired over my career mapping habitat feature for a variety of species, which include both host specific species (Wild Lupine- Karner Blue Butterfly) or habitat generalists. These studies focused on habitat structure as well as species composition.

Site Development and Permitting, Stone Industries, Ramapo, NY
As project manager and senior biologist, Mr. Tompkins provided environmental and engineering services in support of a mining permit application for an approximate 500-acre site in Ramapo, New York. Prepared various environmental impact analyses for traffic, noise, visual, ecology, archaeology, and hydrogeology.

Stream Assessments, Syracuse, Watertown, German Flats, Chazy, NY
Using either the Hilsenhoff Biotic Index or The Rapid Bioassessment Protocols established by USEPA and various state agencies, stream assessments were conducted at a variety of sites in support of ongoing remedial investigation being conducted under the NYSDEC Superfund program. These assessments included benthic sampling for macro invertebrates (including taxonomic enumeration), fish surveys seining and electro-shocking), and habitat assessments to determine the level of impairment on a given stream from both anthropogenic sources and site contamination. Several of these studies focused on the bioaccumulation of contaminants in the food chain. In some cases, stream remediation and subsequent restoration was required and implemented. Two specific studies included the impacts of site contaminants on the reproductive potential of mink and on piscivorous birds.

Bloody Brook Sediment Investigation, Lockheed Martin Corp., Syracuse, NY
Conducted sediment sampling and ecological surveys along a 3+ mile section of stream, which was a tributary to Onondaga Lake. Negotiated extensively with NYSDEC on clean-up goals, and selection of appropriate receptor species for bioaccumulation studies. Special consideration was given to mink due to potential reproductive failure, and piscivorous bird species and potential for bioaccumulation of toxic levels of various heavy metals.

Ecological and Sediment Investigation, New York Air Brake, Watertown, NY
Over a period of several years, (mid to late 1990's) personally conducted numerous ecological investigations regarding the deposition /remediation of contaminated sediments in tributaries of the Black Dirt River. Special emphasis was placed on the bioaccumulation of heavy metals in crawfish and the subsequent uptake by mink along the river corridor. Other species included earthworms, fish, benthic macro-invertebrates and avian species. Involved in various discussions over the presence of mink and the appropriateness of the species as a receptor species.

Eastern Timber Rattlesnakes Population Study Rockland County, NY
Conducted a 4 year study identifying population levels, den and basking area locations using live capture and radio telemetry techniques, performed den surveys, and overall evaluation of habitat suitability and impacts from development projects.

General Wildlife Survey, Various Clients, NY And NJ
Routinely evaluate sites for identification of natural resources (wildlife and plant species) and evaluate impacts from proposed development projects. This evaluation includes site visits, historical data source review, interpolation from existing habitat conditions and known reference site conditions and species

assemblages. Commonly, this work includes specific focus on migratory songbirds and reptiles and amphibians.

WETLAND DELINEATION AND PERMITS/WATERFRONT DEVELOPMENT

Buckeye Pipeline Company, Wetland Delineation and Permitting, Sewaren, NJ
To replace a damaged cathodic protection system associated with a pipeline crossing a tidal marsh wetland, Kleinfelder conducted a wetland delineation, and permitting exercise to allow Buckeye to successfully complete onsite activities required to maintain the integrity of the pipeline system. Permitting was necessary for Coastal Waterfront Development, Freshwater wetlands General Permit, and Water Quality Certification.

Buckeye Pipeline Company, Waterfront Redevelopment Permitting, JFK Airport, New York
Coastal erosion exposed a critical pipeline supplying aviation gas to the airport facility. As part of restoration project, Kleinfelder, provided engineering and design services for waterfront restoration project. Permits required included NYS Dept. of State Coastal Consistency Review, Army Corp of Engineers Nationwide Permit Approval, NYS Dept. of Environmental Conservation Protection of Waters Article 15, NYSDEC Tidal Wetlands Article 25, and 401 Water Quality Certificate.

Torches On The Hudson, Waterfront Permitting, Newburgh, NY
Conducted permitting for a 162 slip marina facility in Newburgh. Engineering design included the use of screw anchors in the river bottom to protect fish habitat. Components of the permitting included Essential Fish Habitat Study, Army Corp of Engineers, and NYSDEC Protection of Waters, NYSDOS Coastal Consistency Review.

Ames Rubber, Wetland Delineation and Permitting, Totowa, NJ
Kleinfelder staff delineated onsite wetlands and obtained necessary approvals to conduct a remedial investigation inside the transition zone and wetland area of a palustrine forested wetland. Necessary improvements will include monitoring well installation and construction of a work area. Site restoration recommendations were included.

NYSDOT Pin 9804.17.101 Contract D015617 Pin S082.00, Wetland Delineation For Bridge Rehab/Replacement, Interstate Bridge #7, Town Of Calicoon, Sullivan County, NY
Mr. Tompkins directing staff flagged the boundary of each onsite wetland in accordance with the Army Corps of Engineers Wetlands Delineation Manual. The work was preformed during the appropriate field season (i.e. growing season) and the limits of the delineation where 500 feet upstream of the proposed crossing "D" to 500 feet downstream of the proposed crossing "F". In addition to flagging the river bank, wetland areas surrounding proposed construction access roads were surveyed. Data points and representative photographs of the uplands and wetlands were taken for inclusion in the delineation report. The report consisted of the introduction of the area including discussion of site location, limits of study area, soils, hydrology, plant communities, and existing mapping resources. In addition, provided was the approximate total wetland area and approximate wetland area within the proposed road crossings, as well as an opinion on the regulatory status of the wetlands on site.

Moore Project, WCI/Spectrum, East Fishkill, NY
Assisted project team with the delineation and assessment of on-site wetlands, development of permit documents, and mitigation plans. Project activities included extensive negotiations with USCOE for permit issuance.

The Marketplace, Wilder Balter Partners, Newburgh, NY

Project included the delineation of wetlands on a 108-acre parcel and the subsequent obtainment of a jurisdictional determination (JD). As part of the JD negotiations, approximately 4 acres were determined to be isolated pursuant to the SWANC decision.

WETLAND MITIGATION AND MITIGATION MONITORING

Mitigation Monitoring, Beekman Country Club, Town Of Beekman, NY
Currently managing project which involves the bi-monthly monitoring of a 1.85 acre wetland mitigation site. Project involves monitoring the reestablishment of hydrophic species, hydrology and the re-colonization by wildlife species. An assessment is also performed on the impact of herbivores. A monitoring report was written and submitted for the USCOE.

Wetland Mitigation Monitoring, Woodbury Premium Outlets, Woodbury, NY
Successfully conducted and managed a 5 year program designed to document the successful establishment of a wetland community in an off-site mitigation site. The project included vegetation monitoring, hydrologic monitoring, and documentation of wildlife utilization. Annual reports were submitted to the USCOE and after 5 years the bond for the monitoring was released.

Dutchess County Airport Landfill, Landfill Board Of Trustees, Town Of Wappingers Falls, NY
Remediation efforts at this site required the delineation of wetlands and ecological resources to minimize and compensate for impacts. Subsequently, wetland delineation was performed; permitting documents were prepared for submittal to the USCOE and Town, which included the preparation of approximately 2 acres of compensatory wetlands to be established after remediation was completed.

Timber Rattlesnake Assessment, Putnam Valley Planning Board, Putnam Valley, NY
As part of Town Consultant responsibilities, an assessment of historical records and existing habitat was conducted to determine if a proposed subdivision had potential for impacts to remnant timber rattlesnake populations.

GENERAL ENVIRONMENTAL SERVICES

Environmental Compliance, Us Postal Service, Six Districts
Mr. Tompkins developed an environmental compliance guidebook for postmasters in six districts of the US Postal Service, including: New York, New Jersey, Maryland, Puerto Rico, and Virgin Islands. Coordinated Hazardous Materials Inventories, US Postal Service, NY and managed the training for the implementation of the guidebook.

Town Of Wawayanda, Town Planning Board, Orange County, NY
As consultants to the Town Planning Board, all applications presented to the Planning Board were screen for wetland and ecological impacts. Either directly or by supervising staff, all wetland lines were field verified, and evaluated for permitting needs and possible mitigation. Where applicable, applicants were forwarded to NYSDEC or USCOE for permitting review. Impacts to resident wildlife was also assessed and discussed with project applicants.

Industrial Site Responsibility Act Investigation, Metal Processing Plant, NJ
Managed a New Jersey ISRA investigation involving a galvanized metal processing plant. Environmental concerns at the site included underground storage tanks, historical dumping, groundwater contamination, chemical storage, storm water management and off-site versus on-site contamination issues.

Developed and managed programs designed for conducting chemical inventories at over 360 U.S. Postal Service facilities in New York State. Assembled inventory data into a centralized database for USPS management.

Tank Management, Confidential Commercial Client, NY, NJ, MA, CT, MD, VA, TX
Instituted a tank management program for a 120-facility commercial client. Project included tank monitoring, upgrading, removal, remediation, and regulatory compliance.

Environmental Surveys, Turner Construction, Pittsburgh, PA
Managed Phase I and II environmental surveys of eight buildings scheduled for demolition in downtown Pittsburgh. Environmental concerns included asbestos, lead paint, fuel tanks biohazards, PCBs and other potentially hazardous materials.

PUBLICATIONS AND PRESENTATIONS

Tompkins, D.B. Impact of Endangered Species on Development Projects in the Northeast US. Kleinfelder Technical Conference, Denver, CO., Feb. 2009.

Tompkins, D.B. and H. Russell, Ph.D. Electronically enhanced bioremediation of chlorinated solvents using the Biolance system. New York Water Environment Association. West Point, NY, Sept. 2007.

Tompkins, D.B. Rattlesnake Populations in the Ramapo Mountains of SE New York State. New York State Chapter of the Wildlife Society. Owego, NY, Feb. 2007.

Tompkins, D.B. Rapid Bioassessment Protocols: What are they? Do they work? Should we use them? New York State Wetlands Forum Annual Conference, Liverpool, NY 2002.

Sorell, T.L. and D. B. Tompkins. A Tiered Approach to Selecting Remedial Strategies for an Urbanized Watershed with Multiple Stressors. Society of Environmental Toxicology and Chemistry, Newport, Rhode Island, April 2000.

Sorell,T.L. and D.B. Tompkins. Evaluation of Ecological Risk in an Estuarine Marsh Post Remediation: Comparison of Field-Collected and Laboratory-Based Sediment to Tissue Bioaccumulation. Society of Environmental Toxicology and Chemistry, North Atlantic Chapter, Newport, Rhode Island, April 1996.

Tompkins, D.B. Monitoring the Re-Establishment of Biotic Communities in a Disturbed Wetland. American Communities Working for Wetlands Conference, Washington D.C., May 1997.

Tompkins, D.B., J .A. Gilbert, and D. M. Lebek. Development of a Material Consolidation and Waste Elimination Plan (MCWEP) for the USPS. Mid-Atlantic Industrial and Hazardous Waste Conference. Buffalo, New York. July 1996.

Tompkins, D. B. and T.L.Sorell. Evaluation of Ecological Risk in an Estuarine Marsh Post Remediation: Evaluation of Multiple Environmental Endpoints. Society of Environmental Toxicology and Chemistry, North Atlantic Chapter, Newport, Rhode Island, April 1996.

Tompkins, D.B., and Sorell, T.L., Development of a Biota Monitoring Program to Assess Effectiveness of Sediment Remediation. Society of Environmental Toxicology and Chemistry, North Atlantic Chapter, Plymouth Massachusetts. July 1995.

Tompkins, D.B., Wetlands: Current status and trends. Sullivan County Community College, Fallsburgh, New York. October 1990.

Tompkins, D.B., Natural Revegetation of Abandoned Surface Mines in Northern West Virginia. M.S. Thesis, West Virginia University, Morgantown, West Virginia. pp. 99, 1981.

Tompkins, D.B., and Woehr, J.R. Influence of Habitat on the Movements and Densities of Snowshoe Hares. Transactions of the Northeast Wildlife Society, Providence, Rhode Island pp. 169-175, 1979.

APPENDIX J
USACE and NYSDEC Wetland Correspondence

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

AUG 5 - 2010

REPLY TO
ATTENTION OF:
Regulatory Branch

SUBJECT: Permit Application Number NAN-2010-00197-WOR
by Orange and Rockland Utilities, Inc.

Douglas J. Chabrak
Birdsall Services Group
65 Jackson Drive
Cranford, New Jersey 07016

Dear Mr. Chabrak:

On January 8, 2010, the New York District of the U.S. Army Corps of Engineers received a request for a Department of the Army jurisdictional determination for the above referenced project. The site consists of approximately 48.732 acres, in the Rondout Creek watershed, located at the intersection of Hartley and Cheechunk Roads in the Town of Goshen, Orange County, New York. The proposed project would involve the construction of an electrical substation.

In the letter received on January 8, 2010, your office submitted a proposed delineation of the extent of waters of the United States within the subject property. A site inspection was conducted by a representative of this office on April 28, 2010, during which no changes were made to the proposed delineation. At that time, additional information was still required in order to complete the jurisdictional determination. On May 6, 2010, this office received the additional information.

Based on the material submitted and the observations of the representative of this office during the site visit, this site has been determined to contain jurisdictional waters of the United States based on: the presence of wetlands determined by the occurrence of hydrophytic vegetation, hydric soils and wetland hydrology according to criteria established in the 1987 "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1 that are either adjacent to or part of a tributary system; the presence of a defined water body (e.g. stream channel, lake, pond, river, etc.) which is part of a tributary system; and the fact that the location includes property below the ordinary high water mark, high tide line or mean high water mark of a water body as determined by known gage data or by the presence of physical markings including, but not limited to, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter or debris or other characteristics of the surrounding area.

RECEIVED
AUG 10 2010
BIRDSALL ENGINEERING, INC

These jurisdictional waters of the United States are shown on the drawing entitled "Wetland Delineation Plan For Orange and Rockland Utilities, Inc. Town of Goshen Orange County New York", prepared by CMX, dated December 22, 2009. This drawing indicates that there are two (2) principal wetland areas on the project site which are part of a tributary system, and are considered to be waters of the United States. The first wetland ("Wetland/Water Area A") is located on the southeastern portion of the property and is approximately 7.95 acres within the subject property. The second wetland ("Wetland Area B") is located on the northwestern portion of the property and is approximately 5.45 acres within the subject property.

This determination regarding the delineation shall be considered valid for a period of five years from the date of this letter unless new information warrants revision of the determination before the expiration date.

This determination was documented using the Approved Jurisdictional Determination Form. A copy of that document is enclosed with this letter, and will be posted on the New York District website at: http://www.nan.usace.army.mil/business/buslinks/regulat/jurisdet/index.htm.

This delineation/determination has been conducted to identify the limits of the Corps Clean Water Act jurisdiction for the particular site identified in this request. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed is a combined Notification of Appeal Process (NAP) and Request For Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the North Atlantic Division Office at the following address:

Michael G. Vissichelli, Administrative Appeals Review Officer
North Atlantic Division, U.S. Army Engineer Division
Fort Hamilton Military Community
General Lee Avenue, Building 301
Brooklyn, New York 11252-6700

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Park 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by OCT 4- 2010. It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

It is strongly recommended that the development of the site be carried out in such a manner as to avoid as much as possible the discharge of dredged or fill material into the delineated waters of the United States. If the activities proposed for the site involve such discharges, authorization from this office may be necessary prior to the initiation of the proposed work. The extent of such discharge of fill will determine the level of authorization that would be required.

In order for us to better serve you, please complete our Customer Service Survey located at http://www.nan.usace.army.mil/business/buslinks/regulat/survey.htm

If any questions should arise concerning this matter, please contact Brian A. Orzel, of my staff, at (917) 790-8413.

Sincerely,

Christopher S. Mallery

Christopher S. Mallery, Ph.D.
Chief, Western Section

Enclosures

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Orange and Rockland Utilities, Inc.	File Number: NAN-2010-00197-WOR	Date: AUG 5 - 2010

Attached is:		See Section Below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/CECW/Pages/reg_permit.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

•ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the New York District Engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations (JD) associated with the permit.

•OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the New York District Engineer. Your objections must be received by the New York District Engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the New York District Engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the New York District Engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit.

•ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the New York District Engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

•APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the North Atlantic Division Engineer, ATTN: CENAD-PD-PSD-O, Fort Hamilton Military Community, Building 301, General Lee Avenue, Brooklyn, NY 11252-6700. This form must be received by the Division Engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the North Atlantic Division Engineer, ATTN: CENAD-PD-PSD-O, Fort Hamilton Military Community, Building 301, General Lee Avenue, Brooklyn, NY 11252-6700. This form must be received by the Division Engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

•ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

•APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the North Atlantic Division Engineer within 60 days of the date of this notice with a copy furnished to the New York District Engineer.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: Richard L. Tomer U.S. Army Corps of Engineers, New York District Jacob K. Javits Federal Building New York, NY 10278-0090 (917) 790-8510	If you only have questions regarding the appeal process you may also contact: Michael G. Vissichelli, Administrative Appeals Review Officer North Atlantic Division, U.S. Army Engineer Division Fort Hamilton Military Community General Lee Avenue, Building 301 Brooklyn, NY 11252-6700 (718) 765-7163 E-mail: Michael.G.Vissichelli@usace.army.mil

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date:	Telephone number:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 05-Aug-2010

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: New York District, NAN-2010-00197-JD1

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State:	NY - New York
County/parish/borough:	Orange
City:	Goshen
Lat:	41.4105
Long:	-74.3686
Universal Transverse Mercator	Folder UTM List *UTM list determined by folder location* • NAD83 / UTM zone 18N Waters UTM List *UTM list determined by waters location* • NAD83 / UTM zone 18N
Name of nearest waterbody:	Cheechunk Creek
Name of nearest Traditional Navigable Water (TNW):	Wallkill River
Name of watershed or Hydrologic Unit Code (HUC):	02020007

☑ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc¿) are associated with the action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION:

☐ Office Determination Date:

☑ Field Determination Date(s): ☐ 28-Apr-2010

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION

There [ ] "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area.

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There [ ] "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area.

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area:[1]

Water Name	Water Type(s) Present
Wetland A	Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
Wetland B	Wetlands directly abutting RPWs that flow directly or indirectly into TNWs

b. Identify (estimate) size of waters of the U.S. in the review area:

Area: (m²)
Linear: (m)

c. Limits (boundaries) of jurisdiction:

based on: [ ]
OHWM Elevation: (if known)

2. Non-regulated waters/wetlands:[3]

Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

1.TNW
Not Applicable.

2. Wetland Adjacent to TNW
Not Applicable.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: [ ]
Drainage area: [ ]
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics
(a) Relationship with TNW:

☐ Tributary flows directly into TNW.

☐ Tributary flows through [ ] tributaries before entering TNW.

:Number of tributaries

Project waters are [ ] river miles from TNW.
Project waters are [ ] river miles from RPW.
Project Waters are [ ] aerial (straight) miles from TNW.
Project waters are [ ] aerial(straight) miles from RPW.

☐ Project waters cross or serve as state boundaries.

Explain:

Identify flow route to TNW:[5]

Tributary Stream Order, if known:
Not Applicable.

(b) General Tributary Characteristics:

Tributary is:
Not Applicable.

Tributary properties with respect to top of bank (estimate):
Not Applicable.

Primary tributary substrate composition:
Not Applicable.

Tributary (conditions, stability, presence, geometry, gradient):
Not Applicable.

(c) Flow:
Not Applicable.

Surface Flow is:
Not Applicable.

Subsurface Flow:
Not Applicable.

Tributary has:
Not Applicable.

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction:

High Tide Line indicated by:
Not Applicable.

Mean High Water Mark indicated by:
Not Applicable.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality;general watershed characteristics, etc.).
Not Applicable.

(iv) Biological Characteristics. Channel supports:
Not Applicable.

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:
(a) General Wetland Characteristics:
Properties:

Wetland Name	Size (Acres)	Wetland Type	Wetland Quality	Cross or Serve as State Boundaries. Explain
Wetland A	7.95	Forested	Good	No
Wetland B	5.45	Emergent/Scrub Shrub/Forested	Fair	No

(b) General Flow Relationship with Non-TNW:
Flow is:

Wetland Name	Flow	Explain
Wetland A	Perennial flow.	-
Wetland B	Perennial flow.	-

Surface flow is:

Wetland Name	Flow	Characteristics
Wetland A	Discrete and confined	-
Wetland B	Discrete	-

Subsurface flow:

Wetland Name	Subsurface Flow	Explain Findings	Dye (or other) Test
Wetland A	-	-	-
Wetland B	-	-	-

(c) Wetland Adjacency Determination with Non-TNW:

Wetland Name	Directly Abutting	Discrete Wetland Hydrologic Connection	Ecological Connection	Separated by Berm/Barrier
Wetland A	Yes	-	-	-
Wetland B	Yes	-	-	-

(d) Proximity (Relationship) to TNW:

Wetland Name	River Miles From TNW	Aerial Miles From TNW	Flow Direction	Within Floodplain
Wetland A	1 (or less)	1 (or less)	Wetland to navigable waters	50 - 100-year
Wetland B	1 (or less)	1 (or less)	Wetland to navigable waters	100 - 500-year

(ii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Wetland Name	Explain	Identify specific pollutants, if known
Wetland A	-	-
Wetland B	-	-

(iii) Biological Characteristics. Wetland supports:

Wetland Name	Riparian Buffer	Characteristics	Vegetation	Explain
Wetland A	X	-	X	Forested/80%
Wetland B	-	-	X	Emergent/60% Scrub Shrub/20% Forested/20%

Habitat for:

Wetland Name	Habitat	Federally Listed Species	Explain Findings	Spawn Area	Explain Findings	Other Environmentally Sensitive Species	Explain Findings	Aquatic\Wildlife Diversity	Explain Findings
Wetland A	X	X	Potential habitat for Indiana bat	-	-	-	-	X	-
Wetland B	X	X	Potential habitat for Indiana bat	-	-	-	-	-	-

3. Characteristics of all wetlands adjacent to the tributary (if any):

All wetlands being considered in the cumulative analysis:
Not Applicable.

Summarize overall biological, chemical and physical functions being performed:
Not Applicable.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Significant Nexus: Not Applicable

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE:

1. TNWs and Adjacent Wetlands:
Not Applicable.

2. RPWs that flow directly or indirectly into TNWs:
Not Applicable.

Provide estimates for jurisdictional waters in the review area:
Not Applicable.

3. Non-RPWs that flow directly or indirectly into TNWs:[8]
Not Applicable.

Provide estimates for jurisdictional waters in the review area:

Not Applicable.

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

Wetland Name	Flow	Explain
Wetland A	PERENNIAL	Water within this wetland flows within the channel of a perennial unnamed tributary to the Wallkill River. Aerial photography, the Goshen, NY USGS quadrangle map, field observations, a 2-square mile drainage basin and annual precipitation of 44 inches, indicate that the stream flows all year.
Wetland B	PERENNIAL	Water within this wetland flows off-site, then directly into the channel of the same perennial unnamed tributary to the Wallkill River that flows through Wetland A. Aerial photography, the Goshen, NY USGS quadrangle map, field observations, a 2-square mile drainage basin and annual precipitation of 44 inches, indicate that the stream flows all year.

Provide acreage estimates for jurisdictional wetlands in the review area:

Wetland Name	Type	Size (Linear) (m)	Size (Area) (m^2)
Wetland A	Wetlands directly abutting RPWs that flow directly or indirectly into TNWs	-	32172.5052
Wetland B	Wetlands directly abutting RPWs that flow directly or indirectly into TNWs	-	22055.3652
Total:		0	54227.8704

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs:
Not Applicable.

Provide acreage estimates for jurisdictional wetlands in the review area:
Not Applicable.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs:
Not Applicable.

Provide estimates for jurisdictional wetlands in the review area:
Not Applicable.

7. Impoundments of jurisdictional waters:[9]
Not Applicable.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS:[10]
Not Applicable.

Identify water body and summarize rationale supporting determination:
Not Applicable.

Provide estimates for jurisdictional waters in the review area:
Not Applicable.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS

- [ ] If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements:
- [ ] Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce:
- [ ] Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based soley on the "Migratory Bird Rule" (MBR):
- [ ] Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (Explain):

- [ ] Other (Explain):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (ie., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment:
Not Applicable.

Provide acreage estimates for non-jurisdictional waters in the review area, that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction.
Not Applicable.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD
(listed items shall be included in case file and, where checked and requested, appropriately reference below):

Data Reviewed	Source Label	Source Description
--Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant	-	-
--Data sheets prepared/submitted by or on behalf of the applicant/consultant	-	-

---Office concurs with data sheets/delineation report	-	-
--U.S. Geological Survey map(s).	Goshen, NY	-
--USDA Natural Resources Conservation Service Soil Survey.	Orange County, NY	-
--National wetlands inventory map(s).	Goshen, NY	-
--State/Local wetland inventory map(s):	Goshen, NY	-
--FEMA/FIRM maps	-	-
---Photographs	-	-
---Aerial	-	-
---Other	-	-

B. ADDITIONAL COMMENTS TO SUPPORT JD:
Not Applicable.

---

[1]-Boxes checked below shall be supported by completing the appropriate sections in Section III below.

[2]-For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

[3]-Supporting documentation is presented in Section III.F.

[4]-Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

[5]-Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

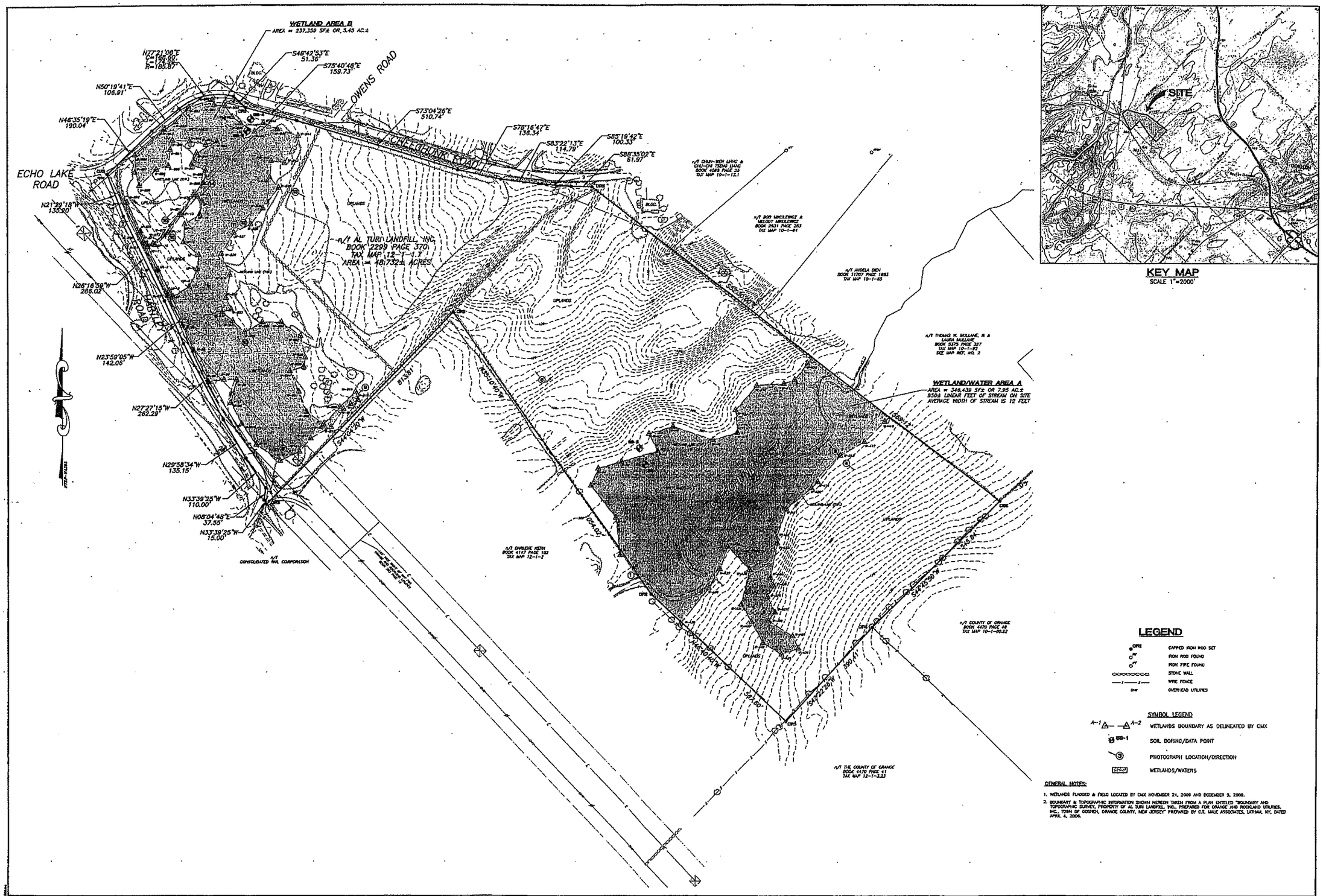
[6]-A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

[7]-Ibid.

[8]-See Footnote #3.

[9]-To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

[10]-Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.



NO.	DATE	REVISION

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GRAPHIC SCALE IN FEET
100 0 100 200
1"=100'

GLEN J. LLOYD
PROFESSIONAL LAND SURVEYOR, N.Y. LIC. No. 050492

CMX
ARIZONA • FLORIDA • MARYLAND • NEVADA • NEW JERSEY
NEW YORK • PENNSYLVANIA • MEXICO
1311 MAMARONECK AVENUE
SUITE 50
WHITE PLAINS, NY 10605
TEL (914)686-1000
FAX (914)686-1222

WETLAND DELINEATION PLAN FOR ORANGE AND ROCKLAND UTILITIES, INC.

TOWN OF GOSHEN ORANGE COUNTY NEW YORK

PROJECT NO	0904272602
DATE	12/22/2009
DRAWN BY	HA
CHECKED BY	n/a
SCALE	1"=100'
APPROVED BY	DC
	CMX
SHEET NO	1 of 1

Julia Craner

From: Laura Cheney
Sent: Wednesday, August 03, 2011 2:29 PM
To: David Tompkins; Julia Craner
Subject: FW: Goshen project mapping review
Attachments: ATT00001..jpg

DEC contact James did a map review of the map I sent over earlier – see his response below – no more updated information. That would mean no unknown 'buffers' to worry about!

What should I bill this work to?

Thanks,

Laura Cheney
Environmental Scientist
1279 Route 300, Second Floor
Newburgh, NY 12550
o| 845.567.6530 x113
c| 845.674.7367
f| 845.567.6542

KLEINFELDER
Bright People. Right Solutions.

From: James Pinheiro [mailto:jmpinhei@gw.dec.state.ny.us]
Sent: Wednesday, August 03, 2011 1:09 PM
To: Laura Cheney
Subject: Re: Goshen project mapping review

Laura,

After looking into your request I did not find any additional information for this site. It seems what you were provided is the same information that I have to date. Please feel free to contact me with any other questions you may have.

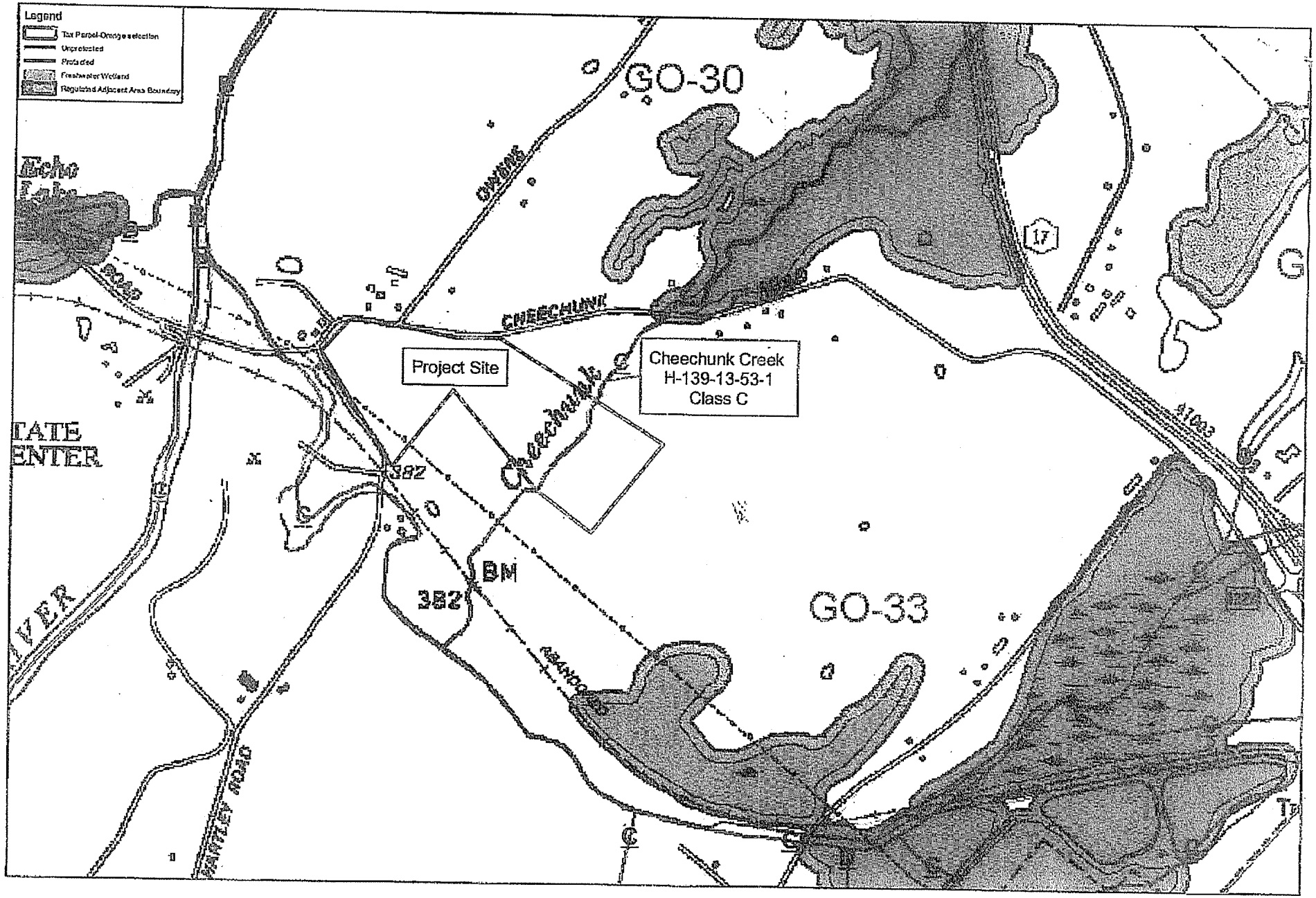
Thank you,
Jim

James Pinheiro
Wetland Biologist
NYS DEC Region 3
21 South Putt Corners Road
New Paltz, NY 12561
jmpinhei@gw.dec.state.ny.us
845-256-2227
845-255-4659 - fax>>> Laura Cheney <LCheney@kleinfelder.com> 8/3/2011 1:00 PM >>>
Hi Jim,

Thank you for agreeing to review this area for mapping accuracy. As per our phone conversation, please let us know if the attached map is still up to date, or if there are additions that we should incorporate into our project planning. Feel free to markup the attached map if there is any new information in your current mapping.

Let me know if you have any questions, thanks again,

Laura Cheney
Environmental Scientist
1279 Route 300, Second Floor
Newburgh, NY 12550
o| 845.567.6530 x113
c| 845.674.7367
f| 845.567.6542



0 500 1,000 2,000 Feet

Hartley Road Substation
Goshen, Orange County

N

DEC Division of Environmental Permits 4/6/11

KLEINFELDER
Bright People. Right Solutions.

TELEPHONE CONVERSATION RECORD

DATE 8/2-3/11 TIME 12:36 pm 8/2 / 12:40 pm 8/3 ☐ AM ☒ PM

ROUTE

☒ TO ☐ FROM Jim (James) Pinheiro

COMPANY NYS DEC PHONE NO. 256-2227

PROJECT NAME O&R Hartley Road

COPY

SUBJECT Mapping accuracy (wetlands) PROJECT NO. ~~11915~~ 119978

JAC 8/3/11

ACTION BY DUE DATE DISCUSSION

8/2 Called to see if he could talk or set up an appointment to verify mapping accuracy for Hartley Road wetlands. Left message

8/3 Spoke with Jim and requested that he compare a scan (screenshot) of 4/6 DEC map with all current data, to make sure all info. we have is up to date. He agreed to review map and said they had done delineation work since April in the Goshen area.

* Via email, he confirmed that he reviewed the map I sent over and it is accurate as per all available DEC info.

RECORDED BY Laura Cheney

APPENDIX K
Stormwater Pollution Prevention Plan (SWPPP)

CMX

STORMWATER POLLUTION PREVENTION PLAN

FOR

HARTLEY ROAD SUBSTATION
GOSHEN, NY

PREPARED FOR

ORANGE AND ROCKLAND UTILITIES, INC
1 BLUE HILL PLAZA
PEARL RIVER, NY 10965

W. Charles Utschig, Jr., PE
N.Y.S. Lic. No. 62303

570312000100
August, 2011

HARTLEY ROAD SUBSTATION

TOWN OF GOSHEN

Orange County, New York

Table of Contents

Section No.

1 NOTICE OF INTENT

2 REPORT, SOILS MAP

3 FEMA MAP, MS4 MAP

4 ENGINEER AND CONTRACTOR CERTIFICATIONS

5 EXISTING CONDITIONS DRAINAGE AREA MAP and ROUTING COMPUTATIONS

6 PROPOSED CONDITIONS DRAINAGE AREA MAP and ROUTING COMPUTATIONS

7 GRADING AND EROSION CONTROL PLAN

8 DETAILS PLAN

9 COMPUTATIONS: AREAS, WATER QUALITY, CHANNEL PROTECTION, TEMPORARY SEDIMENT BASIN, OUTLET PROTECTION AND PIPE SIZE DESIGN

10 PERCOLATION TEST RESULTS AND LOCATION MAP

11 NYSDEC MAINTENANCE AND INSPECTION CHECKLIST, EROSION AND SEDIMENT CONTROL DETAILS

1

1358331598

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR _____ (for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-10-001

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE
OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
ORANGE AND ROCKLAND UTILITIES, INC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
COFFEY

Owner/Operator Contact Person First Name
JOHN

Owner/Operator Mailing Address
1 BLUE HILL PLAZA

City
PEARL RIVER

State
NY

Zip
10965 -

Phone (Owner/Operator)
845 - 577 - 3700

Fax (Owner/Operator)
845 - 577 - 3720

Email (Owner/Operator)
COFFEYJO@ORU.COM

FED TAX ID
__ - _____ (not required for individuals)

Project Site Information

Project/Site Name
HARTLEY ROAD SUBSTATION

Street Address (NOT P.O. BOX)
HARTLEY ROAD

Side of Street
○ North ○ South ● East ○ West

City/Town/Village (THAT ISSUES BUILDING PERMIT)
TOWN OF GOSHEN

State: NY Zip: 10924 - County: ORANGE DEC Region: 3

Name of Nearest Cross Street
Cheechunk Road

Distance to Nearest Cross Street (Feet): 10

Project In Relation to Cross Street
○ North ● South ○ East ○ West

Tax Map Numbers
Section-Block-Parcel

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting): 525254

Y Coordinates (Northing): 4584574

2. What is the nature of this construction project?

● **New Construction**

○ **Redevelopment with increase in imperviousness**

○ **Redevelopment with no increase in imperviousness**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ● PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ● OTHER: ELEC SUBSTATION

*note: for gas well drilling, non-high volume hydraulic fractured wells only

4. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law ? ○ Yes ● No

5. Is this a project which does not require coverage under the General Permit (e.g. Project done under an Individual SPDES Permit, or department approved remediation)? ○ Yes ● No

6. Is this property owned by a state authority, state agency, federal government or local government? ○ Yes ● No

7. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area. Round to the nearest tenth of an acre.

Total Site Acreage	Acreage To Be Disturbed	Existing Impervious Area Within Disturbed	Future Impervious Area Within Disturbed
7.4 *	7.3 **	0.2 ***	1.2 ***

8. Do you plan to disturb more than 5 acres of soil at any one time? ○ Yes ● No

9. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
%	%	100 %	%

* Drainage area considered for SWPPP.
** (7.36 AC,) 0.74 AC of disturbance relates to trenching on paved roads.
*** (1.27 AC.)Trenched areas not included in impervious areas; not used for SWPPP preparation.

10. Is this a phased project? ● Yes ○ No

11. Enter the planned start and end dates of the disturbance

Start Date 1/02/2012 - End Date 7/02/2013

12. Identify the nearest, natural, surface waterbody(ies) to which construction site runoff will discharge.

Name

CHEECHUNK CREEK

12a. Type of waterbody identified in Question 12?

- ○ Wetland / State Jurisdiction On Site (Answer 12b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 12b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ● Stream / Creek Off Site
- ○ River On Site
- ● River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

12b. How was the wetland identified?

- ● Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

13. Has the surface waterbody(ies) in question 12 been identified as a 303(d) segment in Appendix E of GP-0-10-001? ○ Yes ● No

14. Is this project located in one of the Watersheds identified in Appendix C of GP-0-10-001? ○ Yes ● No

15. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? **If no, skip question 16.** ○ Yes ● No

16. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? **If Yes, what is the acreage to be disturbed?** ○ Yes ● No

.

17. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ Yes ● No

18. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ● Yes ○ No ○ Unknown

19. What is the name of the municipality/entity that owns the separate storm sewer system?

TOWN OF GOSHEN

20. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ Yes ● No ○ Unknown

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book) ? ● Yes ○ No

22. Does this construction activity require the development of a SWPPP that includes Water Quality and Quantity Control components (Post-Construction Stormwater Management Practices) **(If No, skip questions 23 and 27-35)** ● Yes ○ No

23. Have the Water Quality and Quantity Control components of the SWPPP been developed in comformance with the current NYS Stormwater Management Design Manual ? ● Yes ○ No

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ● **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer: CMX/BSG

Contact Name (Last, Space, First): UTSCHIG ,W. CHARLES

Mailing Address: 1311 MAMARONECK AVENUE SUITE 50

City: WHITE PLAINS

State: NY

Zip: 10605-

Phone: 914-686-1000

Fax: 914-686-1222

Email: CUTSCHIG@BIRDSALL.COM

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-10-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name: W. CHARLES

MI:

Last Name: UTSCHIG

Signature:

Date: 10 / / 2011

25. Has a construction sequence schedule for the planned management practices been prepared? ● Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ● Check Dams
- ○ Construction Road Stabilization
- ● Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ● Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ○ Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ● Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ● Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ● Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ● Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ● Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ○ Riprap Slope Protection
- ● Rock Outlet Protection
- ○ Streambank Protection

Other

Water Quality and Quantity Control

Important: Completion of Questions 27-35 is not required if response to Question 22 is No.

Post-Construction Stormwater Management Practices

27. Indicate **all** Stormwater Management Practice(s) that will be installed/constructed on this site:

Ponds
- ○ Micropool Extended Detention (P-1)
- ○ Wet Pond (P-2)
- ○ Wet Extended Detention (P-3)
- ○ Multiple Pond System (P-4)
- ○ Pocket Pond (P-5)
- ● Dry Extended Detention Basin

Filtering
- ○ Surface Sand Filter (F-1)
- ○ Underground Sand Filter (F-2)
- ○ Perimeter Sand Filter (F-3)
- ○ Organic Filter (F-4)
- ● Bioretention (F-5)
- ○ Other

Alternative Practice
- ○ Rain Garden
- ○ Cistern
- ○ Green Roof
- ○ Stormwater Planters
- ○ Permeable Paving (Modular Block)

Wetlands
- ○ Shallow Wetland (W-1)
- ○ Extended Detention Wetland (W-2)
- ○ Pond/Wetland System (W-3)
- ○ Pocket Wetland (W-4)

Infiltration
- ○ Infiltration Trench (I-1)
- ○ Infiltration Basin (I-2)
- ○ Dry Well (I-3)
- ○ Underground Infiltration System

Open Channels
- ○ Dry Swale (O-1)
- ○ Wet Swale (O-2)

Verified Proprietary Practice
- ○ Hydrodynamic
- ○ Wet Vault
- ○ Media Filter

28. Describe other stormwater management practices not listed above or explain any deviations from the technical standards.

No channel protection is required as CPv release orifice was calculated to be less than 3" in diameter.

29. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ● Yes ○ No

If Yes, Identify the entity responsible for the long term Operation and Maintenance

ORANGE AND ROCKLAND UTILITIES, INC

30. Provide the total water quality volume required and the total provided for the site.

WQv Required 0.129 **acre-feet**

WQv Provided 0.145 **acre-feet**

31. Provide the following Unified Stormwater Sizing Criteria for the site.

Total Channel Protection Storage Volume (CPv) - Extended detention of post-developed 1 year, 24 hour storm event

CPv Required 0.00 **acre-feet**

CPv Provided 0.00 **acre-feet**

31a. The need to provide for channel protection has been waived because:

○ **Site discharges directly to fourth order stream or larger**

Total Overbank Flood Control Criteria (Qp) - Peak discharge rate for the 10 year storm

Pre-Development 17.01 **CFS**

Post-development 15.64 **CFS**

Total Extreme Flood Control Criteria (Qf) - Peak discharge rate for the 100 year storm

Pre-Development 29.00 **CFS**

Post-development 25.60 **CFS**

31b. The need to provide for flood control has been waived because:

○ **Site discharges directly to fourth order stream or larger**

○ **Downstream analysis reveals that flood control is not required**

IMPORTANT: For questions 31 and 32, impervious area should be calculated considering the project site and all offsite areas that drain to the post-construction stormwater management practice(s). (Total Drainage Area = Project Site + Offsite areas)

32. Pre-Construction Impervious Area - As a percent of the Total Drainage Area enter the percentage of the existing impervious areas before construction begins. 2 %

33. Post-Construction Impervious Area - As a percent of the Total Drainage Area, enter the percentage of the future impervious areas that will be created/remain on the site after completion of construction. 19 %

34. Indicate the total number of post-construction stormwater management practices to be installed/constructed. 2

35. Provide the total number of stormwater discharge points from the site. (include discharges to either surface waters or to separate storm sewer systems) 1

36. Identify other DEC permits that are required for this project.

DEC Permits

○ Air Pollution Control	○ Navigable Waters Protection / Article 15
○ Coastal Erosion	○ Water Quality Certificate
○ Hazardous Waste	○ Dam Safety
○ Long Island Wells	○ Water Supply
○ Mined Land Reclamation	○ Freshwater Wetlands/Article 24
○ Other SPDES	○ Tidal Wetlands
○ Solid Waste	○ Wild, Scenic and Recreational Rivers
● None	○ Stream Bed or Bank Protection / Article 15

○ Other

37. Does this project require a US Army Corps of Engineers Wetland Permit? ○ Yes ● No
If Yes, Indicate Size of Impact. [ ][ ][ ][ ][ ].[ ]

38. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ Yes ● No
(If No, skip question 39)

39. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ Yes ● No

40. If this NOI is being submitted for the purpose of continuing coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. [N][Y][R][ ][ ][ ][ ][ ][ ]

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name [J][O][H][N] **MI** [ ]

Print Last Name [C][O][F][F][E][Y]

Owner/Operator Signature

Date [ ][ ] / [ ][ ] / [ ][ ][ ][ ]

HARTLEY ROAD SUBSTATION
TOWN OF GOSHEN

Orange County, New York

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A. Introduction

This Stormwater Pollution Prevention Plan (SWPPP) report has been prepared as part of the permitting process for the construction of the Hartley Road Electrical Substation, located east of the intersection between Cheechunk Road and Hartley Road, in the Town of Goshen, Orange County, State of New York. The substation is proposed on a portion of an undeveloped, partially wooded/meadow parcel having a total area of 48.73 acres. This SWPPP is required by the New York State Department of Environmental Conservation (NYSDEC) pursuant to the Phase II regulations under General Permit GP-0-10-001 for more than one acre of disturbance; the disturbance area accounts for 7.36 ac, including an approximate 0.732 ac of disturbance from trenching activities along nearby local roads (Owens, Cheechunk and Hartley Roads).

This report and application shall hereafter refer to the "site" as the portions of land delineated by the limit of disturbance as shown on site plans prepared by CMX and attached herewith (section 7).

B. Site Description

The site consists primarily of MdB soils (C Soils); hydrologic groups based on NRCS. The site and additional offsite areas are analyzed in this report as one area labeled "Subarea 1" in the pre-development conditions and "Subarea 1A, 1B, 1C & 1D" in the post-development conditions.

The grading and drainage plans have been designed to capture and treat all of the stormwater runoff from all impervious surfaces on the site. Hydrologic characteristics for Subareas 1B & 1C are not expected to change significantly; as such, runoff from these areas were designed to bypass the proposed stormwater best management practices (BMPs) through the use of swales and culverts. Stormwater runoff for Subareas 1A and 1D will be collected through a series of field inlets, perimeter swales and a trench drain; this runoff will be directed towards the proposed BMPs: a bioretention area (NYSDEC F-5) and a dry extended detention basin.

Water quality for the proposed impervious surfaces has been provided by means of the bioretention area; flow control is provided by both the bioretention area and dry extended detention basin. Stormwater runoff rates for the 1, 10 (Overbank Protection), 25 and, 100-yr storm events have been analyzed and routed in the pre-development and post-development conditions utilizing computer software by Bentley (Haestad Methods), the design assumptions and results are attached herewith and made part of this report.

In the pre-development conditions, the site consists of one (1) drainage area (Subarea 1) generally formed by the existing topography and limited to the areas within the proposed disturbance; this area is undeveloped and drains towards an existing culvert through Hartley Road (southwest of the proposed substation); the location of this culvert is hereinafter referred to as the "Design Point".
In the post-development conditions, four (4) drainage areas (Subarea 1A, 1B, 1C & 1D) are considered. Subarea 1A consists of the areas directly related with the development of the substation and is mitigated by the proposed bioretention basin and dry extended detention basin. Subarea 1D is immediately adjacent to the bioretention basin and accounts for the proposed dry extended detention basin and a small contributing area. Subarea 1D is modeled separate from Subarea 1A as it is located downstream from the bioretention basin. All post-development subareas have similar drainage patterns and design point as in the pre-development conditions.

It is expected that construction will last 17 months from the time of ground breaking to final completion, with work commencing within 30 days following the receipt of all necessary approvals. Throughout the construction process strict adherence to the *Grading and Erosion Control Plan* and Specifications will be maintained to ensure all sediments are contained within the site.

C. Project Description

Proposed services, related studies and information for the electrical substation are as follows:

1. Sanitary Sewer:
   No sanitary sewer improvements are proposed.

2. Water Supply:
   No potable water supply improvements are proposed.

3. Floodplain Analysis:
   The FEMA floodplain map (attached herewith) does not show potential floodplains in the immediate vicinity of the site area.

4. Stormwater Management:
   The stormwater management plan has been implemented to provide quality of runoff (WQv), Runoff Reduction Volume (RRv) and flow control by means of the storage provided within the basins (bioretention area and dry extended detention); as such, the 1, 10, 25 and 100-yr storm events at the Design Point were reduced in the post-development conditions.

   Detailed Calculations and analysis of the pre-development and post-development rates of runoff for the project are included in this report.

   Stormwater Quantity:
   A detailed analysis of the pre and post-development peak rates of runoff for the 1, 10, 25 and 100 year 24-hour storm events have been included in this report.

   Stormwater Quality (WQv):
   The project will reduce the pollutants carried by stormwater runoff; this has been accomplished through the use of filtering practices per NYSDEC: Bioretention Area (F-5).

   Runoff Retention Volume (RRv):
   In accordance with the new sizing criteria for Chapter 3 of the *New York State Stormwater Management Design Manual*, the provision of Runoff Reduction Volume (RRv) is required for this development. This RRv shall be equal or greater than the required water quality volume (WQv) and be provided through the use of green infrastructure (GI) practices; the following is proposed to meet such requirements:

   - Calculated WQv: 5,626 cf
   - Selected GI Practice: Bioretention basin (NYSDEC F-5) with underdrains
   - Soil HSG: C
   - RRv capacity: 40%
   - Total bioretention basin volume: 15,750 cf
   - Total RRv provided: 6,300 cf

   Please refer to section 9 of this SWPPP for further information.

   Maintenance of Temporary and Permanent Structures and Practices:
   Temporary and permanent erosion controls measures will be maintained and inspected in accordance with the NYSDEC general permit.

   All proposed soil erosion and sediment control practices are designed in accordance with the following publications:

- New York State Standards and Specifications for Erosion and Sediment Control, August 2005, latest edition.
- New York State Guidelines for Urban Erosion and Sediment Control, latest edition,
- New York State General Permit for Stormwater Discharges,
- "Reducing the Impacts of Stormwater Runoff from New Development", as published by the New York State Department of Environmental Conservation (NYSDEC), second edition, April 1993.

The proposed soil erosion and sediment control devices include: protective earthmoving procedures and grading practices, soil stabilization, check dams, and silt fencing. The approach of the plan is to control sedimentation, and re-establish vegetation as soon as practicable.

Additionally, the contractor shall adhere to the recommended material stockpile locations and staging area as shown on the ***Grading and Erosion Control Plan*** prepared by CMX and attached herewith. The plan will be implemented prior to commencement of earthmoving activities.

D. Required Permits and Approvals

- Municipal approval.

E. Stormwater Management Methodology (Five-Step Process)

Stormwater management computations provided in this report are based upon the Soil Conservation Service (SCS) TR-20 and TR-55 methodologies. The stormwater management design is based on the NYSDEC 'New York State Stormwater Management Design Manual', latest edition and 'Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMP'S, by the Metropolitan Washington Council of Governments. Pre and post development rates of storm water runoff have been computed for comparison for the 1, 10, 25 and 100-year storms events.

Stormwater quality has been analyzed in accordance with the guidelines set forth in the New York State General Permit for Storm Water Discharge, GP-0-10-001. Calculations for the water quality are included in section 9 of this report.

In accordance with the "Five Step Process for Stormwater Site Planning and Practice Selection" (Chapter 3 of the *New York State Stormwater Management Design Manual)*, following are the criteria implemented in the development of this SWPPP:

Step 1: Site Planning

Preservation of Natural Resources:

The substation and related improvements are proposed on a parcel having 48.73 acres in area; only 6.62 acres of this parcel are proposed to be disturbed (+/-13.6% of the total parcel area) with 1.27 acres resulting as permanent impervious areas; 42.11 acres will remain undisturbed. Of this undisturbed area, ORU proposes the implementation of a conservation easement having a total area of 28.74 acres or 59% of the total parcel area (previously approved by the NYS Public Services Commission); this area is delineated on the site plans prepared by CMX/ORU and made part of this report.

Further consideration for the proposed substation (and related improvements) included: *preservation of wetland areas/water resources* (entire substation was designed outside of wetlands areas; a small temporary disturbance is proposed for the construction of two steel mono-poles); *locating development in less sensitive areas* (majority of the disturbed areas are proposed outside of tree lines); *reduction of clearing and grading* (majority of the disturbed areas are proposed on flatter terrain consisting mostly of grasslands).

Reduction of Impervious Cover:
Switchgear, electrical equipment and related machinery within the substation will rest on a gravel bed; no sidewalk is proposed for this development and minimum parking area is proposed for maintenance vehicles.

Step 2: Determine Water Quality Treatment Volume (WQv)
Water quality volume has been calculated for the proposed impervious areas in accordance with Chapter 4 of the "manual"; numerical values are provided herewith in section 9 of this report.

Upon the implementation of the RRv design criteria, the proposed stormwater management practice will ultimately provide a much larger water quality volume than required. This is the result of over-sizing the filter volume in the bioretention area to account for the low "RRv capacity" of the proposed green practice i.e. bioretention in C soils has 40% RRv capacity.

Step 3: Runoff Reduction by Applying Green Infrastructure Techniques and Standard SMPs with RRv Capacity
Water quality and runoff reduction volumes have been provided entirely within the proposed bioretention area.

Step 4: Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume
No additional practice is proposed to address water quality or runoff reduction volumes; the proposed extended detention basin serves as a flow control practice exclusively.

Step 5: Apply Volume and Peak Rate Control Practices if Still Needed to Meet Requirements
Quantity control requirements were addressed by both the bioretention area (i.e. the storage above the filter area) and the dry extended detention basin. Pre and post development rates of storm water runoff have been computed for comparison for the 1, 10, 25 and 100-year storms events; all rates of runoff were reduced in the post development condition (see section 5 and 6 of this report).

F. Stormwater Rate of Runoff Analysis

Modeling of the rate of storm water runoff has been performed for the pre and post-development conditions. For both conditions, the peak rates of runoff have been calculated for the 1, 10, 25 and 100-year storm events, the results are provided in **Table 1.** Detailed routing computations are provided in this report in sections 5 and 6.

The following publications have been used in developing the Stormwater Runoff Calculations:

- Computer software entitled "PondPack". This program is based on USDA Soil Conservation Service (SCS) Technical Release 55 (TR 55) Urban Hydrology for Small Watersheds (2nd edition) June 1986.
- "Stormwater Collection Systems Design Handbook" by Larry W. Mays
- "Hydraulic Analysis and Design" Second Edition by Richard H. McCuen
- "Handbook of Hydraulics" Seventh Edition by Ernest F. Brater, Horace W. King, James E. Lindell, C.Y. Wei

Table 1 (Peak Runoff Discharge)

Design Point

Design Storm (YR)	Pre Development Peak Runoff (cfs)	Post Development Peak Runoff (cfs)
1	5.52	4.12
10	17.01	15.64
25	21.77	19.36
100	29.00	25.60

G. Construction Phasing Plan and Stormwater Management Facilities Maintenance Program
Because of the size of the proposed disturbance (7.35 ac.), two (2) phases of construction shall be implemented in the following order:

Phase 1(3.97 ac.):

This phase accounts for the vegetation/tree removal and grading activities related with the construction of the gravel access road, bioretention area, dry extended detention area, temporary and permanent wetland disturbances and the removal of an existing tower; maintenance program for this phase is as follows:

- Erosion and Sediment Control (ESC) measures implementation,
  - Install hay bales (as needed).
  - Provide tree protection.
- Tree removal,
- Clearing and grubbing within LOD,
  - Install silt fences
  - Construct stabilized construction entrance for the site
  - Construct diversion temporary swales and install check dams
  - Construct temporary sediment basin and install riser (rough-graded dry extended detention basin shall be used as a temporary sedimentation basin)
- Excavation and rough grading of proposed driveway and areas within LOD
  - Establish topsoil stockpiles as shown on ***Grading and Erosion Control Plan***
  - Install silt fences around the stockpiles and temporarily stabilize the stockpiles with tarp or mulch or temporary seeding
  - Disturbed areas where construction will cease for more than 14 days will be stabilized with erosion controls, such as hydro-seeding, hydro-mulch, or hay.
- Utility installation
  - Construct combined staging and materials storage area as shown on the ***Grading and Erosion Control Plans***
  - Install temporary sanitary facilities (portasans, etc.)
  - Install dumpsters for the site

Phase 2 (4.87 ac.):

This phase accounts for the disturbed areas directly related with the construction of the proposed substation, including but not limited to: paved access driveway, concrete pads for towers, gravel areas near towers, land grading activities, electrical distribution installation (both within and along local roads), transmission line connection, stormwater management practices and earth berm; maintenance program for this phase is as follows:

- Erosion and Sediment Control (ESC) measures implementation,
  - Install hay bales (as needed).
  - Provide tree protection.
- Clearing and grubbing within LOD,
- Restore and re-seed any eroded areas as soon as possible.
- Construct earth berm (see grading plans)
- Rough access driveway construction
  - Prepare driveway subgrade and install storm drain inlets (FI) and trench drains
  - Install inlet protection as indicated on *Details Plans*
  - Allocation of concrete washout areas (provided by operator)
  - Construction waste shall be stored in dumpsters and carried off-site on a regular basis
- Final stabilization of disturbed areas,
  - Remove BMPs from storm drain inlets and finalize pavement activities
  - Remove temporary concrete washout areas and restore to original grade
  - Remove all ESC measures upon approval of design engineer and/or ESC inspector.

Awarded contractor shall be responsible for the proper implementation of the ESC practices. The following maintenance program is proposed in order to maintain the proper function of all drainage and erosion and sediment control facilities:

- Inspect bioretention area and if necessary remove accumulated sedimentation and debris; at no point should the filter bed be allowed to continue operations beyond 50% of its capacity being compromised by debris (three inches from bottom).
- Vegetation height limited to 12" and shall be mowed a minimum of 3 times per growing season.
- Re-mulch bioretention filter area annually.
- If water ponds on the filter bed for a period greater than 48 hours, remove and replace all filter media.
- All disturbed areas will be stabilized and the sediment build-up in the filter removed. After the construction is completed, any areas disturbed shall be stabilized immediately after the required work is completed.
- During construction, erosion and sediment controls must be inspected by a qualified professional every seven days. The Owner shall inspect the facilities once a month. A report by the Professional Engineer shall be submitted to the Owner and the Town of Goshen in the event deficiencies are found. In addition, the Owner shall inspect the systems after each major storm event to ensure the inlets remain open. Specific attention should be paid to the following:
  - Evidence of clogging in inlets, pipes, and end sections,
  - Erosion of the flow path through the temporary swales,
  - Accumulation of sediment (in both the bioretention area and dry extended detention basin)
- All sediment removal and/or repairs will be followed *immediately* by re-vegetation.
- Maintenance and inspection checklists (as per NYSDEC) are attached herewith in section 10 of this plan. (Completed forms shall be kept on site at all times and made available to authorities upon request.)
- Clean inlets and other drainage structures from silt regularly, but not less than twice a year. Remove sediment build up in the bioretention area and dry detention basin as required, but a minimum of every five years.
- Restore and re-seed any eroded areas as soon as possible.

In accordance with the *New York State Stormwater Management Design Manual* section 3.5: "[...the] owner of a post-construction stormwater management practice, including the runoff reduction practices and SMPs included in this Design Manual, shall erect or post, in the immediate vicinity of the stormwater management practice, a conspicuous and legible sign of not less than 18 inches by 24 inches [...] bearing

the following information:"

STORMWATER MANAGEMENT PRACTICE – *(name of the practice)*
Project Identification – *(SPDES Construction Permit #, other)*
Must be maintained In Accordance with O&M Plan
DO NOT REMOVE OR ALTER

The Stormwater Management Facilities Maintenance Program will be managed by the owner during construction and eventually by Orange & Rockland Utilities, Inc. The contact person is John Coffey and the 24-hour contact number is (845) 577-3700.

H. Material Handling and Waste Management

Operator shall be responsible for all waste materials being collected and disposed of into one (1) metal trash dumpster located in the combined staging area as shown on the site plans. Dumpster shall have a secure watertight lid, be placed away from stormwater conveyances and drains, and meet all local and state solid-waste management regulations. Only trash and construction debris from the site will be deposited in the dumpster.

Operator shall not store erodible or hazardous materials on any roadway. Oil and machinery fuels shall be kept to a necessary minimum and stored in structurally sound and sealed shipping containers in hazardous-material storage area segregated from other non-waste materials. All hazardous materials will be disposed of in accordance with federal, state, and municipal regulations.

Operator shall be responsible for maintaining the cleanliness of the streets (driveways/parking and adjacent areas) and storm drain inlet protection (as applicable) Best Management Practices (BMPs) throughout the construction project.

Operator shall provide adequate designated concrete washout areas throughout the construction project and will be responsible for proper disposal of the concrete, mortar or grout collected there.

One (1) temporary sanitary facility (portable toilet) shall be provided at the site in the combined staging area. The toilet shall be away from a concentrated flow path and traffic flow and shall have collection pans underneath as secondary containment.

Wood pallets, cardboard boxes, and other recyclable construction scraps will be disposed of in a designated dumpster for recycling. Construction equipment and maintenance materials shall be stored at the combined staging area.

All spills shall be cleaned up immediately upon discovery. Spent absorbent materials and rags will be hauled off-site immediately after the spill is cleaned up for disposal. Spills large enough to discharge to surface water will be reported to the National Response Center at 1-800-424-8802. Material safety data sheets, a material inventory, and emergency contact information will be maintained on site.

I. Narrative Report

The primary goal of the soil erosion and sediment control measures is to reduce soil erosion from areas stripped of vegetation during and after construction, and to prevent discharge of silt offsite. Erosion control barriers shall be placed around exposed areas during construction. The barriers shall consist of silt fence, or silt fence backed by hay bales

Any areas stripped of vegetation during construction will be left bare for the shortest time possible. Any topsoil removed during construction will be temporarily stockpiled for future use in grading and

landscaping. Stockpile locations have been provided on the Erosion and Sediment Control Plan and shall be contained within a silt fence/hay bale barrier.

Temporary vegetation will be established to protect exposed soil areas during construction. If growing conditions are not suitable for the temporary vegetation, mulch will be used. Materials that may be used for mulching include; straw, hay, salt hay, wood fiber, synthetic soil stabilizers, mulch netting, and sod. A permanent vegetative cover will be established upon completion of construction of those areas that have been brought to finish grade and to remain undisturbed.

The dry extended detention basin area shall be used as a temporary sedimentation basin. A temporary riser shall be installed prior to and maintained during construction activities; riser to be removed upon completion of construction activities.

A temporary stabilized construction entrance comprised of three inches clean stone will be constructed at the entrances to the site. The purpose of a stabilized entrance is to remove as much soil from the construction vehicle tires prior to exiting the site and traveling on the existing roadways. During construction, inlet protection (as applicable) will be installed at each storm sewer inlet to minimize the conveyance of silt and sediment through the storm sewer system.

If the contractor encounters ground water during the excavation of the areas for the filter media, he shall notify the design engineer immediately. The contractor shall store all excavated material at the designated location show on the ***Erosion Sediment Control and Construction Phasing Plan*** with the appropriate erosion control measures corresponding to the stockpile detail.

J. Final Stabilization

Permanent seeding shall be applied immediately after the final design grades are achieved as applicable throughout the site but no later than fourteen (14) days after construction activities have ceased. After stabilization, accumulated sediment shall be removed from site for disposal along with construction debris, trash and temporary BMPs e.g. silt fences, straw bales, material storage areas, sanitary toilets, etc.

Seedbed preparation/grass application

A minimum depth of 2 to 6 inches shall be applied on areas where disturbance results in subsoil being the final grade surface. The seedbed shall be free of large clods, rocks, woody debris and other intrusive materials; fertilizer shall be applied accordingly.
Seeding schedule and application procedure notes are shown on the *Grading and Erosion Control Plans* attached herewith.

K. Conclusion:

The implementation of this stormwater pollution prevention plan will not adversely affect the existing drainage system along the downstream channel. The pre-development rates of runoff have been reduced in the developed condition, stormwater runoff treated and runoff reduction volume (RRv) provided in conformance with New York State Department of Environmental Conservation Phase II regulations.

Respectfully Submitted,

W. Charles Utschig, Jr., PE
N.Y.S. Lic. No. 62303
CMX

Soil Map—Orange County, New York
(Soils Maps)

MAP LEGEND

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

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

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

MAP INFORMATION

Map Scale: 1:3,710 if printed on B size (11" × 17") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

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

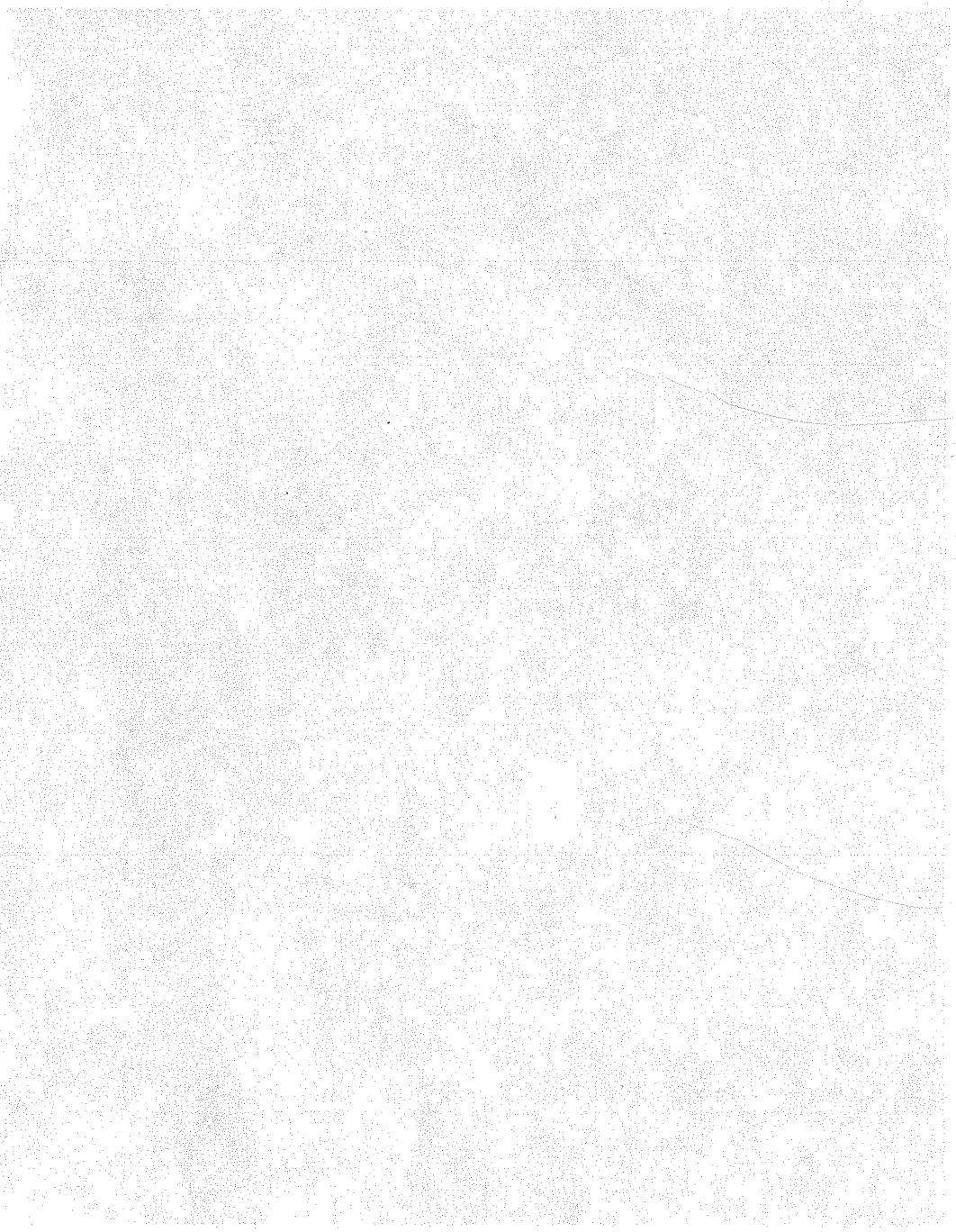
Soil Survey Area: Orange County, New York
Survey Area Data: Version 10, Feb 5, 2010

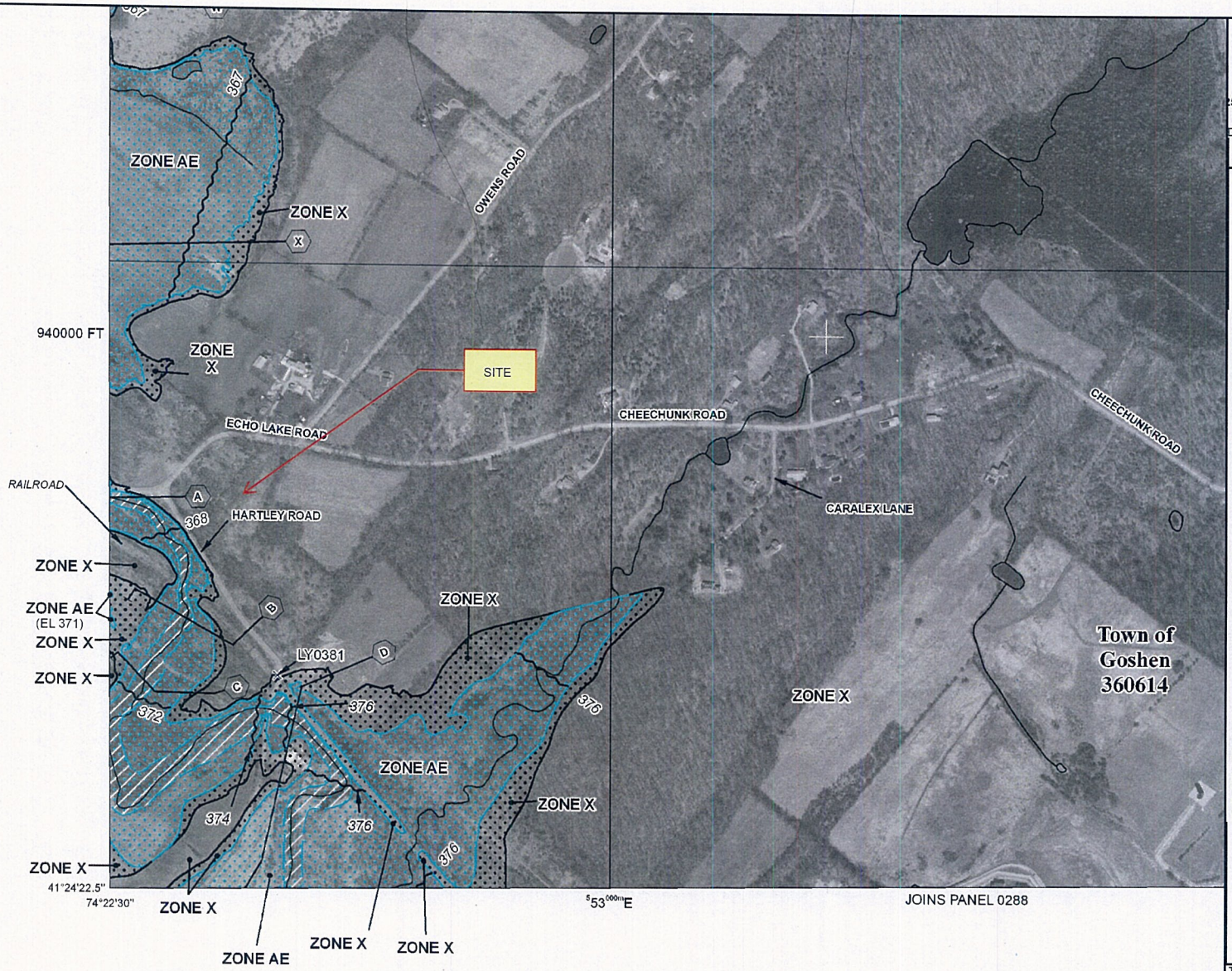
Date(s) aerial images were photographed: 8/13/2006

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

Map Unit Legend

Orange County, New York (NY071)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ab	Alden silt loam	0.0	0.0%
AdB	Allard silt loam, 3 to 8 percent slopes	3.9	7.9%
BnC	Bath-Nassau channery silt loams, 8 to 15 percent slopes	5.9	12.1%
CnB	Chenango gravelly silt loam, 3 to 8 percent slopes	0.1	0.2%
ErA	Erie gravelly silt loam, 0 to 3 percent slopes	0.2	0.4%
ErB	Erie gravelly silt loam, 3 to 8 percent slopes	7.8	15.9%
Ma	Madalin silt loam	3.9	8.0%
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	14.6	30.0%
MdC	Mardin gravelly silt loam, 8 to 15 percent slopes	3.3	6.7%
Pg	Pits, gravel	0.1	0.2%
RSD	Rock outcrop-Nassau complex, hilly	2.2	4.6%
SXC	Swartswood and Mardin very stony soils, sloping	5.6	11.4%
UnB	Unadilla silt loam, 0 to 8 percent slopes	1.3	2.7%
Totals for Area of Interest		**48.8**	**100.0%**





MAP SCALE 1" = 500'

250 0 500 1000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0286E

FIRM

FLOOD INSURANCE RATE MAP

for ORANGE COUNTY, NEW YORK
(ALL JURISDICTIONS)

CONTAINS:

COMMUNITY	NUMBER
GOSHEN, TOWN OF	360614
WALLKILL, TOWN OF	360634
WAWAYANDA, TOWN OF	360639

PANEL 286 OF 630
MAP SUFFIX: E
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
36071C0286E

EFFECTIVE DATE
AUGUST 3, 2009

Federal Emergency Management Agency

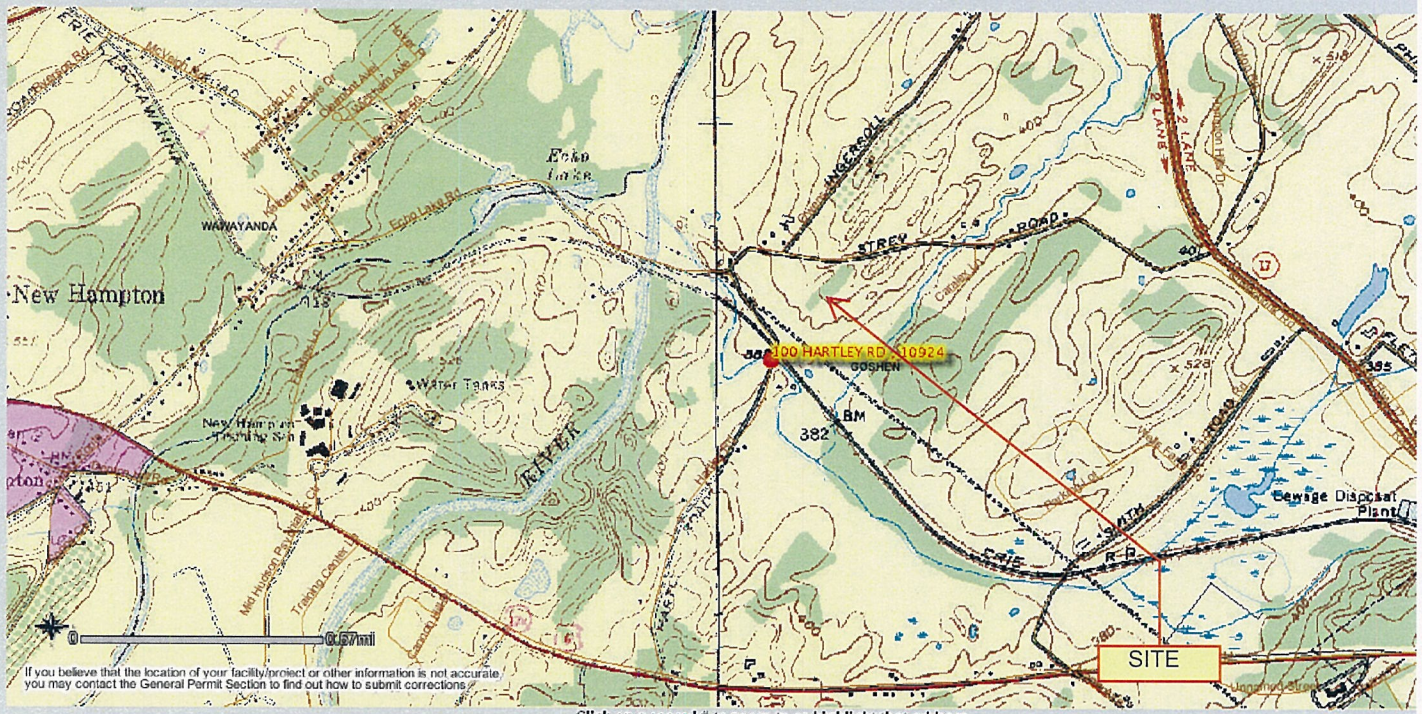
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

NEW YORK STATE - DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Stormwater Interactive Map

Search | Layers & Legend | Tell Me More...
Stormwater Permit Info | Contacts | Help

- [ ] Combined Sewer Overflow
- [x] State & US Highways
- [ ] Watershed Improvement Strategy Area
  - 27 Long Island Shellfish Watersheds
  - Greenwood Lake
  - NYC EOH Watershed
  - Onondaga Lake
  - Oscawana Lake
  - Oyster Bay
  - Peconic Nitrogen
  - Peconic Pathogen
- [x] Regulated MS4s
  - Automatic
  - Designation 2003
  - Designation 2008
  - Designation 2010
- 303(d) Construction Appendix E
  - [ ] Streams
  - [ ] Estuary
  - [ ] Lake



Click on a record # to zoom to or highlight that address

Record #	Address	Score
1	100 HARTLEY RD , 10924	100

CMX

Date:

RE: Hartley Road Substation
Goshen, NY
Our Project Number: 570312000100

Dear Sir or Madam:

Please consider this letter, written confirmation of the following acknowledgement being made this day of , 2011.

ENGINEER CERTIFICATION:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.

_____

W. Charles Utschig, Jr. P.E.
CMX
1311 Mamaroneck Avenue, Suite 50
White Plains, NY 10605
Phone: 914-686-1000
Fax: 914-686-1222

SPDES General Permit for Stormwater Runoff from Construction Activity, GP-0-10-001.

Date:

RE: Hartley Road Substation
Goshen, NY

Dear Sir or Madam:

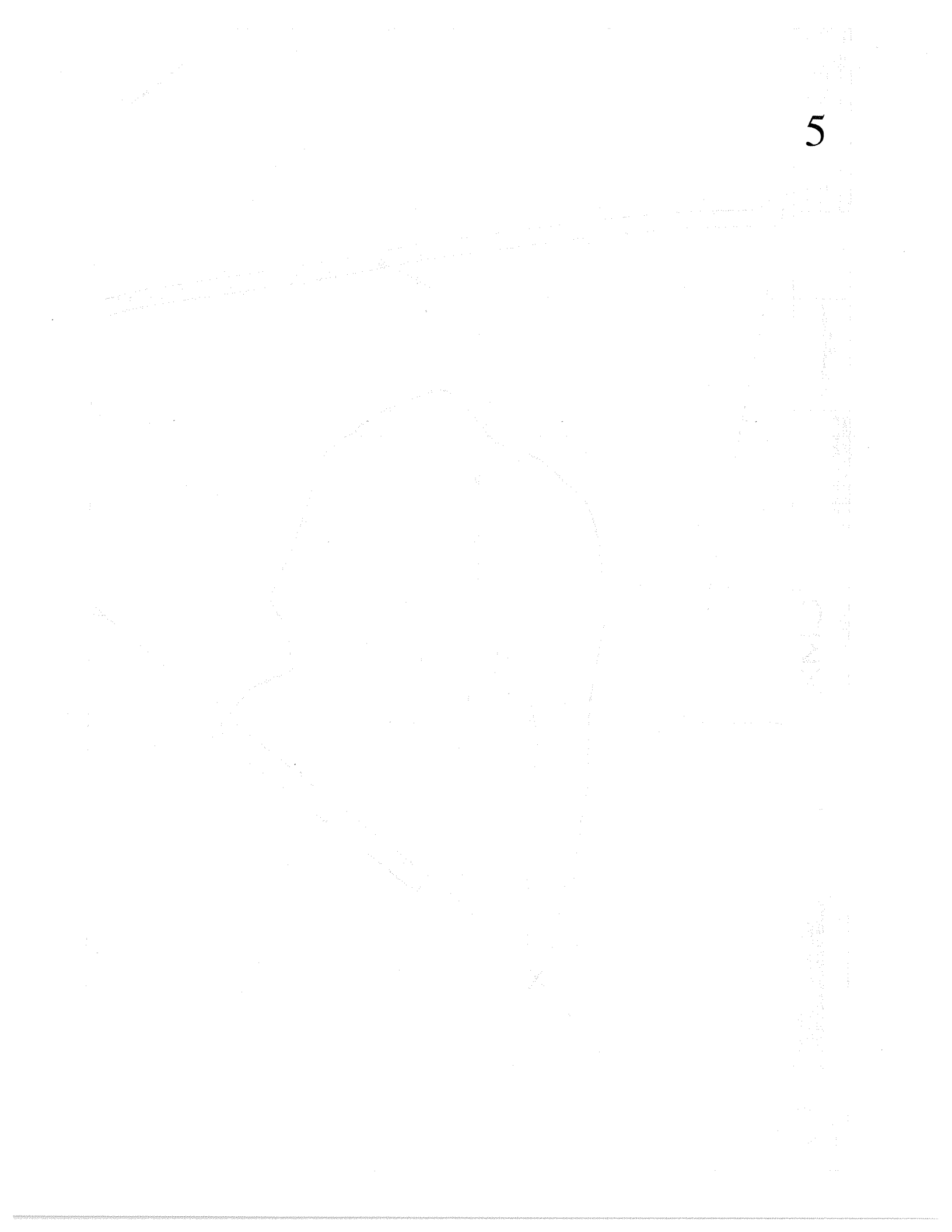
Please consider this letter, written confirmation of the following acknowledgement being made this day of , 20 .

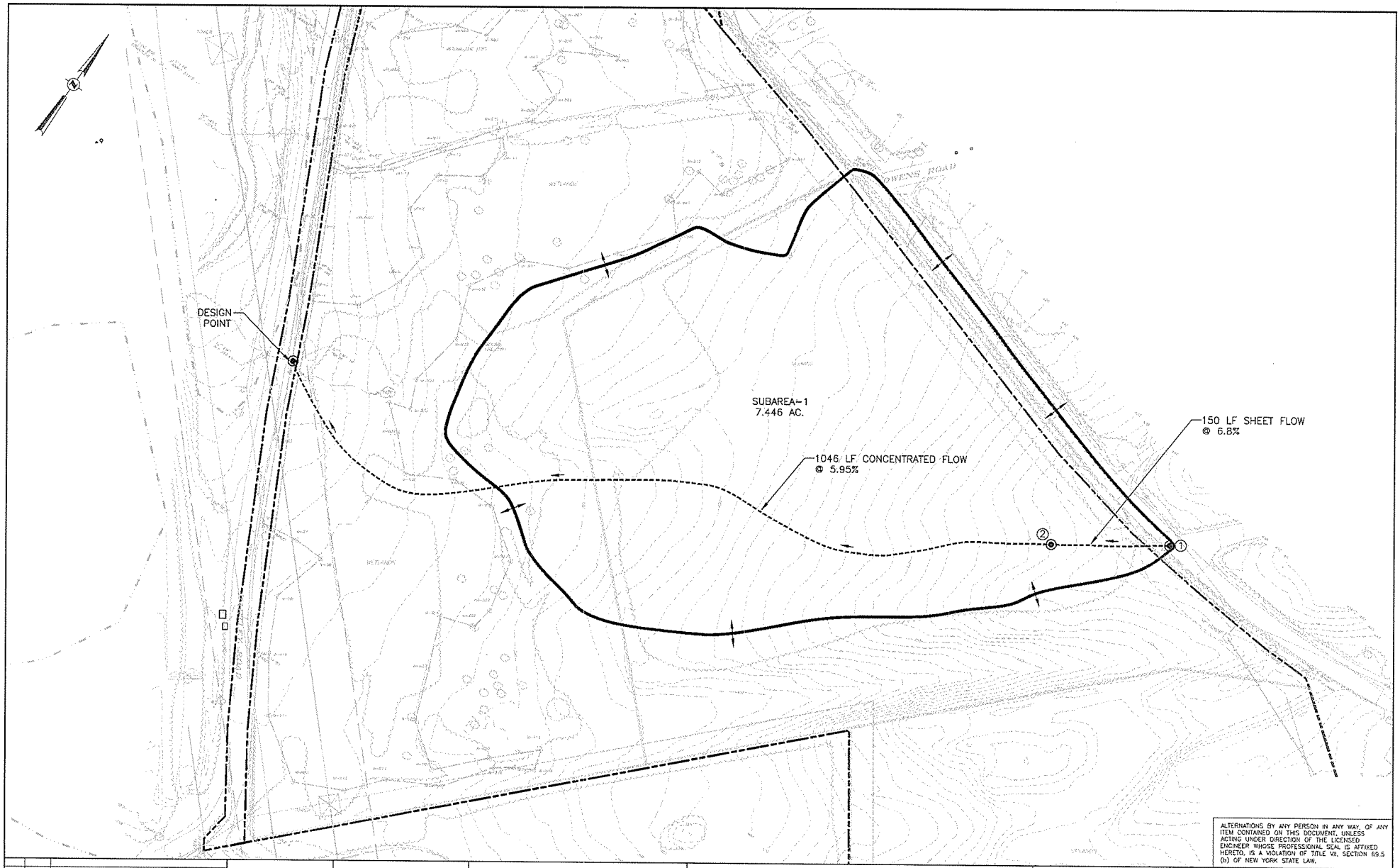
CONTRACTOR STATEMENT:

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."

Trained Contractor Information:	Trained Contractor Signature	SWPPP-specific task *responsible* for:
Name:_____ Title:_____ Address:_____ _____ Telephone number: (_____)_____-_____	X_____ Date:_____	_____ _____ _____ _____ _____

In accordance to Section III.A.6 of GP-0-10-001 "The owner or operator shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above."





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REVISION NO.	DATE	REVISION

50 0 50
GRAPHIC SCALE IN FEET
1"=50'

W. CHARLES UTSCHIG, JR.
PROFESSIONAL ENGINEER, N.Y. LIC. No. 62303-1

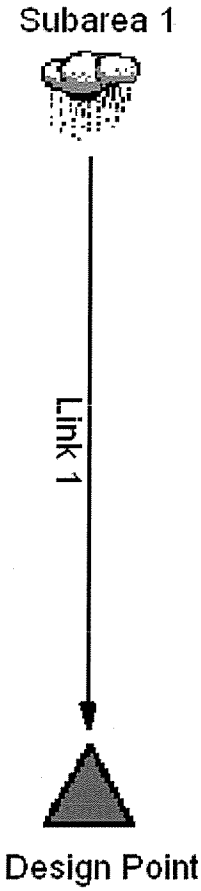
CMX
CMX ENGINEERING, SURVEY & LANDSCAPE ARCHITECTS, PC OF NEW YORK
AN AFFILIATE OF BIRDSALL SERVICES GROUP

1311 MAMARONECK AVENUE
SUITE 50
WHITE PLAINS, NY 10605
TEL (914)686-1000
FAX (914)686-1222

EXISTING CONDITIONS DRAINAGE AREA MAP
HARTLEY ROAD SUBSTATION
ORANCE AND ROCKLAND UTILITIES, INC.

TOWN OF GOSHEN ORANGE COUNTY NEW YORK

PROJECT NO	5703120000100
DATE	08/01/11
DRAWN BY	JP
DESIGNED BY	JP
SCALE	1"=50'
CHECKED BY	MF
	CMX
SHEET NO.	1 of 1


Subarea 1
Link 1
Design Point

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********** CN CALCULATIONS **********

SUBAREA 1..... Runoff CN-Area 4.01

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Orange County

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.9000	Synthetic Curve	TypeIII 24hr
10	5.5000	Synthetic Curve	TypeIII 24hr
25	6.5000	Synthetic Curve	TypeIII 24hr
100	8.0000	Synthetic Curve	TypeIII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*DESIGN POINT	JCT	1	.643		12.3000	5.52		
*DESIGN POINT	JCT	10	1.909		12.2500	17.01		
*DESIGN POINT	JCT	25	2.446		12.2500	21.77		
*DESIGN POINT	JCT	100	3.277		12.2500	29.00		
SUBAREA 1	AREA	1	.643		12.3000	5.52		
SUBAREA 1	AREA	10	1.909		12.2500	17.01		
SUBAREA 1	AREA	25	2.446		12.2500	21.77		
SUBAREA 1	AREA	100	3.277		12.2500	29.00		

Title... Project Date: 2/27/2009
Project Engineer: jparedes
Project Title: Corporate Drive Substation
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Orange County

Storm Tag Name = 1

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 6.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 8.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.4000	
Hydraulic Length	150.00	ft
2yr, 24hr P	3.5000	in
Slope	.068000	ft/ft
Avg.Velocity	.14	ft/sec

Segment #1 Time: .2901 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1046.00	ft
Slope	.059500	ft/ft
Unpaved		
Avg.Velocity	3.94	ft/sec

Segment #2 Time: .0738 hrs

Total Tc: .3639 hrs

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf =.Flow length, ft

RUNOFF CURVE NUMBER DATA

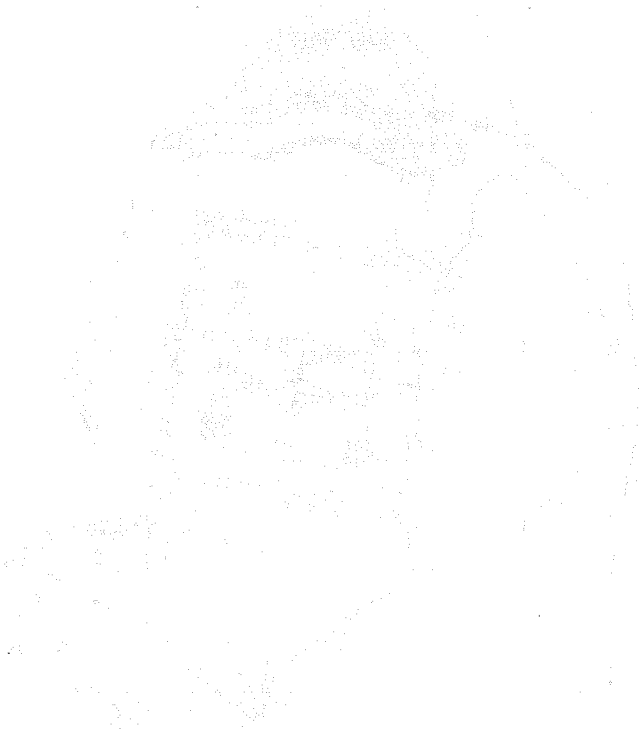
Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Woods - grass combination - fair	76	2.010			76.00
Paved Roadway	98	.017			98.00
Pasture, grassland, or range - fair	79	5.270			79.00
COMPOSITE AREA & WEIGHTED CN --->		7.297			78.22 (78)

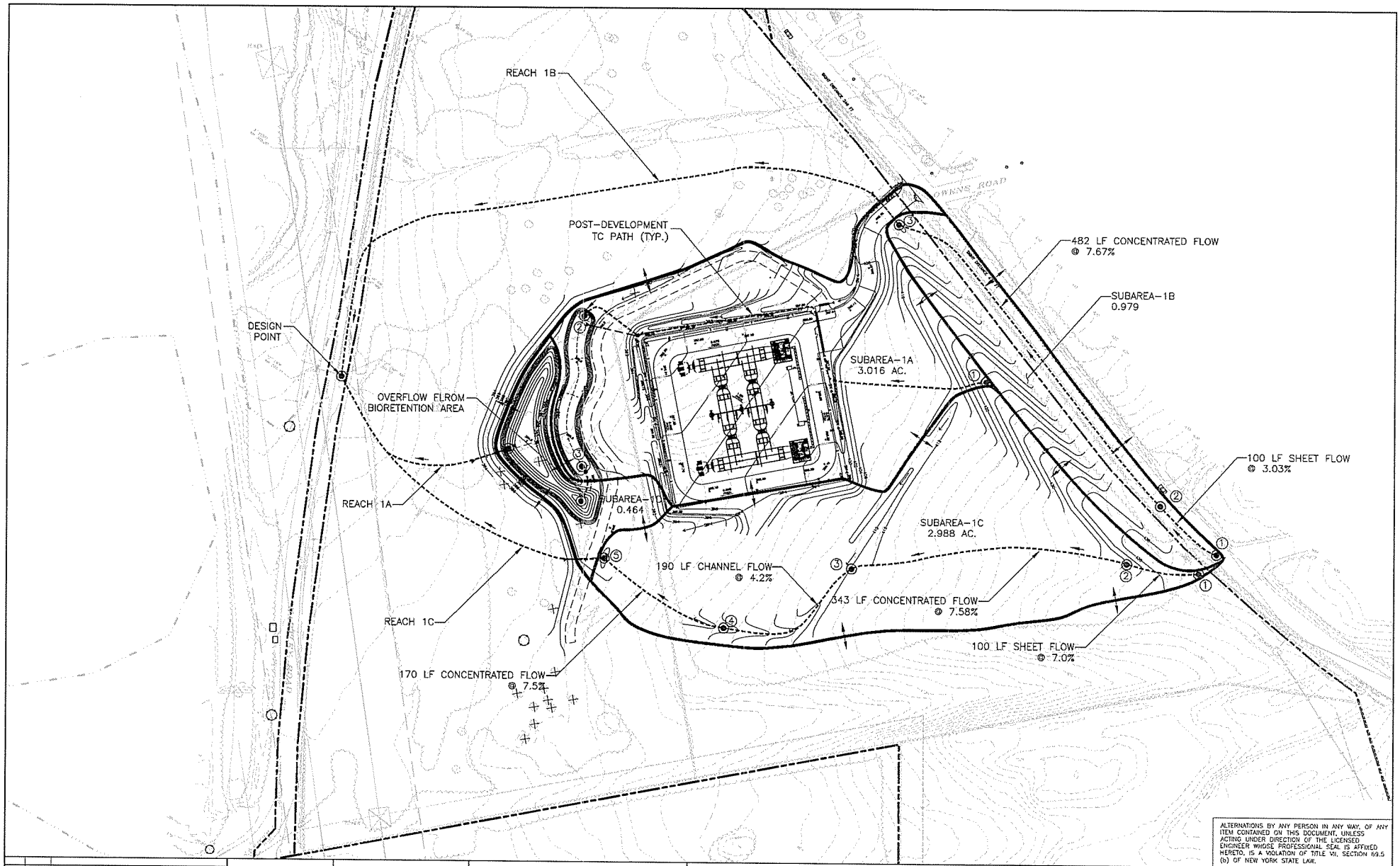
Index of Starting Page Numbers for ID Names

----- O -----
Orange County... 2.01

----- S -----
SUBAREA 1... 3.01, 4.01

----- W -----
Watershed... 1.01





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REVISION NO.	DATE	REVISION

GRAPHIC SCALE IN FEET
50 0 50
1"=50'

W. CHARLES UTSCHIG, JR.
PROFESSIONAL ENGINEER, N.Y. LIC. No. 82303-1

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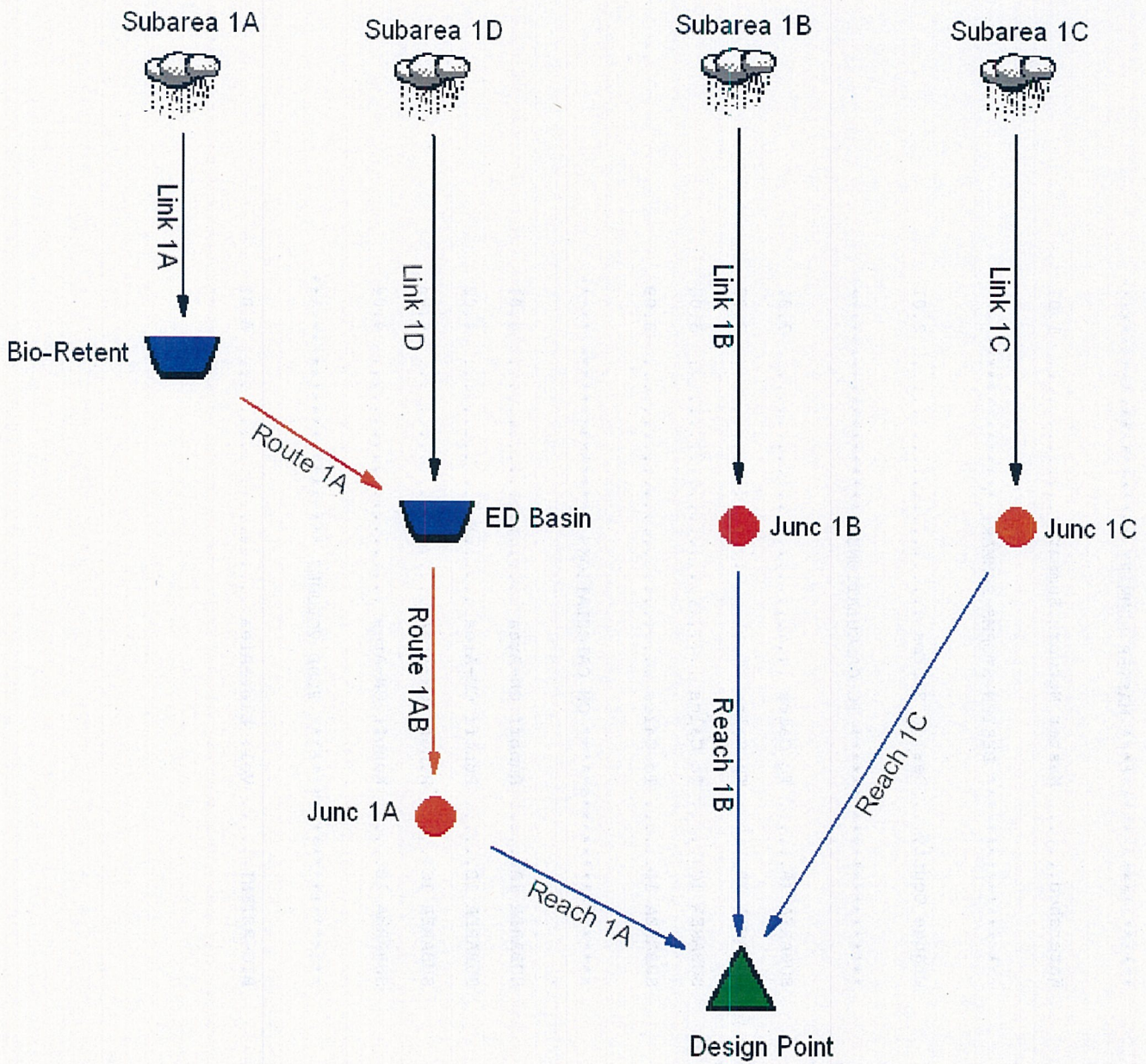
PROPOSED CONDITIONS DRAINAGE AREA MAP
HARTLEY ROAD SUBSTATION
ORANGE AND ROCKLAND UTILITIES INC.

TOWN OF GOSHEN ORANGE COUNTY NEW YORK

PROJECT NO. 370317000100	DATE 08/01/11
DRAWN BY JP	DESIGNED BY JP
SCALE 1"=50'	CHECKED BY MF
CMX	
SHEET NO. 1 of 1	


Subarea 1A
Subarea 1D
Subarea 1B
Subarea 1C
Link 1A
Link 1D
Link 1B
Link 1C
Bio-Retent
Route 1A
ED Basin
Junc 1B
Junc 1C
Route 1AB
Reach 1B
Reach 1C
Junc 1A
Reach 1A
Design Point

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SUBAREA 1A..... Tc Calcs 3.01

SUBAREA 1B..... Tc Calcs 3.03

SUBAREA 1C..... Tc Calcs 3.05

SUBAREA 1D..... Tc Calcs 3.09

********** CN CALCULATIONS **********

SUBAREA 1A..... Runoff CN-Area 4.01

SUBAREA 1B..... Runoff CN-Area 4.02

SUBAREA 1C..... Runoff CN-Area 4.03

SUBAREA 1D..... Runoff CN-Area 4.04

********** POND VOLUMES **********

BIO-RETENT..... Vol: Elev-Area 5.01

Table of Contents (continued)

ED BASIN..... Vol: Elev-Area 5.02

********** OUTLET STRUCTURES **********

Outlet 1..... Outlet Input Data 6.01

Outlet 2..... Outlet Input Data 6.03

********** POND ROUTING **********

BIO-RETENT..... Pond E-V-Q Table 7.01

ED BASIN..... Pond E-V-Q Table 7.02

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Orange County

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.9000	Synthetic Curve	TypeIII 24hr
10	5.5000	Synthetic Curve	TypeIII 24hr
25	6.5000	Synthetic Curve	TypeIII 24hr
100	8.0000	Synthetic Curve	TypeIII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
BIO-RETENT	IN POND	1	.360		12.1000	4.41		
BIO-RETENT	IN POND	10	.937		12.1000	11.23		
BIO-RETENT	IN POND	25	1.172		12.1000	13.90		
BIO-RETENT	IN POND	100	1.531		12.1000	17.89		
BIO-RETENT	OUT POND	1	.306		12.1500	4.19	388.65	.072
BIO-RETENT	OUT POND	10	.883		12.1000	10.85	388.80	.090
BIO-RETENT	OUT POND	25	1.118		12.1000	13.56	388.84	.096
BIO-RETENT	OUT POND	100	1.477		12.1000	17.54	388.91	.104
*DESIGN POINT	JCT	1	.732		12.2500	4.12		
*DESIGN POINT	JCT	10	2.099		12.2500	15.64		
*DESIGN POINT	JCT	25	2.665		12.2500	19.36		
*DESIGN POINT	JCT	100	3.534		12.3500	25.60		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
ED BASIN IN	POND	1	.350		12.1500	4.67		
ED BASIN IN	POND	10	1.008		12.1000	12.38		
ED BASIN IN	POND	25	1.278		12.1000	15.49		
ED BASIN IN	POND	100	1.690		12.1000	20.08		
ED BASIN OUT	POND	1	.349		12.5500	1.26	385.62	.119
ED BASIN OUT	POND	10	1.008		12.4000	5.28	387.15	.309
ED BASIN OUT	POND	25	1.277		12.4000	6.10	387.69	.395
ED BASIN OUT	POND	100	1.690		12.3000	10.55	388.20	.487
JUNC 1A	JCT	1	.349		12.5500	1.26		
JUNC 1A	JCT	10	1.008		12.4000	5.28		
JUNC 1A	JCT	25	1.277		12.4000	6.10		
JUNC 1A	JCT	100	1.690		12.3000	10.55		
JUNC 1B	JCT	1	.106		12.1000	1.32		
JUNC 1B	JCT	10	.288		12.1000	3.53		
JUNC 1B	JCT	25	.363		12.1000	4.40		
JUNC 1B	JCT	100	.478		12.1000	5.71		
JUNC 1C	JCT	1	.277		12.2000	2.76		
JUNC 1C	JCT	10	.803		12.2000	8.14		
JUNC 1C	JCT	25	1.025		12.2000	10.33		
JUNC 1C	JCT	100	1.367		12.2000	13.65		
SUBAREA 1A	AREA	1	.360		12.1000	4.41		
SUBAREA 1A	AREA	10	.937		12.1000	11.23		
SUBAREA 1A	AREA	25	1.172		12.1000	13.90		
SUBAREA 1A	AREA	100	1.531		12.1000	17.89		
SUBAREA 1B	AREA	1	.106		12.1000	1.32		
SUBAREA 1B	AREA	10	.288		12.1000	3.53		
SUBAREA 1B	AREA	25	.363		12.1000	4.40		
SUBAREA 1B	AREA	100	.478		12.1000	5.71		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
SUBAREA 1C	AREA	1	.277		12.2000	2.76		
SUBAREA 1C	AREA	10	.803		12.2000	8.14		
SUBAREA 1C	AREA	25	1.025		12.2000	10.33		
SUBAREA 1C	AREA	100	1.367		12.2000	13.65		
SUBAREA 1D	AREA	1	.043		12.1000	.52		
SUBAREA 1D	AREA	10	.125		12.1000	1.52		
SUBAREA 1D	AREA	25	.160		12.1000	1.93		
SUBAREA 1D	AREA	100	.213		12.1000	2.55		

Title... Project Date: 2/27/2009
Project Engineer: jparedes
Project Title: Corporate Drive Substation
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Orange County

Storm Tag Name = 1

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 6.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 8.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: .1000 hrs

Total Tc: .1000 hrs

Tc Equations used...

==== User Defined ==

Tc = Value entered by user

Where: Tc = Time of concentration

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.0110	
Hydraulic Length	100.00	ft
2yr, 24hr P	3.5000	in
Slope	.030300	ft/ft
Avg.Velocity	1.70	ft/sec

Segment #1 Time: .0164 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	482.00	ft
Slope	.076700	ft/ft
Unpaved		
Avg.Velocity	4.47	ft/sec

Segment #2 Time: .0300 hrs

==========
Total Tc: .0463 hrs

Calculated Tc < Min.Tc:
Use Minimum Tc...
Use Tc = .0833 hrs
==========

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.4000	
Hydraulic Length	100.00	ft
2yr, 24hr P	3.5000	in
Slope	.070000	ft/ft
Avg.Velocity	.13	ft/sec

Segment #1 Time: .2073 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	343.00	ft
Slope	.075800	ft/ft
Unpaved		
Avg.Velocity	4.44	ft/sec

Segment #2 Time: .0214 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	6.8000	sq.ft
Wetted Perimeter	13.20	ft
Hydraulic Radius	.52	ft
Slope	.042000	ft/ft
Mannings n	.0300	
Hydraulic Length	190.00	ft
Avg.Velocity	6.54	ft/sec

Segment #3 Time: .0081 hrs

Segment #4: Tc: TR-55 Shallow

Hydraulic Length 170.00 ft
Slope .075000 ft/ft
Unpaved

Avg.Velocity 4.42 ft/sec

Segment #4 Time: .0107 hrs

Total Tc: .2475 hrs

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

==== SCS Channel Flow ==

R = Aq / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

Tc = (Lf / V) / (3600sec/hr)

Where: R = Hydraulic radius
Aq = Flow area, sq.ft.
Wp = Wetted perimeter, ft
V = Velocity, ft/sec
Sf = Slope, ft/ft
n = Mannings n
Tc = Time of concentration, hrs
Lf = Flow length, ft

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: .1000 hrs

Total Tc: .1000 hrs

Tc Equations used...

==== User Defined ====

Tc = Value entered by user

Where: Tc = Time of concentration

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Open space (Lawns,parks etc.) - Fai	79	1.149			79.00
Impervious Areas - Gravel (w/ right	85	.771			85.00
Pasture, grassland, or range - fair	79	.599			79.00
Impervious Areas - Building/Concret	98	.496			98.00
COMPOSITE AREA & WEIGHTED CN --->		3.015			83.66 (84)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Paved road	98	.154			98.00
Open space (Lawns,parks etc.) - Fai	79	.825			79.00
COMPOSITE AREA & WEIGHTED CN --->		.979			81.99 (82)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Pasture, grassland, or range - fair	79	1.944			79.00
Open space (Lawns,parks etc.) - Fai	79	1.034			79.00
COMPOSITE AREA & WEIGHTED CN --->		2.978			79.00 (79)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - fair	79	.464			79.00
COMPOSITE AREA & WEIGHTED CN --->		.464			79.00 (79)

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
388.00	-----	.1000	.0000	.000	.000
388.50	-----	.1160	.3237	.054	.054
389.00	-----	.1320	.3717	.062	.116
389.50	-----	.1480	.4198	.070	.186

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
384.00	-----	.0490	.0000	.000	.000
385.00	-----	.0790	.1902	.063	.063
386.00	-----	.1110	.2836	.095	.158
387.00	-----	.1460	.3843	.128	.286
388.00	-----	.1820	.4910	.164	.450
389.00	-----	.2190	.6006	.200	.650
389.50	-----	.2358	.6820	.114	.764

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 388.00 ft
Increment = .10 ft
Max. Elev.= 389.50 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	W0	--->	TW	388.500	389.500
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

Structure ID = W0
Structure Type = Weir-Rectangular

# of Openings = 1
Crest Elev. = 388.50 ft
Weir Length = 20.00 ft
Weir Coeff. = 3.330000

Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 384.00 ft
Increment = .10 ft
Max. Elev.= 389.50 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Orifice-Circular	O1	--->	O2	385.100	389.500
Inlet Box	R0	--->	O2	388.000	389.500
Orifice-Circular	O0	--->	O2	384.000	389.500
Orifice-Circular	O2	--->	TW	384.000	389.500

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID	= O1	
Structure Type	= Orifice-Circular	
# of Openings	= 1	
Invert Elev.	= 385.10	ft
Diameter	= 1.0000	ft
Orifice Coeff.	= .600	

Structure ID	= R0	
Structure Type	= Inlet Box	
# of Openings	= 1	
Invert Elev.	= 388.00	ft
Orifice Area	= 16.0000	sq.ft
Orifice Coeff.	= .600	
Weir Length	= 16.00	ft
Weir Coeff.	= 3.330	
K, Reverse	= 1.000	
Mannings n	= .0000	
Kev,Charged Riser	= .000	
Weir Submergence	= No	

Structure ID	= O0	
Structure Type	= Orifice-Circular	
# of Openings	= 1	
Invert Elev.	= 384.00	ft
Diameter	= .3333	ft
Orifice Coeff.	= .600	

OUTLET STRUCTURE INPUT DATA

Structure ID = O2
Structure Type = Orifice-Circular

# of Openings = 1
Invert Elev. = 384.00 ft
Diameter = 1.5000 ft
Orifice Coeff. = .600

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

LEVEL POOL ROUTING DATA

HYG Dir = M:\WhitePlains\Jobs\Orange and Rockland Utilities\570312000100\SWPPP\
Inflow HYG file = NONE STORED - BIO-RETENT IN 1
Outflow HYG file = NONE STORED - BIO-RETENT OUT 1

Pond Node Data = BIO-RETENT
Pond Volume Data = BIO-RETENT
Pond Outlet Data = Outlet 1

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	388.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
388.00	.00	.000	.1000	.00	.00	.00
388.10	.00	.010	.1031	.00	.00	4.92
388.20	.00	.021	.1063	.00	.00	9.98
388.30	.00	.031	.1095	.00	.00	15.20
388.40	.00	.043	.1127	.00	.00	20.58
388.50	.00	.054	.1160	.00	.00	26.11
388.60	2.11	.066	.1191	.00	2.11	33.91
388.70	5.96	.078	.1223	.00	5.96	43.60
388.80	10.94	.090	.1255	.00	10.94	54.58
388.90	16.85	.103	.1287	.00	16.85	66.64
389.00	23.55	.116	.1320	.00	23.55	79.65
389.10	30.95	.129	.1351	.00	30.95	93.52
389.20	39.01	.143	.1383	.00	39.01	108.19
389.30	47.65	.157	.1415	.00	47.65	123.60
389.40	56.86	.171	.1447	.00	56.86	139.74
389.50	66.60	.186	.1480	.00	66.60	156.56

LEVEL POOL ROUTING DATA

HYG Dir = M:\WhitePlains\Jobs\Orange and Rockland Utilities\570312000100\SWPPP\
Inflow HYG file = NONE STORED - ED BASIN IN 1
Outflow HYG file = NONE STORED - ED BASIN OUT 1

Pond Node Data = ED BASIN
Pond Volume Data = ED BASIN
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 384.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
384.00	.00	.000	.0490	.00	.00	.00
384.10	.02	.005	.0517	.00	.02	2.45
384.20	.06	.010	.0544	.00	.06	5.07
384.30	.13	.016	.0573	.00	.13	7.84
384.40	.18	.022	.0601	.00	.18	10.73
384.50	.22	.028	.0631	.00	.22	13.75
384.60	.25	.034	.0661	.00	.25	16.91
384.70	.28	.041	.0693	.00	.28	20.21
384.80	.31	.048	.0724	.00	.31	23.67
384.90	.33	.056	.0757	.00	.33	27.28
385.00	.35	.063	.0790	.00	.35	31.04
385.10	.37	.071	.0820	.00	.37	34.96
385.20	.43	.080	.0850	.00	.43	39.05
385.30	.54	.088	.0880	.00	.54	43.35
385.40	.71	.097	.0911	.00	.71	47.85
385.50	.92	.107	.0943	.00	.92	52.56
385.60	1.19	.116	.0975	.00	1.19	57.47
385.70	1.50	.126	.1008	.00	1.50	62.58
385.80	1.85	.136	.1042	.00	1.85	67.89
385.90	2.22	.147	.1076	.00	2.22	73.38

LEVEL POOL ROUTING DATA

HYG Dir = M:\WhitePlains\Jobs\Orange and Rockland Utilities\570312000100\SWPPP\
Inflow HYG file = NONE STORED - ED BASIN IN 1
Outflow HYG file = NONE STORED - ED BASIN OUT 1

Pond Node Data = ED BASIN
Pond Volume Data = ED BASIN
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 384.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
386.00	2.63	.158	.1110	.00	2.63	79.07
386.10	3.12	.169	.1143	.00	3.12	85.03
386.20	3.40	.181	.1176	.00	3.40	90.91
386.30	3.64	.193	.1210	.00	3.64	96.93
386.40	3.87	.205	.1244	.00	3.87	103.10
386.50	4.09	.218	.1279	.00	4.09	109.42
386.60	4.29	.231	.1314	.00	4.29	115.90
386.70	4.49	.244	.1350	.00	4.49	122.54
386.80	4.68	.258	.1386	.00	4.68	129.35
386.90	4.86	.272	.1423	.00	4.86	136.34
387.00	5.04	.286	.1460	.00	5.04	143.49
387.10	5.20	.301	.1494	.00	5.20	150.80
387.20	5.37	.316	.1529	.00	5.37	158.28
387.30	5.52	.331	.1564	.00	5.52	165.92
387.40	5.68	.347	.1599	.00	5.68	173.74
387.50	5.83	.363	.1635	.00	5.83	181.71
387.60	5.97	.380	.1671	.00	5.97	189.85
387.70	6.11	.397	.1708	.00	6.11	198.17
387.80	6.26	.414	.1745	.00	6.26	206.67
387.90	6.40	.432	.1782	.00	6.40	215.35

LEVEL POOL ROUTING DATA

HYG Dir = M:\WhitePlains\Jobs\Orange and Rockland Utilities\570312000100\SWPPP\
Inflow HYG file = NONE STORED - ED BASIN IN 1
Outflow HYG file = NONE STORED - ED BASIN OUT 1

Pond Node Data = ED BASIN
Pond Volume Data = ED BASIN
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 384.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
388.00	6.53	.450	.1820	.00	6.53	224.20
388.10	8.21	.468	.1855	.00	8.21	234.77
388.20	10.56	.487	.1891	.00	10.56	246.19
388.30	13.23	.506	.1927	.00	13.23	258.10
388.40	15.65	.525	.1964	.00	15.65	269.93
388.50	16.47	.545	.2001	.00	16.47	280.35
388.60	16.69	.565	.2038	.00	16.69	290.34
388.70	16.90	.586	.2075	.00	16.90	300.51
388.80	17.12	.607	.2113	.00	17.12	310.86
388.90	17.33	.628	.2151	.00	17.33	321.39
389.00	17.53	.650	.2190	.00	17.53	332.10
389.10	17.74	.672	.2223	.00	17.74	342.99
389.20	17.94	.694	.2256	.00	17.94	354.03
389.30	18.14	.717	.2290	.00	18.14	365.23
389.40	18.34	.740	.2324	.00	18.34	376.60
389.50	18.54	.764	.2358	.00	18.54	388.13

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BIO-RETENT... 5.01, 7.01

----- E -----
ED BASIN... 5.02, 7.02

----- O -----
Orange County... 2.01
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Outlet 2... 6.03

----- S -----
SUBAREA 1A... 3.01, 4.01
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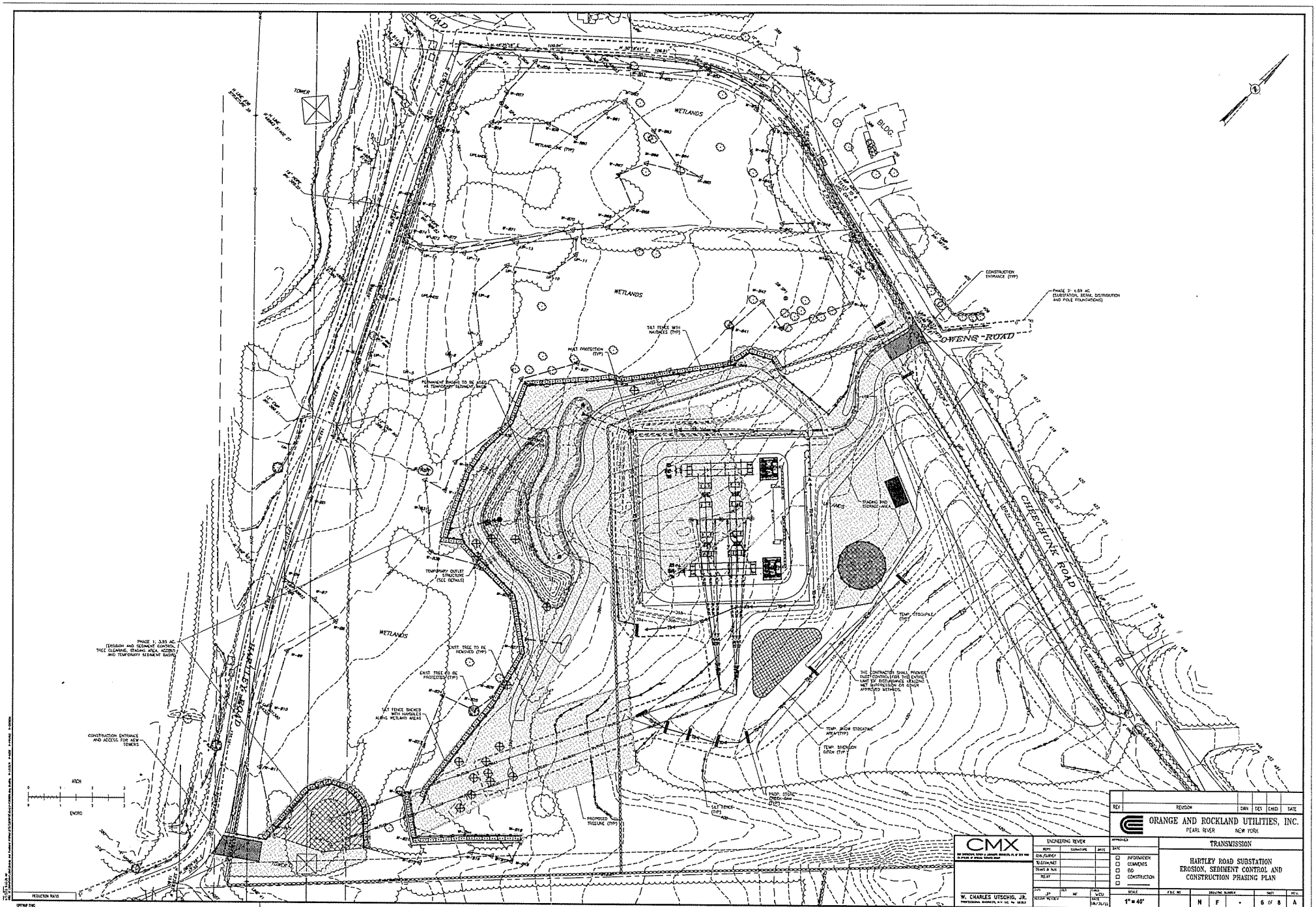
SUBAREA 1C... 3.05, 4.03
SUBAREA 1D... 3.09, 4.04

----- W -----
Watershed... 1.01



REV	REVISION	DWN	DES	CHKD	DATE

ORANGE AND ROCKLAND UTILITIES, INC.
PEARL RIVER NEW YORK

TRANSMISSION

HARTLEY ROAD SUBSTATION
EROSION, SEDIMENT CONTROL AND
CONSTRUCTION PHASING PLAN

CMX

W. CHARLES UTSCHIG, JR.
PROFESSIONAL ENGINEER, N.Y. LIC. No. 063810

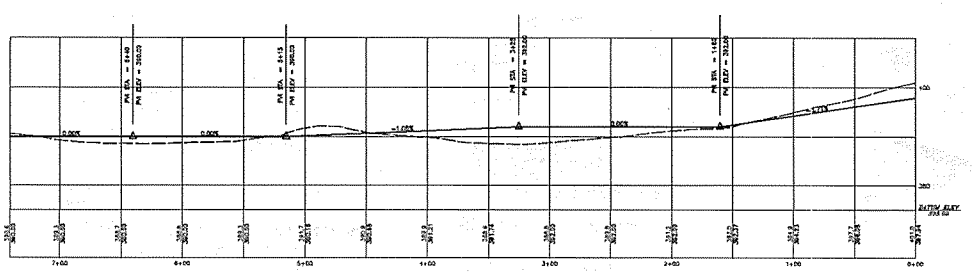
ENGINEERING REVIEW

ROW	SIGNATURE	DATE
SUR./SURVEY		
TELECOM/NET		
TRANS & SUB		
RELAY		

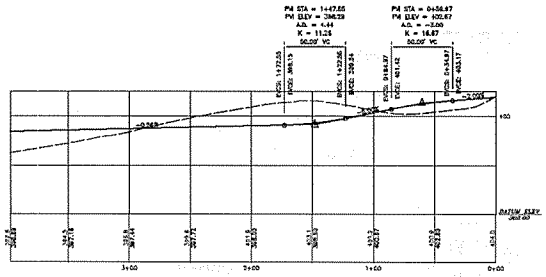
APPROVALS

DWN	
	☐ INFORMATION
	☐ COMMENTS
	☐ BID
	☐ CONSTRUCTION

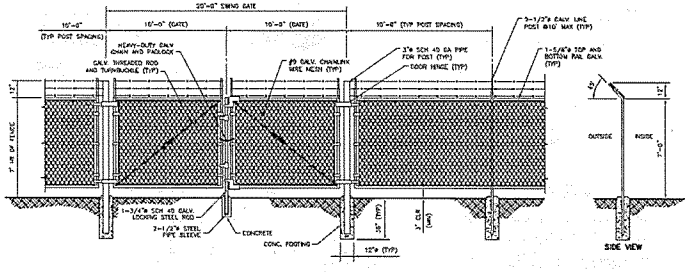
SCALE	F.S.C. NO.	DRAWING NUMBER	SHEET	REV.
1" = 40'		N F -	6 OF 8	A



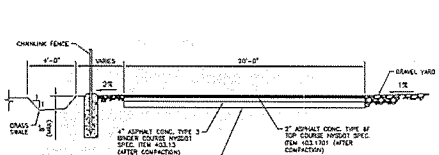
PROFILE - GRAVEL ACCESS ROAD
SCALE HORIZ: 1"=50
VERT: 1"=10'



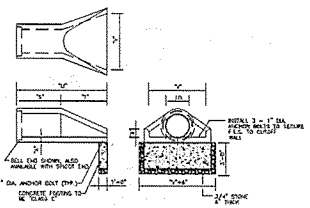
PROFILE - ASPHALT ENTRY ROAD
SCALE HORIZ: 1"=50'
VERT: 1"=10'



CHAINLINK FENCE AND GATE
NTS



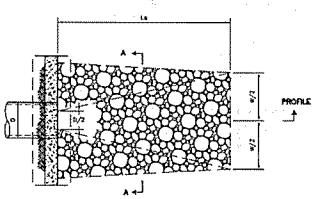
TYPICAL ROAD SECTION
NTS



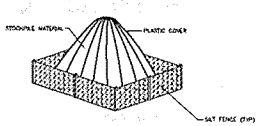
CIRCULAR FLARED END SECTION
NTS

PIPE SIZE

I.D.	15"	15"	18"	21"	24"	27"	30"	36"	42"	48"	54"	60"
"A"	3"	3.25"	3.5"	3.75"	4"	5.25"	5.5"	6"	6.5"	7"	7.5"	8"
"B"	5"	5.5"	6"	10"		11"	11"	12"	13"	14"	15"	
"C"		2'-6"				3'-0"		3'-6"		4'-0"		
"D"		3'-6"				5'-0"		6'-0"		7'-0"		
"E"		4'-8"				6'-8"		8'-0"		9'-4"		
"X"	2'-1"	2'-6"	3'-1"	10"	4'-8"	5'-1"	6'-0"	7'-1"	8'-2"	9'-2"	10'-3"	11'-4"
W1/F1	363	460	840	840	930	1350	1540	2160	3000	5536	8200	8330

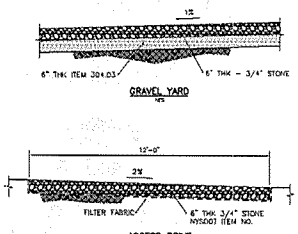


PLAN VIEW



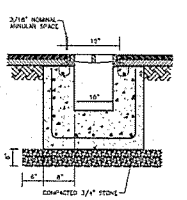
STOCKPILE CONTROL DETAIL
NTS

NOTE
STOCKPILE SHALL BE COVERED ENTIRELY BY AN ANCHORED PLASTIC COVER OR SEEDED

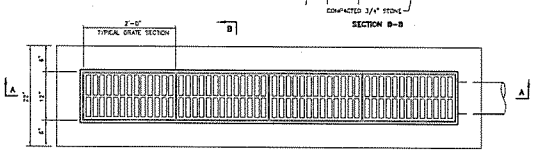


GRAVEL YARD
NTS

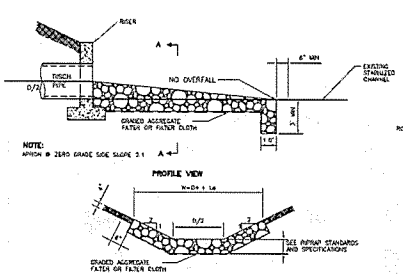
ACCESS DRIVE
NTS



SECTION B-B



PLAN

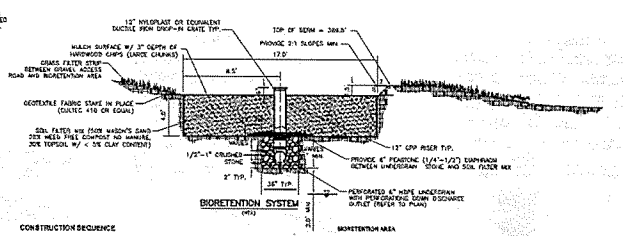


PROFILE VIEW

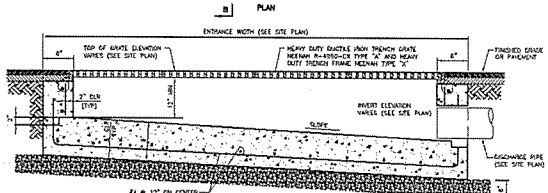
CROSS SECTION A-A

NOTE:
SEE RIPRAP STANDARDS AND SPECIFICATIONS
MINIMUM TAILWATER CONDITIONS

RIPRAP OUTLET PROTECTION
NTS



BIORETENTION SYSTEM
NTS



SECTION A-A

TRENCH DRAIN DETAIL
NTS

CONSTRUCTION SEQUENCE

1. STAKE THE LIMITS AND PROVIDE OFFSETS OF THE PROPOSED BIORETENTION AREA AND SET ACCESSIBLE REFERENCE ELEVATIONS, AS NEEDED.
2. INSTALL EROSION AND SEDIMENT CONTROL MEASURES CONSISTENT WITH OVERALL DEVELOPMENT E&S PLAN.
3. STABILIZE THE DRAINAGE AREA TO THE PROPOSED AREA AND DIVERT RUNOFF AWAY FROM THE PROPOSED EXCAVATIONS.
4. EXCAVATE THE BIORETENTION AREA TO THE PROPOSED LINES AND GRADES SHOWN ON THE SITE PLANS, AND SCARIFY THE EXISTING SOIL SURFACES. TAKING CARE NOT TO COMPACT THE IN-SITU SOILS.
5. INSTALL THE UNDERDRAIN SYSTEM AND OVERFLOW STRUCTURES. INSTALL THE FABRIC ON THE SIDEWALLS AND STAKE IN PLACE.
6. BACKFILL THE EXCAVATIONS WITH THE SOIL MIXTURE AS SHOWN ON THE PLANS AND SPECIFIED HEREIN.
7. FINISH GRADING THE SURFACE OF THE BIORETENTION AREA. LEAVE ROOM FOR THREE (3) INCHES OF WOOD CHIP MULCH.
8. PRESOAK THE PLANTING MIXTURE PRIOR TO PLACEMENT OF PLANTING STOCK. ALLOW THE SOIL MIXTURE TO SETTLE NATURALLY BEFORE PLACING THE PLANTS.
9. PLANT VEGETATION WITHIN THE BIORETENTION AREA AS SPECIFIED IN THE PLANTING NOTES AND LANDSCAPE PLANS (PROVIDED BY OTHERS).
10. MULCH THE SURFACE WITH NOT MORE THAN THREE (3) INCHES OF SINGLE PASS, HARDWOOD MULCH. REMOVE TEMPORARY SEDIMENT CONTROLS AND ANY ENTRANCE BLOCKS TO THE BIORETENTION AREA AFTER ACCEPTANCE BY THE DESIGN PROFESSIONAL AND THE LOCAL REGULATORY AUTHORITY.

BIORETENTION AREA

TREATMENT OF STORMWATER RUNOFF IS ACCOMPLISHED IN PROPOSED BIORETENTION AREA BY MEANS OF INFILTRATION USING PLANTING SOILS. PLANTINGS OF NATIVE VEGETATION WITHIN THE BIORETENTION AREA MAINTAIN THE INFILTRATIVE CAPACITY OF THE SYSTEM, PROVIDE SOIL STABILIZATION, AND THE ASSIMILATE NUTRIENTS AND OTHER CONTAMINANTS. MANAGEMENT ACTIONS INCLUDE THE FOLLOWING:

1. ANNUAL INSPECTION AND REPAIR OF OR REPLACEMENT OF TREATMENT COMPONENTS.
2. TWICE PER YEAR (SPRING AND FALL) INSPECT TREES AND SHRUBS TO EVALUATE HEALTH, REMOVE AND REPLACE DEAD OR DYING PLANTS, AND PRUNE DISEASED OR BROKEN PLANTS.
3. TREATMENT OF DISEASED VEGETATION WITH APPROPRIATE LOW-TOXICITY CHEMICALS (HERBICIDES, PESTICIDES).
4. WEED ANNUALLY AND PRUNE SHRUB VEGETATION UNTIL VEGETATION IS ESTABLISHED TO IMPROVE APPEARANCE.
5. REPLACE MULCH TO COVER EXPOSED SOIL AREA. REMOVE AND REPLACE MULCH EVERY TWO TO THREE YEARS. MULCH DEPTH NOT TO EXCEED THREE (3) INCHES.
6. SAMPLE SOIL FOR FERTILITY EVERY THREE YEARS. ADDITION OF LIMESTONE ONE OR TWO TIMES PER YEAR TO MAINTAIN PROPER PH IS RECOMMENDED. FIELD OR LABORATORY TESTING FOR PH IS ACCEPTABLE.
7. CHECK BASIN FOR SEDIMENT BUILD UP AND REMOVE SEDIMENT IF GREATER THAN ONE INCH.
8. CHECK BASIN AFTER STORM EVENT TO ENSURE THAT IT DEWATERS PROPERLY (DRAINS WITHIN 48-HRS).
9. CHECK OUTLET OVERFLOW FOR EVIDENCE OF BLOCKAGE AND SOIL EROSION AT DISCHARGE POINTS. CLEAN BLOCKAGES AS REQUIRED AND STABILIZE EROSIVE AREAS AS NEEDED.

GENERAL CONSTRUCTION SPECIFICATIONS

1. SOILS:
SOIL FILTER MIXTURE – A SOIL MIXTURE OF 50-60% WASONS SAND (ASTM C-33) WITH GRAIN SIZE OF 0.02 -0.04". 30-20% WEED FREE LEAF COMPOST WITHOUT MANURE, AND 20-30% WEED FREE TOPSOIL WITH LESS THAN 5% CLAY SHALL BE USED TO FILL THE BIORETENTION EXCAVATION. THE SOIL SHALL BE FREE OF STONES, STUMPS, ROOTS OR SIMILAR OBJECTS LARGER THAN 3". NO OTHER MATERIALS SHALL BE MIXED IN WITH THE SOIL THAT MAY BE HARMFUL TO PLANT GROWTH OR FROM A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. SOIL MIXTURE DEPTH SHALL BE 24" DEEP.

PRIOR TO PLACEMENT OF THE SOIL MEDIUM A CERTIFICATE FROM AN ACCREDITED LABORATORY MUST BE SUBMITTED TO THE DESIGN PROFESSIONAL ATTESTING TO THE SOIL'S PHYSICAL PROPERTIES (SIEVE ANALYSIS), CHEMICAL NATURE (PH, AND FERTILITY) AND WEED FREE NATURE (GROW-OUT TEST). WEED FREE MEANS THE SOIL MEDIUM DOES NOT CONTAIN PLANTS OR SEEDS OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, MUGWORT, NUTSEDGE, POISON IVY, CANADIAN THISTLE, TEARTHUMB, OR OTHER NOXIOUS OR INVASIVE WEEDS AS LISTED BY THE MOST RECENT LISTING PUBLISHED BY THE STATE OF NEW YORK.

THE EXCAVATED SOIL SURFACE SHALL BE SCARIFIED AND THE SOIL MIXTURE SHALL BE PLACED IN 8-12" LIFTS TAKING CARE NOT TO COMPACT THE EXISTING SOIL OR THE SOIL MIXTURE. LIFTS MAY BE LIGHTLY WATERED TO ENCOURAGE NATURAL CONSOLIDATION. ANTICIPATE 20% CONSOLIDATION OF THE SOIL MIXTURE FOLLOWING NATURAL CONSOLIDATION. DEPRESSIONS GREATER THAN 6" BELOW THE FINISHED SURFACE OF THE AREA CAN BE FILLED WITH ADDITIONAL SOIL MIXTURE AND COVERED WITH 3" (MINIMUM) LAYER OF "DOUBLE PASS" HARDWOOD CHIP MULCH.

SOIL PH: SOIL PH RANGE SHALL BE 6.5 – 8.0

ORGANIC MATTER CONTENT: 1.5-3.0 % BY DRY WEIGHT.

2. UNDERDRAIN
PERFORATED HDPE PIPE SURROUNDED BY WASHED STONE SHALL BE PLACED BENEATH THE BIORETENTION AREA. ALL DRAINS SHALL CONNECT TO THE DRAINAGE SYSTEM AND SHALL DISCHARGE AS SHOWN ON SITE PLAN.

3. PEA GRAVEL DIAPHRAGM
A PEA GRAVEL DIAPHRAGM, SIX (6) INCHES (NOMINAL) IN DEPTH, SHALL BE PLACED OVER THE UNDERDRAIN AND EXTEND ONE (1) FOOT TO EITHER SIDE OF THE EDGE OF THE TRIAN. PEA GRAVEL SHALL BE 1/4-1/2" DIAMETER.

4. FILTER FABRIC
FILTER FABRIC SHALL BE A NON-WOVEN TYPE (ASTM D-4491) HAVING A MINIMUM FLOW RATE OF 125 GAL/MIN/FT². MULLEN BURST STRENGTH OF 400 PSI (ASTM D-3786). TENSILE STRENGTH OF 300 LBS (ASTM D-1682). 0.08" THICK, E.G.S. 850. THE FABRIC SHALL BE PRE-APPROVED BY THE DESIGN PROFESSIONAL PRIOR TO USE. FABRIC SHALL BE PLACED ON THE SIDEWALLS (FROM SUBGRADE LEVEL) AND OVER THE STONE LAYER). FABRIC SHALL BE OVERLAPPED BY 1-FOOT (MINIMUM) AT THE ENDS AND STAKED IN PLACE DURING CONSTRUCTION AT THE TURNED UP SURFACES. EXCESS FABRIC MAY BE REMOVED BY CUTTING ALONG THE DESIRED ELEVATIONS.

5. MULCH
DALY FRESH, SINGLE PASS, SHREDDED HARDWOOD MULCH SHALL BE USED TO MULCH THE SURFACE OF THE BIORETENTION AREA. MULCH SHALL BE PLACED TO A MAXIMUM HEIGHT OF 3" OVER THE ENTIRE SURFACE OF THE BIORETENTION AREAS FINISHED SURFACE AFTER PLANTS ARE INSTALLED. MULCH SHALL BE FREE OF FOREIGN MATERIALS INCLUDING PLANT MATERIALS AND WELL AGED (STOCKPILED FOR GREATER THAN 12 MONTHS) FRUITOUT AND LIFT GROUND COVER PLANTS TO PLACE THE MULCH MATERIAL BENEATH AND IN BETWEEN THE PLANTINGS.

REV	REVISION	DWN	TEC	CHKD	DATE

ORANGE AND ROCKLAND UTILITIES, INC.
PEARL RIVER NEW YORK

CMX

W. CHARLES UTSCHIG, JR.

ENGINEERING REVIEW		
TYPE	SIGNATURE	DATE
CHK./SURVEY		
"SILCON/ASST.		
TRANS & TAX		
SELECT		

APPROVED
- ☐ INFORMATION
- ☐ COMMENTS
- ☐ BID
- ☐ CONSTRUCTION
- ☐

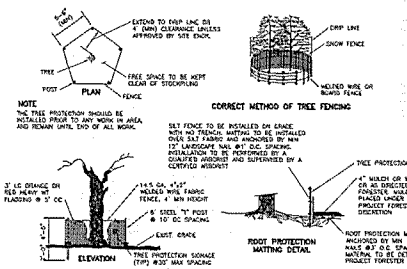
TRANSMISSION

HARTLEY ROAD SUBSTATION
ROAD PROFILES AND
CONSTRUCTION DETAILS

SCALE	F.S.C. NO.	DRAWING NUMBER			SHEET	REV.
AS SHOWN		K	F	-	7 OF 8	0

REDUCTION RADIO

DRAWING



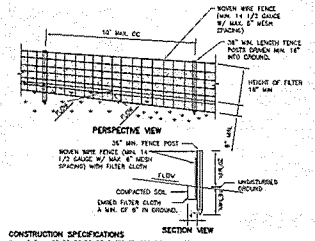
NOTE
THE TREE PROTECTION SHOULD BE INSTALLED PRIOR TO ANY WORK IN AREA AND REMAIN UNTIL END OF ALL WORK.

CORRECT METHOD OF TREE FENCING

SILT FENCE TO BE INSTALLED ON GRADE WITH NO TRENCH. MATTING TO BE INSTALLED OVER SILT FABRIC AND ANCHORED BY MIN 150' LANDSCAPE NAIL @ 4' O.C. SPACING. INSTALLATION TO BE PERFORMED BY A QUALIFIED ARBORIST AND SUPERVISED BY A CERTIFIED ARBORIST

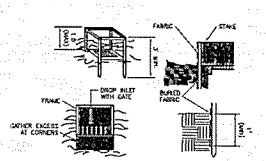
CONSTRUCTION SPECIFICATIONS
1. TREE PROTECTION AREA WILL BE DETERMINED AT PAST OF THE PLAN REVIEW PROCESS. EXACT LOCATION, DEPTH AND METHODS OF ROOT PRUNING TO BE DETERMINED IN FIELD BY PROJECT FORESTER
2. EXACT LOCATION OF TREE PROTECTION AREAS SHALL BE STAKED OR FLAGGED PRIOR TO TRENCHING.
3. TRENCH SHOULD BE BACKFILLED IMMEDIATELY OR INCORPORATED WITH SILT FENCE INSTALLATION.
4. ROOTS SHOULD BE SEVERED BY TRENCHER, VIBRATORY PLOW OR APPROVED EQUIVALENT. ROOTS OVER 1.5" DIAMETER SHOULD BE CLEANLY CUT BY HAND. ROOT PRUNING ADJACENT TO SPECIMEN TREES MAY REQUIRE SOIL REMOVAL BY SUPERVISING AIR TOOL TO MINIMIZE TREE AND ROOT IMPACTS.

TREE/VEGETATION PROTECTION BARRIER
NTS



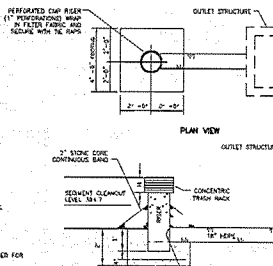
CONSTRUCTION SPECIFICATIONS
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER 'T' OR 'U' TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 12 1/2 GAUGE, 6" MAXIMUM MESH SPACING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

SILT FENCE INSTALLATION DETAIL
NTS



FIELD INLET CONSTRUCTION SPECIFICATIONS
1. FILTER FABRIC SHALL HAVE AN EOS OF 40-85 BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2"x4" WOOD OR EQUIVALENT, METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. STAKES EMBEDDED LESS THAN 3 FEET MAY BE BROKEN WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IF SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 3"x4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY. MAXIMUM DRAINAGE AREA 1 ACRE

INLET PROTECTION
NTS



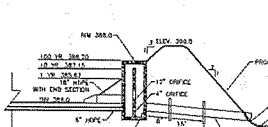
NOTES
1. SEDIMENT BASIN TO BE CONSTRUCTED AS PERMANENT EXTENDED DETENTION BASIN WITH MODIFICATIONS.
   A. CONSTRUCT TEMPORARY PERFORATED RISER AS SHOWN
   B. PROTECT RISER WITH TRASH RACK.
   C. PERFORATIONS MUST NOT BE MADE ANY LOWER THAN 6" ABOVE TOP OF THE HORIZONTAL OUTFALL BARREL.
2. PERIODIC MAINTENANCE OF REMOVING SEDIMENT FROM BASIN WILL BE ANNUAL OR AS NECESSARY WHEN SEDIMENT REACHES CLEANOUT LEVEL INDICATED BELOW.
3. UPON COMPLETION OF SITE CONSTRUCTION AND STABILIZATION OF TOPSOIL, TEMPORARY SEDIMENT BASIN OUTLET CONTROL STRUCTURE IS TO BE REVISED AS A PERMANENT OUTLET STRUCTURE INSTALLED.
   A. REMOVE TEMPORARY RISER STRUCTURE.
   B. REMOVE SEDIMENT WHERE NEEDED, FINAL GRADE THE DETENTION BASIN AND STABILIZE.
   C. CUT RAPPED TO FINAL LENGTH FOR PERMANENT OUTLET STRUCTURE (SEE UTILITY PLANS).
   D. INSTALL PERMANENT OUTLET STRUCTURE.

TEMPORARY OUTLET STRUCTURE

TEMPORARY OUTLET STRUCTURE					
RISER (HDPE)			TRASH RACK		SEDIMENT CLEANOUT
DIAM.	LENGTH	CREST ELEV.	DIAM.	H	
24"	3.5'	387.2	36"	13"	384.7

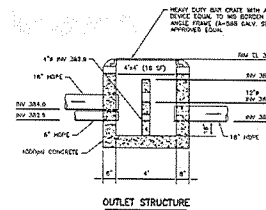
NOTES
TEMPORARY RISER WILL CONNECT TO BARREL AT SAME ELEVATION AS PROPOSED ON UTILITY PLAN FOR OUTLET STRUCTURE.

TEMPORARY OUTLET STRUCTURE
NTS



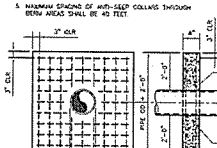
NOTES
1. SEDIMENT REMOVAL IN THE FOREBAY SHALL OCCUR EVERY FIVE TO SIX YEARS OR AFTER 50% OF TOTAL FOREBAY CAPACITY HAS BEEN LOST
2. SEDIMENT SHALL BE DISPOSED OF BY EITHER LAND APPLICATION OR LAND FILLING. THE BOTTOM OF THE FOREBAY MAY BE HARDENED TO EASE SEDIMENT REMOVAL.

EXTENDED DETENTION BASIN
NTS



OUTLET STRUCTURE
NTS

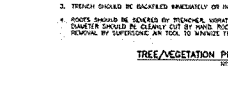
NOTES
1. USE 3000 PSI CONCRETE
2. MAINTAIN A MINIMUM 5" COVER OVER ANTI-SEEP COLLAR.
3. THE CONNECTION OF ANTI-SEEP COLLARS TO OUTLET PIPES SHALL BE WATERTIGHT.
4. O-RING GASKETS SHALL BE USED ON BARN DISCHARGE PIPES THROUGH BERM AREAS.
5. MAXIMUM SPACING OF ANTI-SEEP COLLARS THROUGH BERM AREAS SHALL BE 40 FEET.



NOTES
1. PRIOR TO CONSTRUCTION OF COLLAR, THE OUTSIDE OF THE PIPE SHALL BE CLEANED.
2. ALL REINFORCING STEEL SHALL BE GRADE 60.

ANTI-SEEP COLLAR
NTS

NOTE: PROVIDE APPROPRIATE TRANSITION BETWEEN STABILIZED CONSTRUCTION ENTRANCE AND PUBLIC ROW

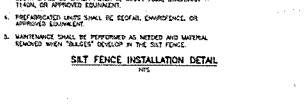


CONSTRUCTION SPECIFICATIONS
1. STONE SIZE – USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT
2. LENGTH – NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY)
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT 8" SINGLE ENTRANCE TO SCALE.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

STABILIZED CONSTRUCTION ENTRANCE
NTS

CONSTRUCTION SPECIFICATIONS
1. THE MATTING SHOULD BE A MINIMUM OF 4FT. WIDE EXTENDING 8 INCHES OVER THE TOP AND BURIED 8 INCHES DEEP IN A TRENCH. TRENCH TO BE OF SUFFICIENT SIZE. THE UPPER EDGE SHOULD BUTT AGAINST UNDISTURBED SOIL AND BE SECURELY HELD IN PLACE WITH EQUALLY SPACED HEAVY DUTY WIRE STAPLES AT LEAST 12 INCHES IN LENGTH.
2. ENSURE THAT THE LIP IS LEVEL TO UNIFORMLY SPREAD DISCHARGE.
3. THE LIP SHALL BE CONSTRUCTED ON UNDISTURBED SOIL NOT FILL.
4. A 20 FOOT TRANSITION SECTION WILL BE CONSTRUCTED FROM THE DIVERSION CHANNEL TO THE SPREADER TO SMOOTHLY BLEND THE DIFFERENT DIMENSION AND SHAPES.
5. THE RUNOFF DISCHARGE WILL BE OUTLETTED ONTO A STABILIZED VEGETATED SLOPE NOT EXCEEDING 10%.
6. SEED AND MULCH THE DISTURBED AREA IMMEDIATELY AFTER CONSTRUCTION.

LEVEL SPREADER
NTS



PIPE EMBEDMENT ZONE WIDTH SCHEDULE FOR PIPE MATERIAL OTHER THAN HDPE

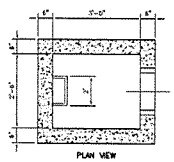
PIPE DIA. OF PIPE (D)	6" or less	8"	10"-12"	14"-18"	20"-30"	36"	
EMBEDMENT ZONE WIDTH (W)	2'- 0"	2'-8"	3'- 0"	3'- 6"	4'- 0"	5'-0"	
PLUS DIA. OF PIPE (D)	48"	56"	60"	66"	72"	78"	84"
EMBEDMENT ZONE WIDTH (W)	6'- 0"	6'- 4"	7'- 0"	7'- 6"	8'- 0"	8'- 6"	9'- 6"	10'- 0"

TRENCH EXCAVATION AND BACKFILL NOTES
1. THE MAXIMUM DRY DENSITIES SHALL BE DETERMINED IN ACCORDANCE WITH ASTM DESIGNATION D1557. THE MINIMUM PERCENTAGE OF COMPACTION TO BE ACHIEVED BY THE CONTRACTOR IN THE VARIOUS ZONES IS AS FOLLOWS:

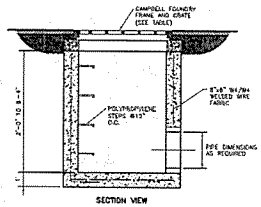
	PIPE MATERIAL	LOCATION	MINIMUM COMPACTION
	ALL	ALL	
SURFACE ZONE			85%
TRENCH BACKFILL ZONE			90%
PIPE EMBEDMENT ZONE			95%
THE MINIMUM COMPACTION IN EMBANKMENTS SHALL BE 90%			

2. THE PIPE EMBEDMENT ZONE WIDTH AND THE MAXIMUM TRENCH WIDTH SHALL NOT EXCEED THE PERMISSIBLE WIDTHS SHOWN. IF THE PERMISSIBLE WIDTH IS EXCEEDED, THE PIPE SHALL BE INSTALLED IN A HIGHER CLASS BEDDING THAN SHOWN ON THIS DRAWING OR THE SPECIFIED PIPE SHALL BE REPLACED WITH PIPE OF GREATER CRUSHING STRENGTH OR BOTH, TO ACHIEVE SUITABLE CONDITIONS.
3. SUITABLE MATERIAL FROM EXCAVATION SHALL BE FREE FROM OBJECTIONABLE QUANTITIES OF ORGANIC MATTER, CLAY, TREES, STUMPS, FROZEN MATERIAL RUBBLE, CINDERS, ASHES, AND OTHER MATERIALS CONSIDERED DELETERIOUS BY THE ENGINEER AND SHALL NOT HAVE FINES IN EXCESS OF 12 PERCENT PASSING THE NO. 200 SIEVE NOR STONE OR GRAVEL LARGER THAN 2 INCHES.

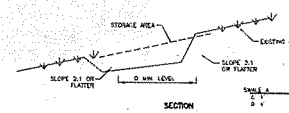
TRENCH EXCAVATION
NTS



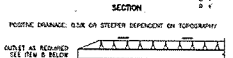
FRAMES AND GRATES		
PATTERN NO.	A	B
3287	30"	24"



FIELD INLET CATCH BASIN
NTS



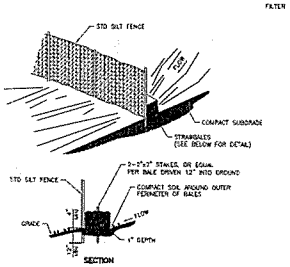
POSITIVE DRAINAGE; 0.5% OR STEEPER DEPENDENT ON TOPOGRAPHY



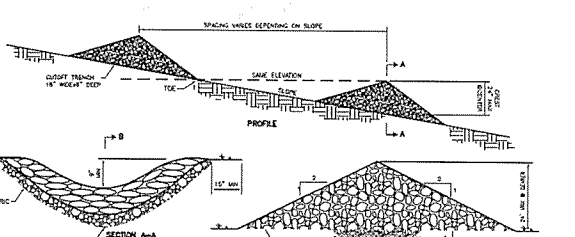
CONSTRUCTION SPECIFICATIONS
1. ALL TEMPORARY SWALES SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. EXCAVATED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. EXCAVATED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.
9. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW

TYPE OF TREATMENT	CHANNEL GRADE	ACT AC. OR LESS	5(1 AC. OR MORE
1	0.5%-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1%-5.0%	SEED AND STRAW MULCH	SEED STRAW MULCH OR EQUIVALENT
3	5.1%-8.0%	SEED WITH JUTE OR EXCELSIOR MAT	LINED WITH 4-6" RIPRAP OR APPROVED EQUIVALENT EQUIVALENT
4	8.1%-20%	LINED WITH 6-9" RIPRAP	ENGINEERED DESIGN

TEMPORARY SWALE
NTS

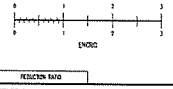


HAYBALES WITH SILT FENCING
(FOR WETLAND AREAS)
NTS



CONSTRUCTION SPECIFICATIONS
1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSURE THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
6. MAXIMUM DRAINAGE AREA 2 ACRES.

CHECK DAM
NTS



REDUCTION RATIO

REV	REVISION	SWM	TES	CHKD	DATE

ORANGE AND ROCKLAND UTILITIES, INC.
PEARL RIVER NEW YORK

TRANSMISSION

HARTLEY ROAD SUBSTATION
CONSTRUCTION DETAILS

CMX
W. CHARLES UTSCHIG, JR.
PROFESSIONAL ENGINEER, N.Y. LIC. NO. 63868

ENGINEERING REVIEW

ITEM	SIGNATURE	DATE
SUB./UTILITY		
TELECOM./NET.		
TRANS. & SUB.		
RELAY		

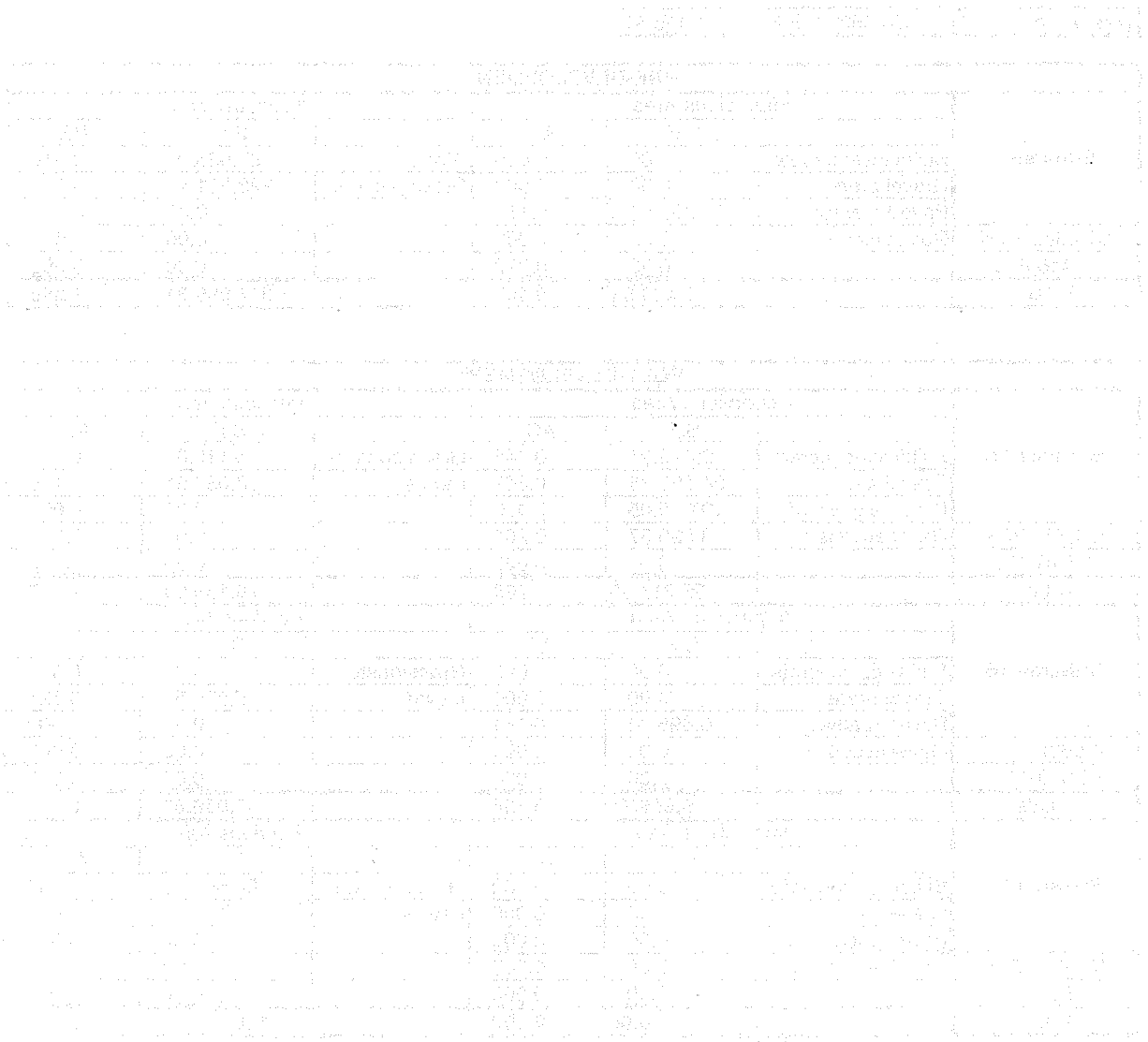
APPROVED

DATE	
	☐ INFORMATION
	☐ COMMENTS
	☐ BID
	☐ CONSTRUCTION
	☐

DRAWN	CHKD	ENG.	CHKD
DESIGN REVIEW		DATE	08/31/11

SCALE: NONE
FILE NO.
DRAWING NUMBER: K F - 8 of 8
SHEET NO.: 0

OPTIMUM LINE LOSS



CMX

Re: Hartley Road Substation/ SWPPP AREAS **Date:** August, 2011

Total Area	324,362.18 S.F.	7.446 AC.

PRE-DEVELOPMENT						
	Impervious Area			Pervious Area		
		S.F.	AC.		S.F.	AC.
Subarea 1	Buildings/concrete	0.00	0.000	Woods	87,533.90	2.010
	Gravel areas	0.00	0.000	Grass/pasture	229,561.44	5.270
	Paved roadway	7,266.84	0.167		0.00	0.000
324,362.18 sf	Rock outcrop	0.00	0.000		0.00	0.000
7.446 AC.		0.00	0.000		0.00	0.000
Totals:		**7,266.84**	**0.167**		**317,095.34**	**7.280**

POST-DEVELOPMENT						
	Impervious Area			Pervious Area		
		S.F.	AC.		S.F.	AC.
Subarea 1A	Buildings/concrete	2,020.95	0.046	Grass/pasture	26,110.02	0.599
	Gravel areas	24,695.78	0.567	Lawns	50,056.51	1.149
	Paved access rd	19,600.05	0.450		0.00	0.000
131,379.88 sf	Gavel access rd	8,896.57	0.204		0.00	0.000
3.016 AC.		0.00	0.000		0.00	0.000
Totals:		**55,213.35**	**1.268**		**76,166.53**	**1.749**
	Impervious Area			Pervious Area		
		S.F.	AC.		S.F.	AC.
Subarea 1B	Buildings/concrete	0.00	0.000	Grass/pasture	0.00	0.000
	Gravel areas	0.00	0.000	Lawns	35,936.87	0.825
	Paved roadway	6,695.74	0.154		0.00	0.000
42,632.61 sf	Gavel access rd	0.00	0.000		0.00	0.000
0.979 AC.		0.00	0.000		0.00	0.000
Totals:		**6,695.74**	**0.154**		**35,936.87**	**0.825**
	Impervious Area			Pervious Area		
		S.F.	AC.		S.F.	AC.
Subarea 1C	Buildings/concrete	0.00	0.000	Grass/pasture	84,697.00	1.944
	Gravel areas	0.00	0.000	Lawns	45,440.77	1.043
	Paved access rd	0.00	0.000		0.00	0.000
130,137.77 sf	Gavel access rd	0.00	0.000		0.00	0.000
2.988 AC.		0.00	0.000		0.00	0.000
Totals:		**0.00**	**0.000**		**130,137.77**	**2.988**
	Impervious Area			Pervious Area		
		S.F.	AC.		S.F.	AC.
Subarea 1D	Buildings/concrete	0.00	0.000	Grass/pasture	20,211.92	0.464
	Gravel areas	0.00	0.000	Lawns	0.00	0.000
	Paved access rd	0.00	0.000		0.00	0.000
20,211.92 sf	Gavel access rd	0.00	0.000		0.00	0.000
0.464 AC.		0.00	0.000		0.00	0.000
Totals:		**0.00**	**0.000**		**20,211.92**	**0.464**

WATER QUALITY COMPUTATIONS

Data: (Subarea 1A)

Site Area												3.016 ac		
Offsite Drainage Area												0.000 ac		
A = Total Site Area											=	3.016 ac	=	131,681 s.f.
Ai = Impervious Area at Post Development Condition											=	1.268 ac	=	55,340 s.f.
I = percent Impervious Area =		[(	Ai	)(	100	)]/(	A	)=						
I = percent Impervious Area =		[(	1.268 ac	)(	100	)]/(	3.016 ac	)=	42.03 %					
Rv = Volumetric Runoff Coeff. =		(	0.05	)+[(	0.009	)(	42.03	)]=						
Rv = Volumetric Runoff Coeff. =		(	0.05	)+[(	0.009	)(	42.03	)]=	0.428					
P = Precipitation Depth =												1.2 in.		
WQv = Water Quality Volume =	[(	P	)(	Rv	)(	A	)]/ 12							
WQv (required)	[(	1.2 in.	)(	0.428	)(	3.016 ac	)]/ 12				=	0.129 ac.ft	=	5,626 cf
WQv (provided)											=	**0.145 ac.ft**	=	**6,300 cf**

CHANNEL PROTECTION STORAGE VOLUME COMPUTATIONS (Cp_v).

(Subarea 1A)

P(1yr): Orange County 2.9 in.

Total Area (Subarea 1A) 3.016 ac

RUNOFF SUMMARY			
Post development Area	CN	T_c	Runoff(Q_a)*
			1 yr storm
		Hours	in.
Subarea 1A	83.66	0.1000	1.41

*NOTE: Computed utilizing Tr-55 Analysis where $Q_a = (P-I_a)^2/[(P-I_a)+(1000/CN-10)]$

Dev. $I_a = (200/CN) - 2 =$ 0.391

Channel Protection(Cp_v):

Determine Watershed Classification:

The extended detention time is 24 hrs.

T: 24 hr

Dev. I_a/P (1yr.): 0.135

T_c: 0.100 hr

Using Exhibit 4-III TR-55 SCS Graphical Method of determining peak discharge (q_u) in csm/in for 24-Hour Type III Storm Distribution with the above I_a/p and T_c, a q_u is determined.

q_u = 450

Using Figure 8.5 Detention Time vs. Discharge Ratios (NYS Stormwater Management Manual) with the above q_u and T, a (q_o/q_i) is determined.

q_o/q_i = 0.040

Compute V_s/V_r for type III rainfall distribution with q_o/q_i.

$V_s/V_r = 0.682 - 1.43(q_o/q_i) + 1.64(q_o/q_i)^2 - 0.804(q_o/q_i)^3 =$ 0.627

Cpv (required) V_s = Cpv = $(V_s/V_r)(Q_a$ dev.)(A)/12 = **0.223 ac-ft**

Cpv (proposed) **0.231 ac-ft @** **386.60**

COMPUTE ED ORIFICE **POND 1**

Cpv	=	0.231 ac.ft		
Average Release rate of Cpv (24 hrs)	=	0.116 cfs		
Average Q_{WQv-ED} (from bioretention)	=	0.033 cfs		
Cpv_ED	=	0.084 cfs		
Cpv. EL. @ **(0.231 ac ft)**	=	386.60 ft		
Invert for orifice "EL. at WQv" @	=	384.00 ft		
Average head (h) "ft"	=	1.30 ft		
Orifice Coefficient	=	0.6		
Orifice Area "sf" A=Q/[C(2gh)^0.5)]	=	0.015 sf		
Orifice diameter "in"	=	1.68"	**USE**	NONE

NOTE: No CPv is needed if orifce is less than 3"

CMX

Bioretention Area (NYSDEC F-5)
Data: (Subarea 1A)

Size Infiltration Trench:

From Darcy's Law: Af=WQv(df)/[k(hf+df)(tf)]

WQv		=	5,626.10 cf
k (coefficient of permiability)	Bioretention Soil *	=	2.00 ft/day
hf (Aver. Height of water above filter bed)	**	=	0.50 ft
tf (design filter drain time)		=	2.00 days
Filter depth (df)		=	4.00 ft
Af (Surface area of filter bed)		=	1,250.24 sf
Af provided		=	3,500.00 sf

** NYS Design Manual Page 6-52*
*** Half of water quality elevation (WQv EL)*

Actual Volume Provided	=	15,750.00 cf

Determine runoff reduction

HSG classification	=	C
Underdrain	=	Yes
RRv capacity	=	40.00 %
RRv Provided	=	6,300.00 cf
Is RRv > WQv?	=	YES

Underdrain Capacity:

Pipe Diameter	=	6.00"
Area (sf)	=	0.196 sf
Hyd. R	=	0.125
Slope	=	0.05
n (PVC)	=	0.011
Underdrain design flow		0.15 cfs
WQv (release in 2.00 days)	=	0.03 cfs
Pipe Capacity:	=	OK

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by: JP Date: August, 2011

Pond: Extended Detention Bas Drainage area: 3.480 ac.

(From Subarea 1A & 1D)

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu.yds. x 3.480 ac. acres drainage area = 466.32 cu.yds.

   Sediment storage volume **provided** (Final pond to be used for sediment basin)= 1,232.58 cu.yds.

2. a. Cleanout at 50 percent of minimum required volume= 616.29 cu.yds.

   b. Elevation corresponding to scheduled time to clean out (@ 0.38 ac.ft) = 384.70'

   c. Distance below top of riser ('b.' - bottom of pond ' 384.00') = 0.70'

3. Min. surface area is larger of $0.01Q_{(10)}$ (12.38cfs)= 0.124 or, 0.015 DA= 0.052 ac. use: 0.124 ac.

   Surface area provided (Final pond grading to be used for sediment basin)= 0.235 ac.

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$= 12.38 cfs *

   * Computations shown on section 6 of SWPPP

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap., Q_{ps} = 0.2 x 3.480 ac.ft = Drainage= 0.70 cfs

   Note: If there is no emergency spillway, then req'd Qps=$Qp_{(10)}$= 12.38 cfs Spillway NOT used.

6. H= 6.00' Barrel length= 41.00'

7. Barrel: Diam.= 18.0" ;Qps = (Q) 20.30 cfs x (cor. fac.) 1.11 = 22.53 cfs

8. Riser: Diam.= 24.0" ; Length 3.20' ; h= 1.00' Crest Elev. 387.20'

9. Trash Rack: Diam. = 36.0" ; H= 13.0"

From **Figure 5A.29(2)** *New York Standards and Specifications For Erosion and Sediment Control*

Emergency Spillway Design (N/A)

10. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = 12.38 cfs - 0.70 cfs = 11.68 cfs

11.

Width:	0.0'**	; Hp	0.00'	Crest elevation=	0.00'
Provided width:	0.00'			Design High Water Elevation=	0.00'
Entrance channel slope		<18.2	%	; Top of Dam Elev.=	0.00'
Exit channel slope		<18.2	%		

** From **Figure 5A.33(2)** *New York Standards and Specifications For Erosion and Sediment Control*

ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y= 4.20' ; z = 3 ; pipe slope = 1:70% L_s= **31.5'**

*** Use 2 collars, 20.25 sq.ft. projection = 1.20 ft

*** From **Figure 5A.31(2)** *New York Standards and Specifications For Erosion and Sediment Control*

Diaphragms: (None used)

NA # width , height

DEWATERING ORIFICE SIZING

13. $Ao = \frac{A_s \times (2h)^{0.5}}{122{,}568}$ = 0.10 sq.ft ~ 4.26" dia. ;h= 0.70' therefore use, N/A

Figure 5A.27
Pipe Flow Chart; "n" = 0.013 (USDA - NRCS)

PIPE FLOW CHART n = 0.013

FOR REINFORCED CONCRETE PIPE INLET K_m = K_e + K_b = 1.00 AND 70 FEET OF REINFORCED CONCRETE PIPE CONDUIT (full flow assumed)

Note correction factors for pipe lengths other than 70 feet

H, in feet	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
1	3.22	5.44	8.29	11.8	15.9	26.0	38.6	53.8	71.4	91.5	114	139	167	197	229	264	302	342
2	4.55	7.69	11.7	16.7	22.5	36.8	54.6	76.0	101	129	161	197	236	278	324	374	427	483
3	5.57	9.42	14.4	20.4	27.5	45.0	66.9	93.1	124	159	198	241	289	341	397	458	523	592
4	6.43	10.9	16.6	23.5	31.8	52.0	77.3	108	143	183	228	278	334	394	459	529	604	683
5	7.19	12.2	18.5	26.3	35.5	58.1	86.4	120	160	205	255	311	373	440	513	591	675	764
6	7.88	13.3	20.3	28.8	38.9	63.7	94.6	132	175	224	280	341	409	482	562	647	739	837
7	8.51	14.4	21.9	31.1	42.0	68.8	102	142	189	242	302	368	441	521	607	699	798	904
8	9.10	15.4	23.5	33.3	44.9	73.5	109	152	202	259	323	394	472	557	685	748	854	966
9	9.65	16.3	24.9	35.3	47.7	78.0	116	161	214	275	342	418	500	590	688	793	905	1025
10	10.2	17.2	26.2	37.2	50.2	82.2	122	170	226	289	361	440	527	622	725	836	954	1080
11	10.7	18.0	27.5	39.0	52.7	86.2	128	178	237	304	379	462	553	653	761	877	1001	1133
12	11.1	18.9	28.7	40.8	55.0	90.1	134	186	247	317	395	482	578	682	794	916	1045	1184
13	11.6	19.6	29.9	42.4	57.3	93.7	139	194	257	330	411	502	601	710	827	953	1088	1232
14	12.0	20.4	31.0	44.1	59.4	97.3	145	201	267	342	427	521	624	736	858	989	1129	1278
15	12.5	21.1	32.1	45.6	61.5	101	150	208	277	354	442	539	646	762	888	1024	1169	1323
16	12.9	21.8	33.2	47.1	63.5	104	155	215	286	366	457	557	667	787	917	1057	1207	1367
17	13.3	22.4	34.2	48.5	65.5	107	159	222	294	377	471	574	688	812	946	1090	1244	1409
18	13.7	23.1	35.2	49.9	67.4	110	164	228	303	388	484	591	708	835	973	1121	1280	1450
19	14.0	23.7	36.1	51.3	69.2	113	168	234	311	399	497	607	727	858	1000	1152	1315	1489
20	14.4	24.3	37.1	52.6	71.0	116	173	240	319	409	510	623	746	880	1026	1182	1350	1528
21	14.7	24.9	38.0	53.9	72.8	119	177	246	327	419	523	638	764	902	1051	1211	1383	1566
22	15.1	25.5	38.9	55.2	74.5	122	181	252	335	429	535	653	782	923	1076	1240	1415	1603
23	15.4	26.1	39.8	56.5	76.2	125	186	258	342	439	547	668	800	944	1100	1268	1447	1639
24	15.8	26.7	40.6	57.7	77.8	127	189	263	350	448	559	682	817	964	1123	1295	1478	1674
25	16.1	27.2	41.5	58.9	79.4	130	193	269	357	458	571	696	834	984	1147	1322	1509	1708
26	16.4	27.7	42.3	60.0	81.0	133	197	274	364	467	582	710	850	1004	1169	1348	1539	1742
27	16.7	28.3	43.1	61.2	82.5	135	201	279	371	476	593	723	867	1023	1192	1373	1568	1775
28	17.0	28.8	43.9	62.3	84.1	138	204	285	378	484	604	737	883	1041	1214	1399	1597	1808
29	17.3	29.3	44.7	63.4	85.5	140	208	290	384	493	615	750	898	1060	1235	1423	1625	1840
30	17.6	29.8	45.4	64.5	87.0	142	212	294	391	501	625	763	913	1078	1256	1448	1653	1871

Correction Factors For Other Pipe Lengths

L, in feet																		
20	1.30	1.24	1.21	1.18	1.15	1.12	1.10	1.08	1.07	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03
30	1.22	1.18	1.15	1.13	1.12	1.09	1.08	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02
40	1.15	1.13	1.11	1.10	1.08	1.07	1.05	1.05	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
50	1.09	1.08	1.07	1.06	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01
60	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	.96	.97	.97	.97	.98	.98	.98	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99
90	.93	.94	.94	.95	.95	.96	.97	.98	.98	.98	.98	.98	.98	.99	.99	.99	.99	.99
100	.90	.91	.92	.93	.93	.95	.95	.96	.97	.97	.97	.98	.98	.98	.98	.98	.98	.99
120	.84	.86	.87	.89	.90	.91	.93	.94	.94	.95	.96	.96	.96	.97	.97	.97	.97	.98
140	.80	.82	.83	.85	.86	.88	.90	.91	.92	.93	.94	.94	.95	.95	.96	.96	.96	.97
160	.76	.78	.80	.82	.83	.86	.88	.89	.90	.91	.92	.93	.94	.94	.95	.95	.95	.96

Figure 5A.25
Riser Inflow Chart (USDA - NRCS)

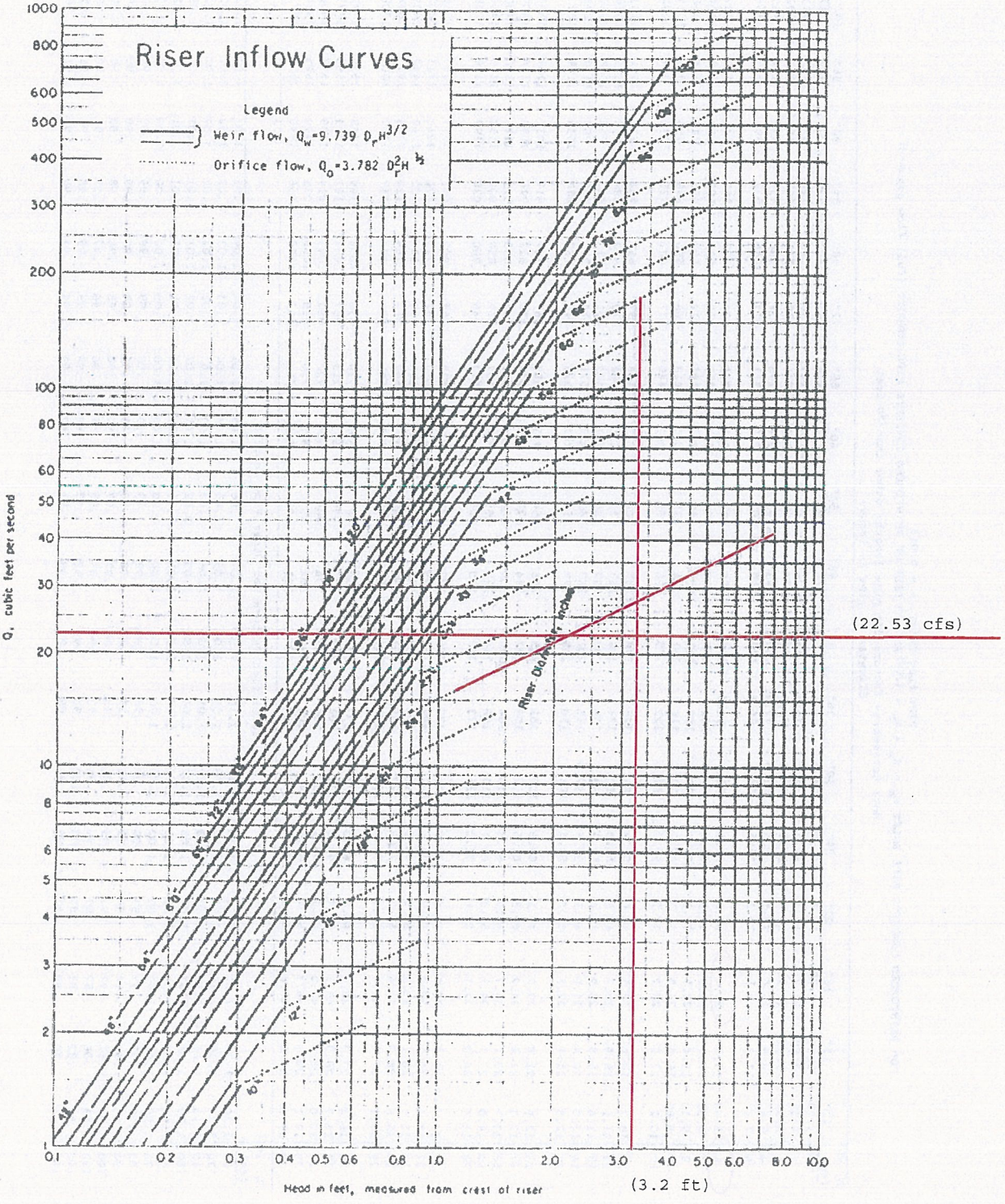
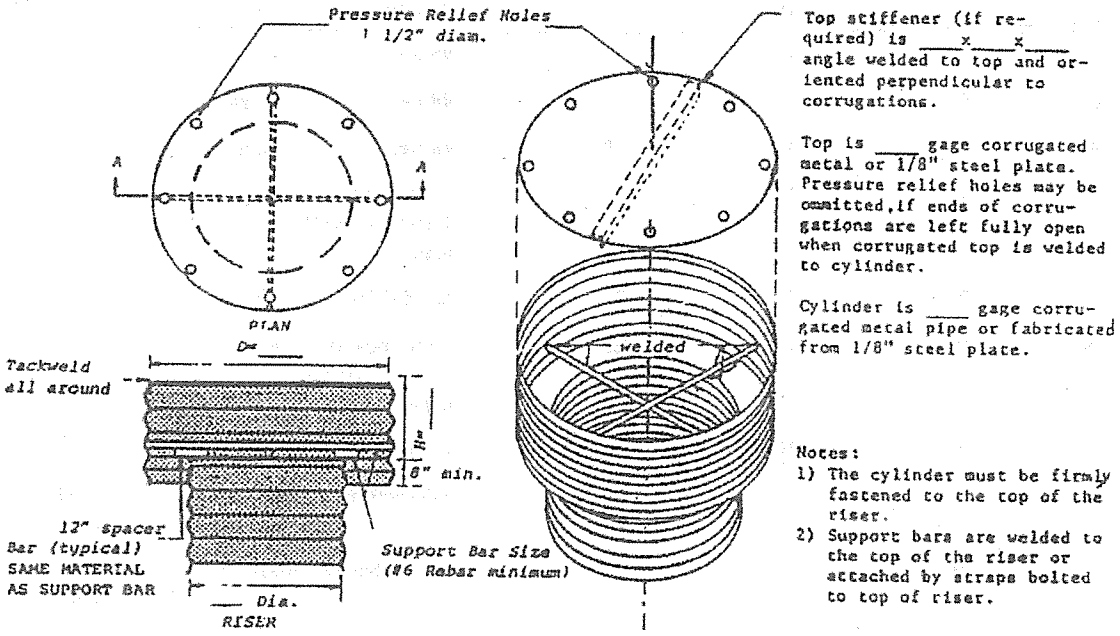


Figure 5A.29(2)
Concentric Trash Rack and Anti-Vortex Device Design Table
(USDA - NRCS)

Riser Diam.(in)	Cylinder Diam (in.)	Thick. Gage	H (in.)	Minimum Size Support Bar	Minimun Top Thickness	Minimun Top Stiffener
12	18	16	6	#6 Rebar	16 ga.	—
15	21	16	7	#6 Rebar	16 ga.	—
18	27	16	8	#6 Rebar	16 ga.	—
21	30	16	11	#6 Rebar	16 ga.	—
24	36	16	13	#6 Rebar	14 ga.	—
27	42	16	15	#6 Rebar	14 ga.	—
36	54	14	17	#8 Rebar	12 ga.	—
42	60	14	19	#8 Rebar	12 ga.	—
48	72	12	21	1 1/4" pipe or 1 1/4x1 1/4x1/4 angle	10 ga.	—
54	78	12	25	See 48" Riser	10 ga.	—
60	90	12	29	1 1/2" pipe or 1 1/2x1 1/2x1/2 angle	8 ga.	—
66	96	10	33	2" pipe or 2x2x3/16 angle	8 ga. w/stiffener	2x2x1/4 angle
72	102	10	36	———See 66" Riser———		2 1/2x2 1/2x1/4 angle
78	114	10	39	2 1/2" pipe or 2x2x1/4 angle	See 72" Riser	See 72" Riser
84	120	10	42	2 1/2" pipe or 2 1/2x2 1/2x1/4 angle	See 72" Riser	2 1/2x 2 1/2x 5/16 angle

Note: The criteria for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.

Figure 5A.29(1)
Concentric Trash Rack and Anti-Vortex Device
(USDA - NRCS)



CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE
(not to scale)

Figure 5A.31(1)
Anti-Seep Collar Design

This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below:

$$L_s = y\,(z + 4)\left[1 + \frac{\text{pipe slope}}{0.25 - \text{pipe slope}}\right]$$

Where: L_s = length of pipe in the saturated zone (ft.)

y = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.

z = slope of upstream embankment as a ratio of z ft. horizontal to one ft. vertical.

pipe slope = slope of pipe in feet per foot.

This procedure is based on the approximation of the phreatic line as shown in the drawing below:

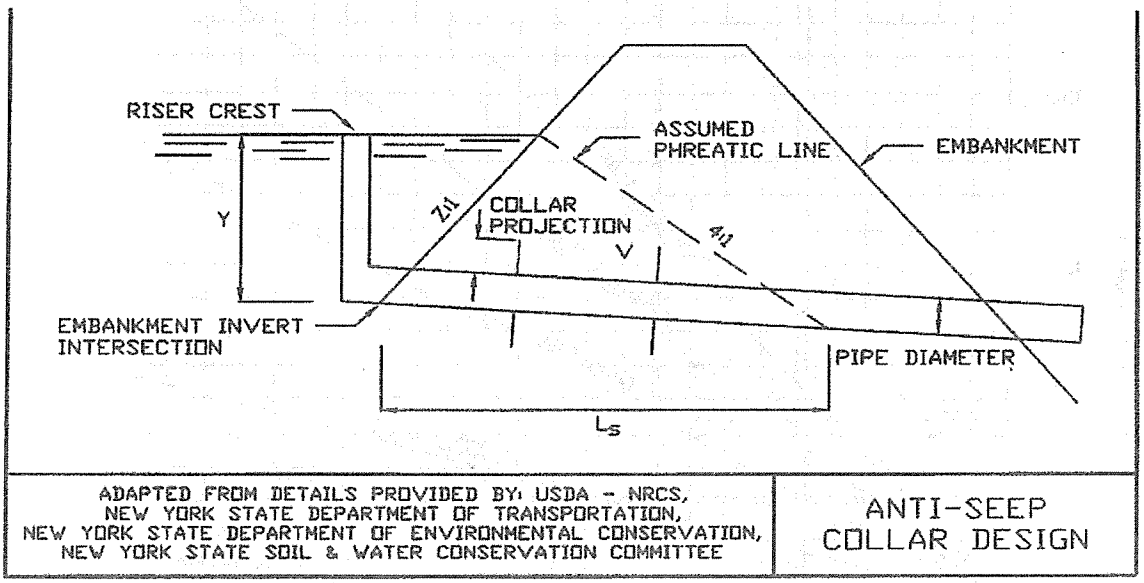


Figure 5A.31(2)
Anti-Seep Collar Design Charts (USDA - NRCS)

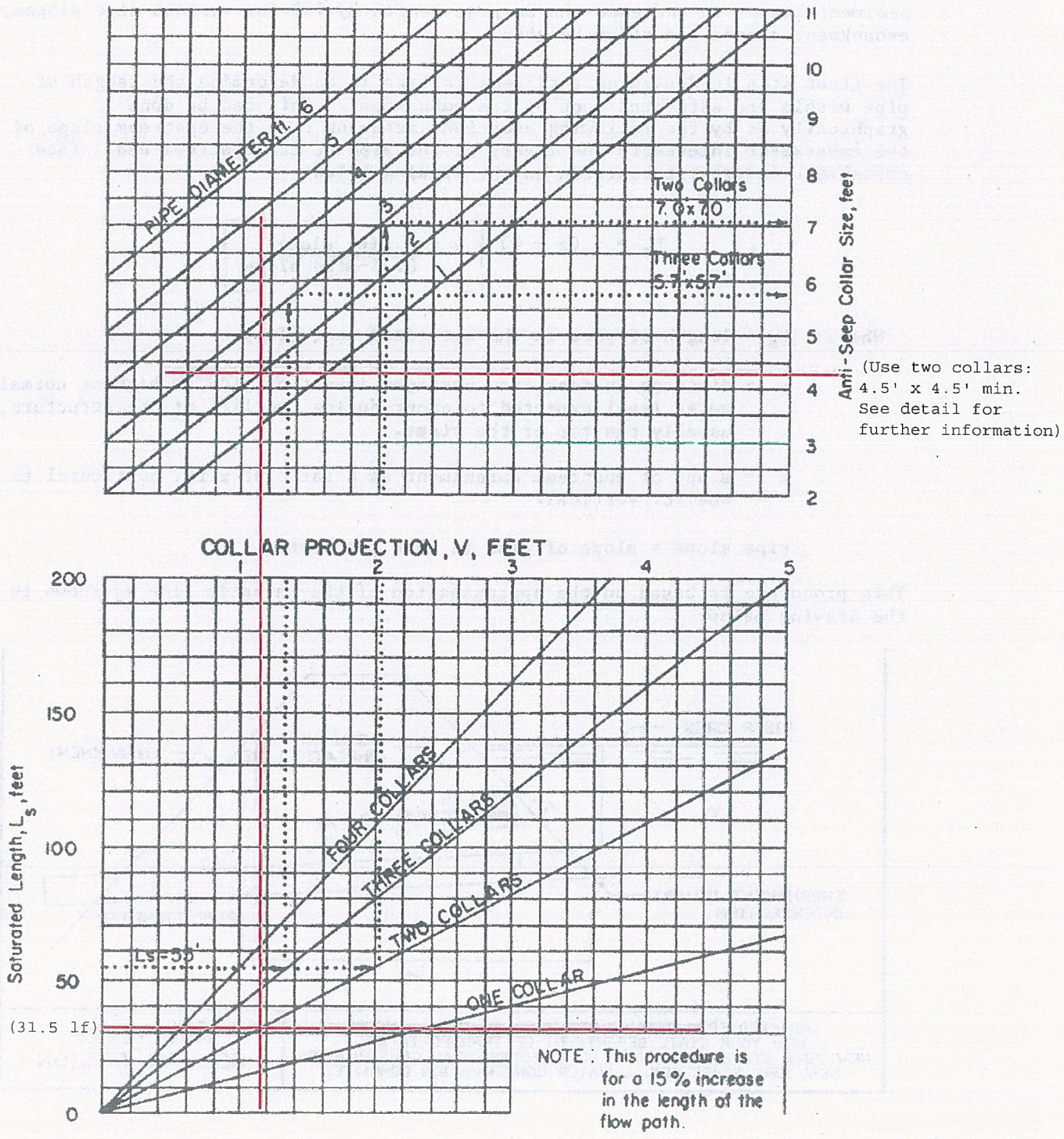
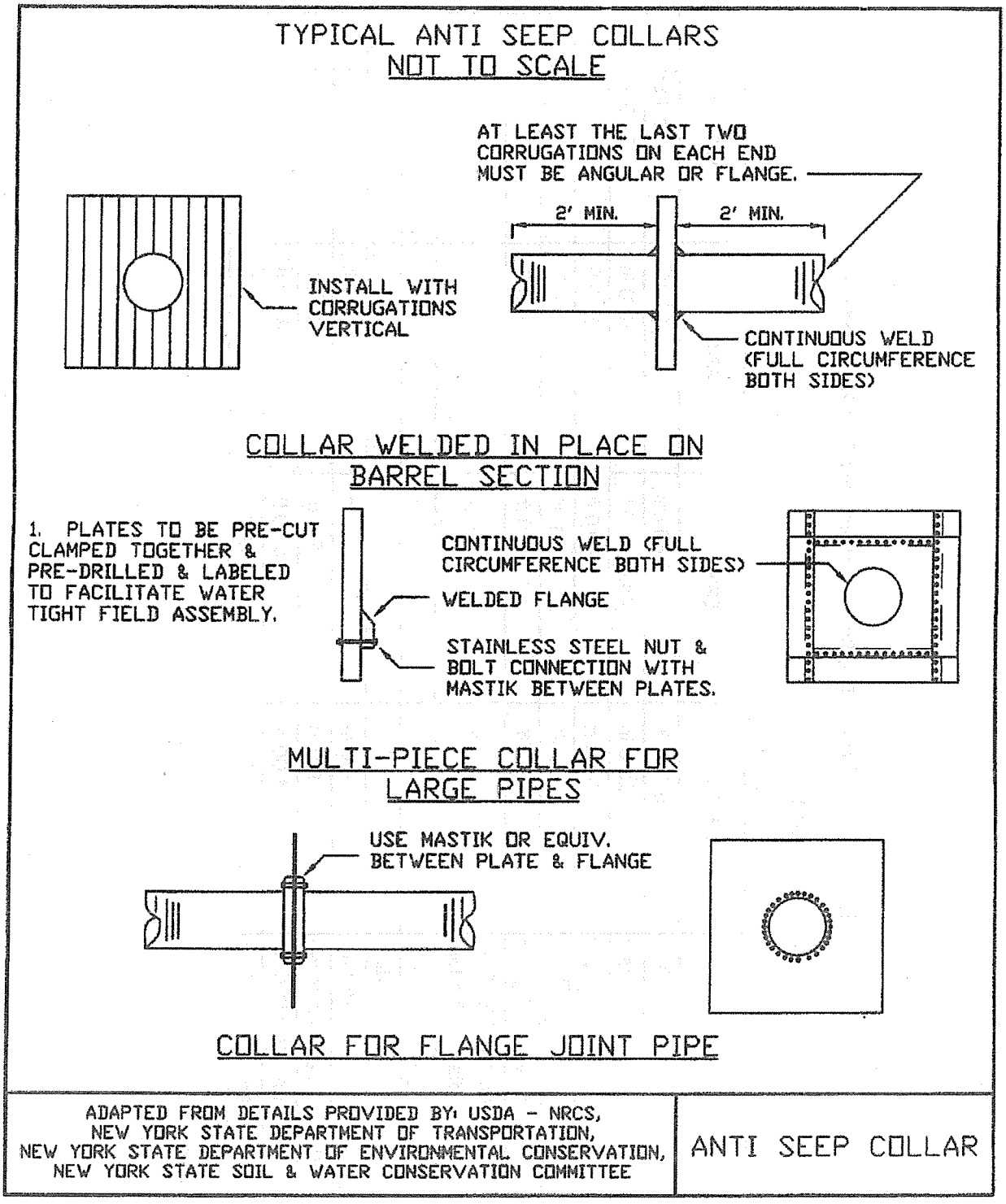


Figure 5A.32
Anti-Seep Collar Design



RE: Rock Outlet Protection/ End Sections (Maximum Tailwater Condition)

Date: August, 2011

	ES-1 & ES-2	ES-6	ES-8	ES-9 & 10
Q*=	5.71 cfs	17.89 cfs	10.55 cfs	13.65 cfs
Pipe dia.=	15.0 in	24.0 in ***	18.0 in	24.0 in ***
d_{50}**=	0.10 ft	0.10 ft	0.10 ft	0.00 ft
	1.2"	1.2"	1.2"	0.0"
Apron length (L_a)**=	*2.0 ft*	*2.0 ft*	*8.0 ft*	*0.0 ft*
Apron width (W)= diam. + 0.4 La=	*2.1 ft*	*2.8 ft*	*4.7 ft*	*2.0 ft*
Use:				
d_{50}=	4 in	4 in	4 in	4 in
dmax=	6.0 in	6.0 in	6.0 in	6.0 in
Min.blanket thickness=	9.0 in	9.0 in	9.0 in	9.0 in
Apron length (L_a)=	4.00 ft	4.00 ft	8.00 ft	8.00 ft
Apron width (W)=	3.00 ft	4.00 ft	5.00 ft	5.00 ft

* 100-year storm event

**(Figure 5B.13, NY Standards and Specifications For Erosion and Sediment Control, August 2005)

*** Site plans show 2 - 12" pipes

STANDARD AND SPECIFICATIONS FOR ROCK OUTLET PROTECTION

Definition

A section of rock protection placed at the outlet end of the culverts, conduits, or channels.

Purpose

The purpose of the rock outlet protection is to reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving downstream reach.

Scope

This standard applies to the planning, design, and construction of rock riprap and gabions for protection of downstream areas. It does not apply to rock lining of channels or streams.

Conditions Where Practice Applies

This practice applies where discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This applies to:

1. Culvert outlets of all types.

2. Pipe conduits from all sediment basins, dry storm water ponds, and permanent type ponds.

3. New channels constructed as outlets for culverts and conduits.

Design Criteria

The design of rock outlet protection depends entirely on the location. Pipe outlet at the top of cuts or on slopes steeper than 10 percent, cannot be protected by rock aprons or riprap sections due to re-concentration of flows and high velocities encountered after the flow leaves the apron.

Many counties and state agencies have regulations and design procedures already established for dimensions, type and size of materials, and locations where outlet protection is required. Where these requirements exist, they shall be followed.

Tailwater Depth

The depth of tailwater immediately below the pipe outlet must be determined for the design capacity of the pipe. If the tailwater depth is less than half the diameter of the outlet pipe, and the receiving stream is wide enough to accept divergence of the flow, it shall be classified as a Minimum Tailwater Condition; see Figure 5B.12 on page 5B.25 as an example. If the tailwater depth is greater than half the pipe diameter and the receiving stream will continue to confine the flow, it shall be classified as a Maximum Tailwater Condition; see Figure 5B.13 on page 5B.26 as an example. Pipes which outlet onto flat areas with no defined channel may be assumed to have a Minimum Tailwater Condition; see Figure 5B.12 on page 5B.25 as an example.

Apron Size

The apron length and width shall be determined from the curves according to the tailwater conditions:

Minimum Tailwater – Use Figure 5B.12 on page 5B.25
Maximum Tailwater – Use Figure 5B.13 on page 5B.26

If the pipe discharges directly into a well defined channel, the apron shall extend across the channel bottom and up the channel banks to an elevation one foot above the maximum tailwater depth or to the top of the bank, whichever is less.

The upstream end of the apron, adjacent to the pipe, shall have a width two (2) times the diameter of the outlet pipe, or conform to pipe end section if used.

Bottom Grade

The outlet protection apron shall be constructed with no slope along its length. There shall be no overfall at the end of the apron. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

Alignment

The outlet protection apron shall be located so that there are no bends in the horizontal alignment.

Materials

The outlet protection may be done using rock riprap, grouted riprap, or gabions.

Riprap shall be composed of a well-graded mixture of stone size so that 50 percent of the pieces, by weight, shall be larger than the d_{50} size determined by using the charts. A well-graded mixture, as used herein, is defined as a mixture composed primarily of larger stone sizes, but with a sufficient mixture of other sizes to fill the smaller voids between the stones. The diameter of the largest stone size in such a mixture shall be 1.5 times the d_{50} size.

Thickness

The minimum thickness of the riprap layer shall be 1.5 times the maximum stone diameter for d_{50} of 15 inches or less; and 1.2 times the maximum stone size for d_{50} greater than 15 inches. The following chart lists some examples:

D_{50} (inches)	d_{max} (inches)	Minimum Blanket Thickness (inches)
4	6	9
6	9	14
9	14	20
12	18	27
15	22	32
18	27	32
21	32	38
24	36	43

Stone Quality

Stone for riprap shall consist of field stone or rough unhewn quarry stone. The stone shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual stones shall be at least 2.5.

Recycled concrete equivalent may be used provided it has a density of at least 150 pounds per cubic foot, and does not have any exposed steel or reinforcing bars.

Filter

A filter is a layer of material placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap. Riprap shall have a filter placed under it in all cases.

A filter can be of two general forms: a gravel layer or a plastic filter cloth. The plastic filter cloth can be woven or non-woven monofilament yarns, and shall meet these base requirements: thickness 20-60 mils, grab strength 90-120 lbs; and shall conform to ASTM D-1777 and ASTM D-1682.

Gravel filter blanket, when used, shall be designed by comparing particle sizes of the overlying material and the base material. Design criteria are available in Standard and Specification for Riprap Slope Protection on page 5B.57.

Gabions

Gabions shall be made of hexagonal triple twist mesh with heavily galvanized steel wire. The maximum linear dimension of the mesh opening shall not exceed 4 ½ inches and the area of the mesh opening shall not exceed 10 square inches.

Gabions shall be fabricated in such a manner that the sides, ends, and lid can be assembled at the construction site into a rectangular basket of the specified sizes. Gabions shall be of single unit construction and shall be installed according to manufacturers recommendations.

The area on which the gabion is to be installed shall be graded as shown on the drawings. Foundation conditions shall be the same as for placing rock riprap, and filter cloth shall be placed under all gabions. Where necessary, key, or tie, the structure into the bank to prevent undermining of the main gabion structure.

Maintenance

Once a riprap outlet has been installed, the maintenance needs are very low. It should be inspected after high flows for evidence of scour beneath the riprap or for dislodged stones. Repairs should be made immediately.

Design Procedure

1. Investigate the downstream channel to assure that nonerosive velocities can be maintained.

2. Determine the tailwater condition at the outlet to establish which curve to use.
3. Enter the appropriate chart with the design discharge to

determine the riprap size and apron length required. It is noted that references to pipe diameters in the charts are based on full flow. For other than full pipe flow, the parameters of depth of flow and velocity must be used to adjust the design discharges.

4. Calculate apron width at the downstream end if a flare section is to be employed.

Examples

Example 1: Pipe Flow (full) with discharge to unconfined section.

Given: A circular conduit flowing full.

Q = 280 cfs, diam. = 66 in., tailwater (surface) is 2 ft. above pipe invert (minimum tailwater condition).

Find: Read d_{50} = 1.2 and apron length (L_a) = 38 ft.

Apron width = diam. + L_a = 5.5 + 38 = 43.5 ft.

Use: d_{50} = 15", d_{max} = 22", blanket thickness = 32"

Example 2: Box Flow (partial) with high tailwater

Given: A box conduit discharging under partial flow conditions. A concrete box 5.5 ft. x 10 ft. flowing 5.0 ft. deep,

Q = 600 cfs and tailwater surface is 5 ft. above invert (max. tailwater condition).

Since this is not full pipe and does not directly fit the nomograph assumptions of Figure 7B.13 substitute depth as the diameter, to find a discharge equal to full pipe flow for that diameter, in this case 60 inches.

Since, $Q = AV$ and $A = \frac{\pi D^2}{4}$

First, compute velocity:

V = (Q/A) = (600/(5) (10)) = 12 fps

Then substituting:

$$Q = \frac{\pi D^2}{4} \times V = \frac{3.14\ (5\ ft)^2}{4} \times 12\ fps = 236\ cfs$$

At the intersection of the curve d = 60 in. and Q = 236 cfs, read d_{50} = 0.4 ft.

Then reading the d = 60 in. curve, read apron length (L_a) = 40 ft.

Apron width, W = conduit width + (6.4)(L_a) = 10 + (0.4) (40) = 26 ft.

Example 3: Open Channel Flow with Discharge to Unconfined Section

Given: A trapezoidal concrete channel 5 ft. wide with 2:1 side slopes is flowing 2 ft. deep, Q = 180 cfs (velocity = 10 fps) and the tailwater surface downstream is 0.8 ft. (minimum tailwater condition).

Find: Using similar principles as Example 2, compute equivalent discharge for a 2 foot, using depth as a diameter, circular pipe flowing full at 10 feet per second.

Velocity:

$$Q = \frac{\pi\ (2ft)^2}{4} \times 10\ fps = 31.4\ cfs$$

At intersection of the curve, d = 24 in. and Q = 32 cfs, read d_{50} = 0.6 ft.

Then reading the d = 24 in. curve, read apron length (L_a) = 20 ft.

Apron width, W = bottom width of channel + L_a = 5 + 20 = 25 ft.

Example 4: Pipe flow (partial) with discharge to a confined section

Given: A 48 in. pipe is discharging with a depth of 3 ft. Q = 100 cfs, and discharge velocity of 10 fps (established from partial flow analysis) to a confined trapezoidal channel with a 2 ft. bottom, 2:1 side slopes, n = .04, and grade of 0.6%.

Calculation of the downstream channel (by Manning's Equation) indicates a normal depth of 3.1 ft. and normal velocity of 3.9 fps.

Since the receiving channel is confined, the maximum tailwater condition controls.

Find: discharge using previous principles:

$$Q = \frac{\pi\ (3ft)^2}{4} \times 10\ fps = 71\ cfs$$

At the intersection of d = 36 in. and Q = 71 cfs, read d_{50} = 0.3 ft.

Reading the d = 36" curve, read apron length (L_a) = 30 ft.

Since the maximum flow depth in this reach is 3.1 ft., that is the minimum depth of riprap to be maintained for the entire length.

Construction Specifications

1. The subgrade for the filter, riprap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.

2. The rock or gravel shall conform to the specified grading limits when installed respectively in the riprap or filter.

3. Filter cloth shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged part or by completely replacing the cloth. All overlaps, whether for repairs or for joining two pieces of cloth shall be a minimum of one foot.

4. Stone for the riprap or gabion outlets may be placed by equipment. Both shall each be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for riprap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogenous with the smaller stones and spalls filling the voids between the larger stones. Riprap shall be placed in a manner to prevent damage to the filter blanket or filter cloth. Hand placement will be required to the extent necessary to prevent damage to the permanent works.

Figure 5B.13
Outlet Protection Design—Maximum Tailwater Condition
(Design of Outlet Protection from a Round Pipe Flowing Full, Maximum Tailwater Condition: $T_w \geq 0.5D_o$) (USDA - NRCS)

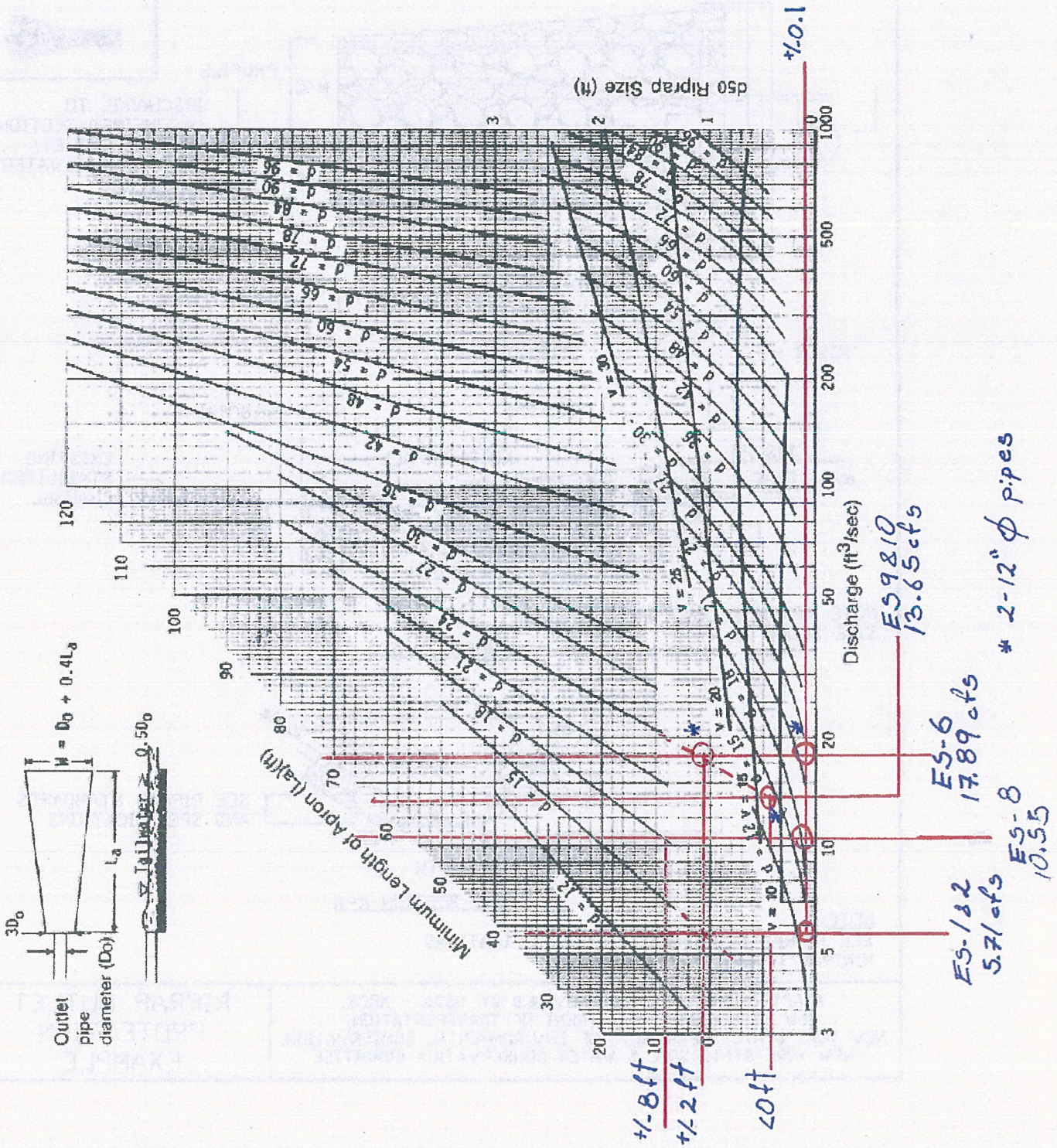
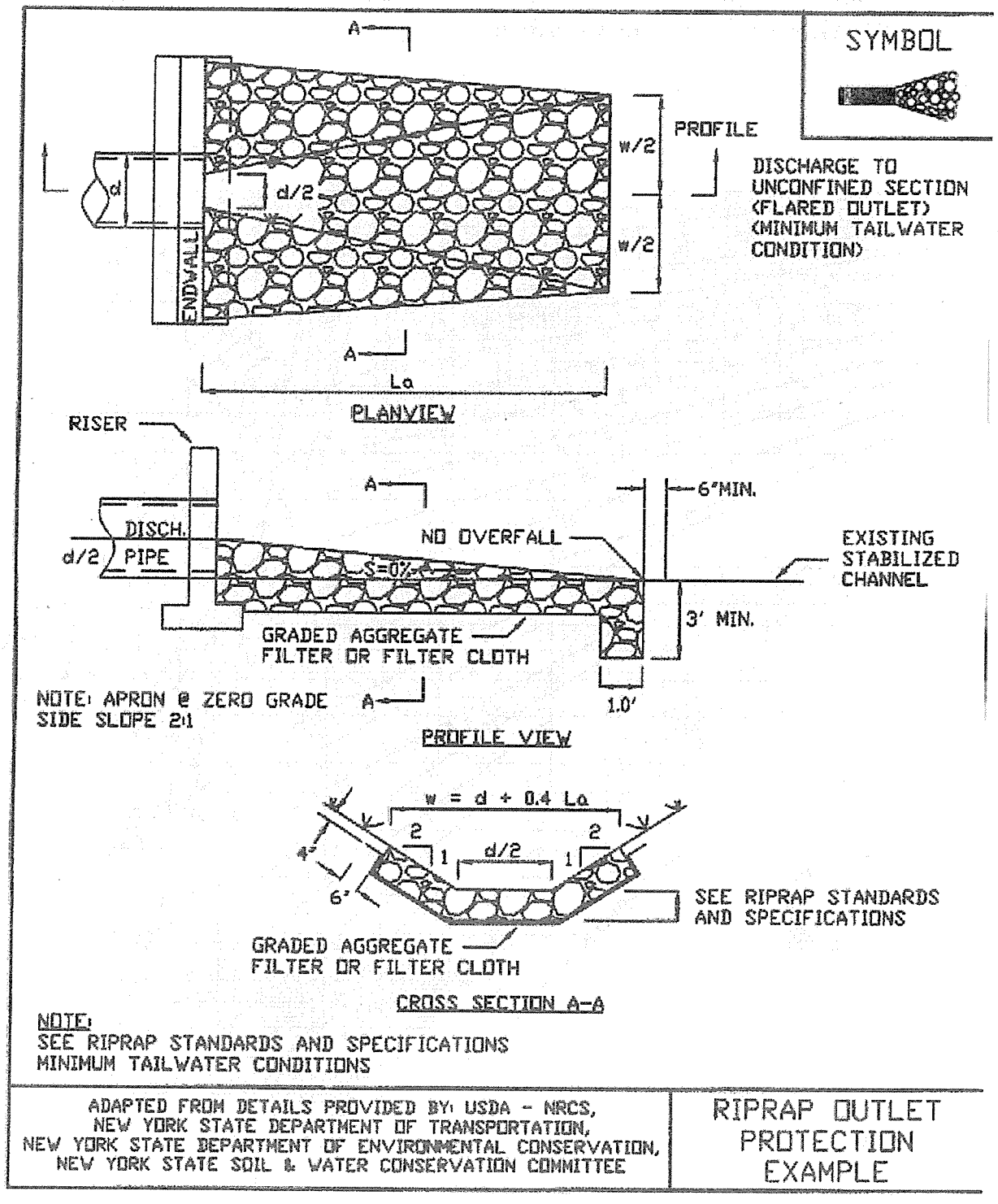


Figure 5B.14
Riprap Outlet Protection Detail (1)



CMX

Pipe Capacity Calculations:
Data: Hartley Road Substation

ES-1 to ES-2		
Pipe Diameter	=	15.00"
Area (sf)	=	1.227 sf
Hyd. R	=	0.313
Slope	=	2.70
n (CMP)	=	0.024
Pipe flow		5.75 cfs
Pipe design flow		
25-yr flow:		4.40 cfs
Pipe Capacity:	=	OK
ES-6		
Pipe Diameter	=	12.00"
Area (sf)	=	0.785 sf
Hyd. R	=	0.250
Slope	=	2.80
n (DIP)	=	0.011
Number of pipes	=	2
Pipe design flow		14.09 cfs
25-yr flow:		13.90 cfs
Pipe Capacity:	=	OK
ES-7 to ES-8		
Pipe Diameter	=	18.00"
Area (sf)	=	1.767 sf
Hyd. R	=	0.375
Slope	=	1.70
n (HDPE)	=	0.012
Pipe design flow		14.84 cfs
25-yr flow:		6.10 cfs
Pipe Capacity:	=	OK
ES-9 to ES-10		
Pipe Diameter	=	12.00"
Area (sf)	=	0.785 sf
Hyd. R	=	0.250
Slope	=	1.60
n (DIP)	=	0.011
Number of pipes	=	2
Pipe design flow		10.65 cfs
25-yr flow:		10.33 cfs
Pipe Capacity:	=	OK

10

PERCOLATION TEST RESULTS

Owner Orange and Rockland Utilities, Inc. Address Hartley Road Substation/ Hartley Road

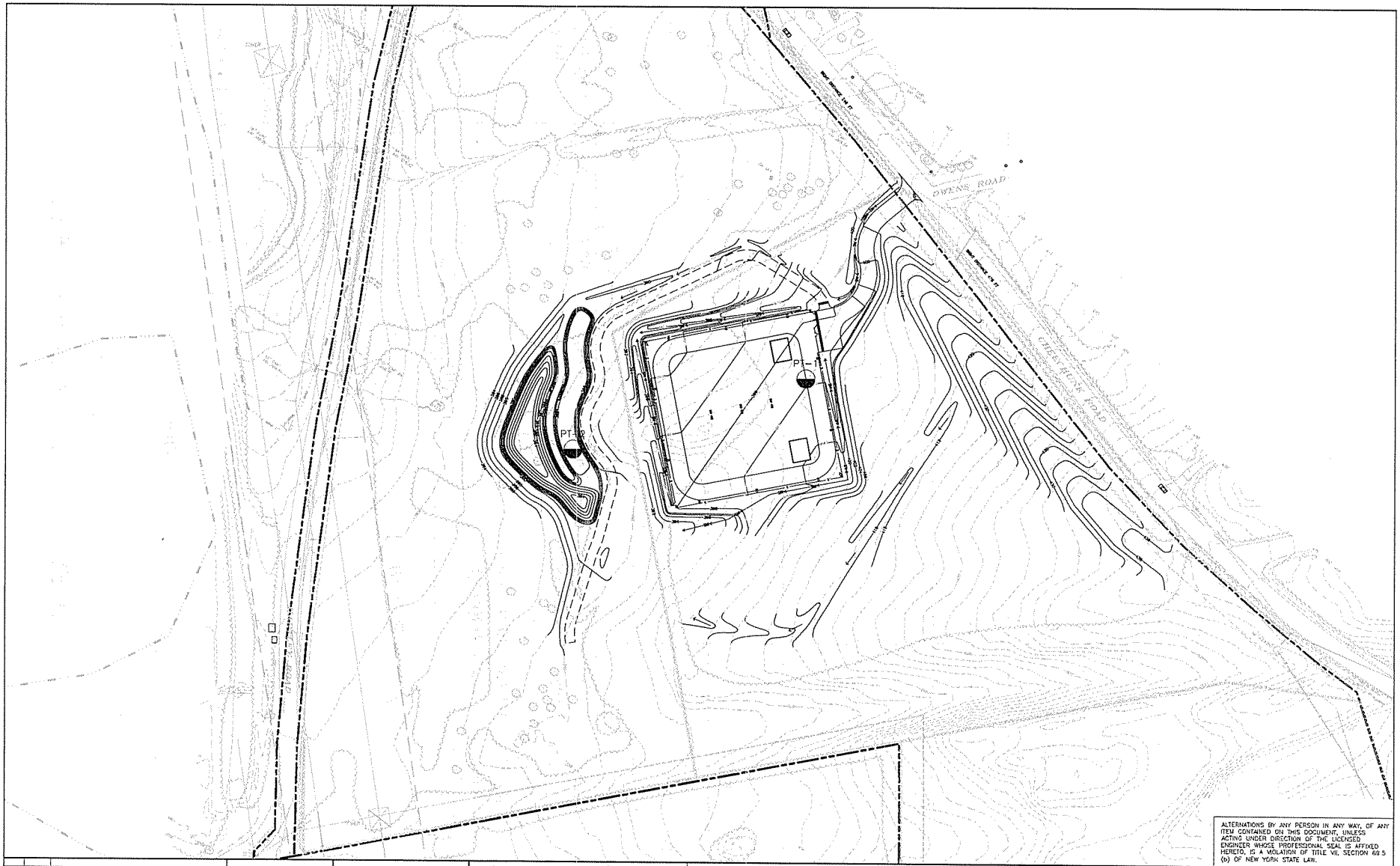
Property Location: Owens Road (Indicate nearest cross street) Sec._____ Block_____ Lot_____

Municipality Goshen, Orange County

Presoak Date: 8/09/11 (rain 0.62"), and 8/10/11 (rain 0.06") Run Date: 8/11/11

Hole #		CLOCK TIME			PERCOLATION			
					Depth to Water From Ground Surface		Water Level Drop	Soil Rate
Hole Number	Run No.	Start	Stop	Elapse Time Min.	Start Inches	Stop Inches	In Inches	Min/in Drop
PT-1	1	11:46 AM	12:16	30	-	-	1 1/4	24.0
	2	12:16	1:46	30	-	-	1	30.0
	3	1:46	2:16	30	-	-	3/4	40.0
	4	2:16	2:46	30	-	-	3/4	40.0
	5							
PT-2	1	1:15 PM	1:45	30	-	-	2 1/4	13.33
	2	1:45	2:15	30	-	-	2	15.0
	3	2:15	2:45	30	-	-	1 3/4	17.14
	4	2:45	3:15	30	-	-	1 3/4	17.14
	5							
	1							
	2							
	3							
	4							
	5							

Perc test done by: J. Paredes/ CMX



ALTERNATIONS BY ANY PERSON IN ANY WAY, OF ANY ITEM CONTAINED ON THIS DOCUMENT, UNLESS ACTING UNDER DIRECTION OF THE LICENSED ENGINEER WHOSE PROFESSIONAL SEAL IS AFFIXED HERETO, IS A VIOLATION OF TITLE VII, SECTION 69 5 (b) OF NEW YORK STATE LAW.

REVISION NO.	DATE	REVISION

GRAPHIC SCALE IN FEET
N.T.S.

W. CHARLES UTSCHIG, JR.
PROFESSIONAL ENGINEER, N.Y. LIC. No. 62303-1

CMX

CMX ENGINEERING, SURVEY & LANDSCAPE ARCHITECTS, PC OF NEW YORK
AN AFFILIATE OF BIRDSALL SERVICES GROUP

1311 MAMARONECK AVENUE
SUITE 50
WHITE PLAINS, NY 10605
TEL (914)686-1000
FAX (914)686-1222

PERCOLATION TESTS_LOCATION MAP
HARTLEY ROAD SUBSTATION
ORANGE AND ROCKLAND UTILITIES INC.

TOWN OF GOSHEN ORANGE COUNTY NEW YORK

PROJECT NO. 5703120000100	DATE 08/01/11
DRAWN BY JP	DESIGNED BY JP
SCALE N.T.S	CHECKED BY MF
CMX	
SHEET NO. 1 of 1	

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM
FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Table of Contents

I. Pre-Construction Meeting Documents.

a. Preamble to Site Assessment and Inspections

b. Operator's Certification

c. Qualified Professional's Credentials & Certification

d. Pre-Construction Site Assessment Checklist

a.

II. Construction Duration Inspections

a. Directions

b. Modification to the SWPPP

III. Monthly Summary Reports

IV. Monitoring, Reporting, and Three-Month Status Reports

a. Operator's Compliance Response Form

a

Properly completing forms such as those contained in this document meet the inspection requirement of NYSDEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name _____

Permit No. _____ **Date of Authorization** _____

Name of Operator _____

Prime Contractor _____

a. Preamble to Site Assessment and Inspections -The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law. "

Name (please print):_____

Title _____**Date:**_____

Address: _____

Phone: _____ **Email:**_____

Signature:_____

c. Qualified Professional's Credentials & Certification

" I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print):_____

Title _____**Date:**_____

Address: _____

Phone: _____ **Email:**_____

Signature:_____

d. Pre-construction Site Assessment Checklist (NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?_____
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_____
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_____
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

Pre-construction Site Assessment Checklist (continued)

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?

[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.

[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.

[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.

[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.

[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.

[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.

[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.

[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals

[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.

[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.

[ ] [ ] [ ] The plan is contained in the SWPPP on page _____

[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? _____

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:
Inspection Forms will be filled out during the entire construction phase of the project.
Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

_____ _____

Inspector (print name) **Date of Inspection**

_____ _____

Qualified Professional (print name) **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA

[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions?

[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?

[ ] [ ] [ ] All disturbance is within the limits of the approved plans.

[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA

[ ] [ ] [ ] Is construction site litter and debris appropriately managed?

[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?

[ ] [ ] [ ] Is construction impacting the adjacent property?

[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA

[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.

[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.

[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?

[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering

Yes No NA

[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.

[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.

[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.

[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader

Yes No NA

[ ] [ ] [ ] Installed per plan.

[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.

[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes No NA

[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.

[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.

[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Runoff Control Practices (continued)

4. Stone Check Dam

Yes No NA

[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control

1. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation is ___% of design capacity.

Sediment Control (continued)

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.

Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:
1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

III. Monthly Summary of Site Inspection Activities

Name of Permitted Facility:	Today's Date:	Reporting Month:
Location:	Permit Identification #:	
Name and Telephone Number of Site Inspector:		

Date of Inspection	Regular / Rainfall based Inspection	Name of Inspector	Items of Concern

Owner/Operator Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signature of Permittee or Duly Authorized Representative

Name of Permittee or Duly Authorized Representative date

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.

APPENDIX L
Draft Spill Prevention, Control, and Countermeasure Plan

ORANGE AND ROCKLAND UTILITIES, INC.

Proposed Hartley Road Substation

DRAFT SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN

Environmental Services
Orange & Rockland Utilities, Inc.
390 West Route 59
Spring Valley, NY 10977

Plan Prepared: November 03, 2011

Prepared by:

KLEINFELDER
Bright People. Right Solutions.

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LIST OF ATTACHMENTS

Attachment I	Cross Reference Table
Attachment II	Certification of Substantial Harm Determination
Attachment III	Spill Notification Procedures
Attachment IV	Oil Spill Response Procedures
Attachment V	Facility Location Map
Attachment VI	Facility Site Plan
Attachment VII	Monthly Substation Inspection Form
Attachment VIII	Amendment Log

DRAFT SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN
HARTLEY ROAD SUBSTATION

1. Introduction and Facility Information

This document constitutes the Draft Spill Prevention, Control, and Countermeasure (SPCC) Plan for the proposed Orange and Rockland Utilities, Inc. (ORU) facility located at 157 Cheechunk Road, Goshen, NY, as contemplated by the United States Environmental Protection Agency (USEPA) regulations contained in 40 CFR 112 (38 Fed. Reg. 34163, December 11, 1973). A cross reference table for this SPCC Plan is presented in Attachment I. The proposed facility is referred to as the Hartley Road Substation. The Facility Location Map is presented as Attachment V and the Facility Site Plan is presented as Attachment VI.

Non-transportation related facilities are subject to SPCC regulation where the total aboveground storage capacity exceeds 1,320 gallons or the underground storage capacity exceeds 42,000 gallons and where the location of the facility could reasonably result in discharge of regulated substances into or upon the navigable waters of the United States or adjoining shorelines. The Certification of Substantial Harm Determination is presented in Attachment II of this SPCC Plan.

The Hartley Road Substation is subject to SPCC regulation because, due to its location near a stormwater detention pond and adjoining wetland that flow to an unnamed tributary of the Wallkill River, it has the potential to discharge oil into or upon the navigable waters of the United States, and the total aboveground storage capacity exceeds 1,320 gallons.

This plan will be finalized and become effective immediately upon emplacement of the transformers at the proposed Facility. The finalized plan must be submitted to the USEPA Regional Administrator if either of the following occurs:

- The facility discharges more than 1,000 gallons of oil into or upon navigable waters of the United States or adjoining shorelines in a single event.
- The facility discharges oil in harmful quantities (as defined in 40 CFR 110) in two spill events greater than 42 gallons each within any 12-month period.

In the case of either of the two (2) events, the following additional information must also be submitted to the USEPA Regional Administrator within 60 days of the incident (40 CFR 112.4):

- Name of the facility
- Name of the owner/operator
- Location of the facility
- Date/year of initial operation
- Maximum storage capacity
- Description of the facility
- Complete copy of the SPCC Plan
- Cause of the spill with failure analysis

- Corrective action taken
- Additional preventative measures taken to minimize possibility of recurrence

SPCC PLAN FACILITY INFORMATION

A. Name of Facility:	Hartley Road Substation
B. Type of Facility:	Electric Distribution Station
C. Date of Initial Operation:	August 2012
D. Location of Facility:	157 Cheechunk Road, Goshen, NY
E. Name and Address of Owner:	Orange & Rockland Utilities, Inc. 390 West Route 59 Spring Valley, NY 10977
F. Designated Person Responsible For Oil Spill Prevention [40 CFR 112.7(f)(2)]:	Patrick Burke, Director - System Operations
G. Nearest Manned Facility:	Middletown Operating Center

A complete copy of the SPCC Plan is maintained at the Middletown Operating Center and by the ORU Environmental Services Department at 390 West Route 59 in Spring Valley, NY and is available to the USEPA Regional Administrator for review during normal business hours.

H. Oil Spill History: Oil spill incident statements are prepared for all spill events and maintained at the Spring Valley Operating Center by Environmental Services.

2. Certification Information

Engineer's Certification [40 CFR 112.3(d)]

I hereby certify that I (or my designated agent) have examined the facility, and being familiar with the provisions of 40 CFR Part 112, attest that this SPCC Plan is appropriate for this facility and has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and with the requirements of the SPCC rule. To the best of my knowledge, applicable procedures for required inspections and testing have been established.

Name: _____

Signature: _____

Date: _____

New York P.E. License No._____

Management Commitment to SPCC Plan [40 CFR 112.7]

This Spill Prevention, Control, and Countermeasure Plan has been prepared in accordance with good engineering practices and has the full approval of management to commit the necessary resources to fully implement this plan. The management of Orange & Rockland Utilities is fully committed to providing sufficient manpower, equipment, and materials required to expeditiously control and remove any harmful quantity of oil discharged.

Name: _____
Patrick Burke, Director – System Operations

Date: _____

Five-Year Reviews [40 CFR 112.5(b)]

This plan must be reviewed by a designated representative at least once every five years. If necessary, the SPCC Plan shall be amended for the facility when there is a change in facility design, construction, operation or maintenance that materially affects the potential to discharge oil [40 CFR 112.5(a)]. The SPCC Plan shall also be amended to include more effective technology if such technology will significantly reduce the likelihood of a spill event from the facility [40 CFR 112.5(b)]. The revised plan shall be recertified by a Professional Engineer [40 CFR 112.5(a) and (c)].

I have completed review and evaluation of the SPCC Plan for the Hartley Road Substation on _____, and _____ amend the Plan as a result.
(Date) (Will/will not)

_____
(Signature)

3. Potential Spills – Prediction and Control [40 CFR 112.7(b) and (c)]

Subsection 112.7(b) of the regulations requires that the SPCC Plan identify locations where experience indicates that a reasonable potential for an oil spill to occur exists. The table on the following page lists oil-filled equipment at the Hartley Road Substation. The table also summarizes appropriate diversionary and/or containment measures in place to prevent discharged oil from reaching a navigable watercourse, along with a prediction of the flow direction, rate of flow, and total quantity of oil that could be discharged from the facility as a result of an oil spill.

In accordance with the Regulations, diversionary measures at the facility include two concrete-walled collection sumps with an oil-stop polymer lining at the base. The oil-stop polymer lining is designed to allow water to flow through it, but prevents oil from flowing through it. The collection sumps are filled with crushed stone and have a capacity of 110% of the transformer capacity plus a 4-inch rainfall (13,235 gallons). In the event of an oil leak or spill and failure of this system, product could flow outside of the substation area into surrounding swales leading to the bioretention area and the stormwater detention pond, which discharges into a wetland and then to an unnamed tributary of the Wallkill River. Therefore, in order to prevent oil from reaching navigable waters, it is imperative that sorbent materials are utilized to contain spilled product and that affected surface cover is cleaned or excavated and removed from the facility immediately. Visual observation of all areas must be performed during routine operations and monthly inspections to check for leaks and spills from oil-containing equipment at the facility.

The supervisory control alarm system in the facility will alert the Systems Operations office at the Company's Spring Valley office if there is a problem with the transformer. Substation crews would be dispatched immediately to respond to the alarm. Additionally, all transmission line outages are monitored by the Systems Operations office so that failures in substation facilities may be discovered.

The transformers and any smaller pieces of equipment that contain 55 gallons, or more, of oil are inspected on a monthly basis. Sorbent materials to be used for responding to small spills are stored on the Substation Department's trucks.

All other cleanup materials, equipment and manpower would be obtained from the Company's emergency response contractor.

ELECTRIC INSULATING OIL-FILLED EQUIPMENT – HARTLEY ROAD SUBSTATION

SOURCE	POTENTIAL FAILURE	PREDICTED SPILL FLOW RATE (GALLONS PER MINUTE)	NO. OF GALLONS	DIRECTION OF FLOW	RATE OF FLOW*	PREVENTATIVE SYSTEM**	ADDITIONAL COMMENTS
Transformer BK 113	Seam failure	<1 to 100 gpm	9,830	Northwest	Less than 1 hour	i, ii and vi	Preventative system consists of a concrete-walled collection sump with an "oil-stop" polymer lining at the bottom. The sump is filled with crushed stone) and has a 110% storage capacity. Electronic oil level gauge and/or supervisory control system immediately notify ORU ECC of equipment failure and/or loss of oil.
BK 213	Seam failure	<1 to 100 gpm	9,830	Southeast	Less than 1 hour	i, ii and vi	Preventative system consists of a concrete-walled collection sump with an "oil-stop" polymer lining at the bottom. The sump is filled with crushed stone) and has a 110% storage capacity. Electronic oil level gauge and/or supervisory control system immediately notify ORU ECC of equipment failure and/or loss of oil.

The substation may also have equipment containing less than 55 gallons of oil such as potential transformers, reclosers, and/or station service transformers, which do not meet the reporting threshold dictated by the USEPA in 40 CFR Section 112.1(d)(2)(ii). In addition, SF6 circuit breakers, which do not contain oil, may be present at the facility.

*Rate of flow is interpreted to mean the reasonable estimated time required for spilled oil to reach navigable water from the oil source, if preventative systems are breached in the case of a significant oil spill.

**Preventative Systems for On-shore Facilities:

(i) Dikes, berms or retaining walls sufficiently impervious to contain spilled oil
(ii) Curbing
(iii) Culverts, gutters or other drainage systems
(iv) Weirs, booms or other barriers
(v) Spill diversion ponds
(vi) Detention ponds or pit with an oil-stop membrane filled with crushed stone
(vii) Sorbent materials

All oil-containing equipment is constructed of materials which are compatible with the oil materials stored [40 CFR 112.8(c)(i)].

All equipment, unless noted, contains Electric Insulating Oil (also referred to as Transformer Oil or Dielectric Fluid).

Containment Structures [40 CFR 112.7(c)]

The oil-filled equipment is contained inside a concrete-walled collection sump with an oil-stop polymer lining at the bottom. The collection sump is filled with crushed stone. The concrete block wall surrounding each collection sump extends 16" above the ground surface. Each collection sump has a minimum total capacity of 110% of the storage capacity of the transformer plus capacity for a 4-inch rainfall. The oil-stop polymer lining is designed to let water pass through, while retaining any oil within the sump.

Demonstration of Practicability [40 CFR 112.7(d)]

ORU management has determined that current substation operation and maintenance procedures, combined with the use of containment, diversionary measures, immediate notification and response by readily available contracted personnel in the event of a loss of oil, are practical and effective at reducing the risk of an oil spill from oil-filled equipment within the Hartley Road Substation from reaching navigable waters. ORU realizes the importance of immediate cleanup or excavation and proper disposal of all materials which come into contact with oil in the event of a spill, including coarse stone, asphalt, soil, used sorbent materials (such as spill booms or absorbent materials), and vegetation.

In addition to the containment and diversionary measures provided, an effective oil spill contingency plan (hereinafter referred to as the Oil Spill Response Procedures), including a written commitment of manpower, equipment and materials required to expeditiously control and remove any harmful quantity of oil discharged, has been prepared for this facility [40 CFR 112.7(d)(1) and (2)]. The Spill Notification Procedures are described in Attachment III of this SPCC Plan, while the Oil Spill Response Procedures are presented in Attachment IV.

Transformers and regulators at the Hartley Road Substation contain non-PCB oil. Capacitors do not contain any oil.

4. Facility Drainage [40 CFR 112.8(b)]

Nearest Identified Surface Water Potentially Impacted by Spill...Stormwater detention pond that discharges to a wetland flowing to unnamed tributary to the Wallkill River
Distance.....230-250 feet
Direction of Flow within Site .....Southwest and southeast
Estimated Flow Time to Nearest Identified Surface Water .....<1 hour

The facility is located on the south side of Cheechunk Road in a gently sloping field. The slope is pitched towards the southwest and Hartley Road. A gravel-lined swale is constructed along all sides of the substation pad area. The swale is directed toward the southwestern side of the substation pad where a stormwater catch basin is located. The catch basin discharges to the bioretention system and the stormwater detention pond. The bioretention system also discharges

to the stormwater detention pond. The detention pond discharges to the wetland area to the south which ultimately discharges to the unnamed tributary to the Wallkill River.

The Facility Location Map and the Facility Site Plan are provided as Attachments V and VI, respectively.

Undiked Storage Areas

The Regulations stress secondary containment as a preferred method of spill control around oil-containing equipment, tanks, drums, or containers, but other means are available to reduce the chances of an oil spill from running over land toward navigable waters, surface water conveyance systems, storm water drains, or from contacting groundwater that is tributary to surface water bodies. The crushed stone in the station would serve to slow the migration of oil from this equipment in the event of an oil spill.

Drainage from undiked areas should generally follow the flow directions shown on the Facility Site Plan (Attachment VI). The ground surface within this substation fenced area is predominantly crushed stone with an asphalt perimeter ("ring") road. In the event of a spill from oil-containing equipment, oil would partially soak into the crushed stone and soil adjacent to the equipment or run along the surface in a radial direction from the equipment.

Substation maintenance workers may respond to small incidental spills only: spills less than 5 gallons in capacity, contained on an impermeable surface (e.g. concrete), able to be completely cleaned up within 2 hours of detection. In the event of a small incidental spill, substation trucks are equipment with some spill response equipment including sorbent materials.

All other spills will be cleaned up by an emergency response contractor hired by Environmental Services.

Diked Storage Areas

Lateral drainage from the transformer pad area is restrained by the concrete block walls of the each collection sump, which are 16" high at the ground surface to prevent a spill or other leakage of oil from spreading beyond the containment area. Oil is prevented from migrating downward within each collection sump and into soil beneath by the sump's oil-stop polymer lining. The lining is designed to allow water to pass through, but prevent oil from passing through the membrane.

5. Applicable Guidelines

In addition to the prevention systems outlined previously and the measures identified in the Oil Spill Response Procedures (Attachment IV), the following guidelines are to be followed as effective spill prevention and containment procedures for this location:

Discharge Prevention Measures [40 CFR 112.7(a)(3)(ii)]

Filling or draining of oil-containing equipment during maintenance or repair activities should be performed using portable steel drums or a tank truck, as appropriate.

Drum and Tank Truck Transfers

1. Position truck away from drainage pathways, set parking brake, and turn off motor if it is not needed for pump operation. Chock tank truck wheels.
2. Set out warning signs around unloading area to prevent pre-mature vehicular departure.
3. No smoking during transfer or in areas of oil transfer.
4. Locate fire extinguisher and spill response materials before transferring.
5. Check all hoses, valves, and connections for leaks or damages. If a problem is found contact the Environmental Services Department.
6. Make connections for oil transfer. Use extreme caution to avoid any spillage.
7. Check all valves to confirm correct transfer of liquid.
8. Begin transfer slowly to ensure connections and hoses are holding correctly.
9. If there are no problems, proceed to transfer oil at the appropriate rate.
10. Transfer must be monitored and observed through the entire process. The transfer must be attended at all times.
11. When transfer is complete, drain hoses back into tank or drum; close all valves, and shutdown pump.
12. Take extreme care when disconnecting hoses to avoid any spillage. Use catch bucket and absorbent materials when necessary.
13. Prior to departure of the tank truck, the lowermost drain and all outlets of such vehicles are examined closely for leakage by the vehicle operator. If necessary, outlets will be tightened, adjusted, or replaced by the vehicle operator to prevent liquid leakage while in transit.
14. Prior to the departure of the truck containing the drums, check that the drums are properly secured for transport. Also check that the portals are closed tightly.
15. In the event of a spill, stop oil transfer and contact the Control Center at (845)577-3228/3185 immediately.

Inspections and Records [40 CFR 112.7(e)]

Visual inspection of all facility locations and the oil-containing equipment at this facility is performed at least once each month and a record of the inspection, including any oil leaks, is made. A qualified person inspects facility locations using the Monthly Substation Inspection Report (Attachment VII) as a procedure guide. This information is retained by the ORU Substation Department for a period of three (3) years. Any identified problems are to be immediately reported to Environmental Services.

Security [40 CFR 112.7(g)]

1. An 8' high security fence of chainlink topped by barb wire will enclose the substation. An access gate will be located at the northern corner and a smaller, pedestrian access gate will be located at the western corner.
2. Oil-filled transformers also have sensors that are monitored remotely.
3. Emergency lighting is provided only during power outages. Otherwise the facility is unlit.

Personnel, Training, and Spill Prevention Procedures [40 CFR 112.7(f)]

1. The company annually trains its personnel in the operation and maintenance of equipment to prevent the discharge of oil. Additionally, appropriate instruction with regard to applicable pollution control laws, rules, and regulations is provided. The use of applicable spill control equipment and materials are also included in ORU's annual personnel training.

2. All oil spills and leaks are reported immediately to the ORU Control Center. The Control Center is responsible for notifying Environmental Services. Environmental Services will make the required regulatory notifications and notify the Company's emergency response contractor for spill cleanup if necessary.

3. Orientation meetings regarding the SPCC Plan for this location are held on an as needed basis to instruct the necessary personnel in oil spill prevention. Upon amendment of this Spill Prevention, Control, and Countermeasure Plan, personnel will be informed of the contents of such amendments via an ORU "Environmental Bulletin" or "Environmental Alert".

4. Trained facility personnel may only respond to small incidental spills. These are spills of less than 5 gallons of oil, contained on an impermeable surface, and able to be cleaned up within 2 hours. Sorbent materials will be stored in substation trucks to be used by authorized personnel to respond to small spills. All other spills will be cleaned up by an emergency response contractor.

Please note: cleaning, excavation, and/or disposal of materials containing oil must be supervised by authorized personnel. All debris shall be disposed of in accordance with all applicable federal, state, and local regulations.

6. PCB Concentration of Equipment

At the Hartley Road Substation, there is no equipment containing PCB-contaminated fluids. All transformers and regulators contain non-PCB oil, and all circuit breakers contain SF6 gas instead of oil.

According to regulations, circuit breakers *are assumed to be not* contaminated unless there is data to the contrary. However, transformers and regulators *are assumed to be* contaminated according to regulations unless data show otherwise.

EQUIPMENT	MAIN/TANK #1	LTC/TANK
Transformer Bank 113	N.D.	N.D.
Transformer Bank 213	N.D.	N.D.
Regulators	N.D.	--

N.D. = Non-detectable.

7. Recommended Improvements

No modifications or improvements to the Hartley Road Substation are required at this time.

ATTACHMENT I

CROSS REFERENCE TABLE

ATTACHMENT I

CROSS REFERENCE TABLE

Revised Rule	Current Rule	Description of Rule	Section(s)
§112.7	§112.7	General requirements for SPCC Plans for all facilities and all oil types.	1, 2
§112.7(a)	§112.7	General requirements; discussion of facility's conformance with rule requirements; deviations from Plan requirements; facility characteristics that must be described in the Plan; emergency procedures.	1
§112.7(b)	§112.7(b)	Fault analysis.	3
§112.7(c)	§112.7(c)	Secondary containment.	3, 4
§112.7(d)	§112.7(d)	Contingency planning.	3
§112.7(e)	§112.7(e)(8)	Inspections, tests, and records.	5
§112.7(f)	§112.7(e)(10)	Employee training and discharge prevention procedures.	5
§112.7(g)	§112.7(e)(9)	Security (excluding oil production facilities).	5
§112.7(h)	§112.7(e)(4)	Loading/unloading (excluding offshore facilities).	5
§112.7(i)	N/A	Brittle fracture evaluation requirements.	N/A [1]
§112.7(j)	§112.7(e)	Conformance with state requirements.	2
§112.8, §112.12	§112.7(e)(1)	Requirements for onshore facilities (excluding production facilities).	3
§112.8(a), §112.12(a)	N/A	General and specific requirements.	2
§112.8(b), §112.12(b)	§112.7(e)(1)	Facility drainage.	4
§112.8(c), §112.12(c)	§112.7(e)(2)	Bulk storage containers (if applicable).	4
§112.8(d), §112.12(d)	§112.7(e)(3)	Facility transfer operations, pumping, and facility process.	5
§112.9, §112.13	§112.7(e)(5)	Requirements for onshore production facilities.	N/A
§112.9(a), §112.13(a)	N/A	General and specific requirements.	N/A
§112.9(b), §112.13(b)	§112.7(e)(5)(ii)	Oil production facility drainage.	N/A
§112.9(c), §112.13(c)	§112.7(e)(5)(iii)	Oil production facility bulk storage containers.	N/A
§112.9(d), §112.13(d)	§112.7(e)(5)(iv)	Facility transfer operations, oil production facility.	N/A

ATTACHMENT I (continued)

Revised Rule	Current Rule	Description of Rule	Section(s)
§112.10, §112.14	§112.7(e)(6)	Requirements for onshore oil drilling and workover facilities.	N/A
§112.10(a), §112.14(a)	N/A	General and specific requirements.	N/A
§112.10(b), §112.14(b)	§112.7(e)(6)(i)	Mobile facilities.	N/A
§112.10(c), §112.14(c)	§112.7(e)(6)(ii)	Secondary containment – catchment basins or diversion structures.	N/A
§112.10(d), §112.14(d)	§112.7(e)(6)(iii)	Blowout prevention (BOP).	N/A
§112.11, §112.15	§112.7(e)(7)	Requirements for offshore oil drilling, production, or workover facilities.	N/A
§112.11(a), §112.15(a)	N/A	General and specific requirements.	N/A
§112.11(b), §112.15(b)	§112.7(e)(7)(ii)	Facility drainage.	N/A
§112.11(c), §112.15(c)	§112.7(e)(7)(iii)	Sump systems.	N/A
§112.11(d), §112.15(d)	§112.7(e)(7)(iv)	Discharge prevention systems for separators and treaters.	N/A
§112.11(e), §112.15(e)	§112.7(e)(7)(v)	Atmospheric storage or surge containers; alarms.	N/A
§112.11(f), §112.15(f)	§112.7(e)(7)(vi)	Pressure containers; alarm systems.	N/A
§112.11(g), §112.15(g)	§112.7(e)(7)(vii)	Corrosion protection.	N/A
§112.11(h), §112.15(h)	§112.7(e)(7)(viii)	Pollution prevention system procedures.	N/A
§112.11(i), §112.15(i)	§112.7(e)(7)(ix)	Pollution prevention systems; testing and inspection.	N/A
§112.11(j), §112.15(j)	§112.7(e)(7)(x)	Surface and subsurface well shut-in valves and devices.	N/A
§112.11(k), §112.15(k)	§112.7(e)(7)(xi)	Blowout prevention.	N/A
§112.11(l), §112.15(l)	§112.7(e)(7)(xiv)	Manifolds.	N/A
§112.11(m), §112.15(m)	§112.7(e)(7)(xv)	Flowlines, pressure sensing devices.	N/A
§112.11(n), §112.15(n)	§112.7(e)(7)(xvi)	Piping; corrosion protection.	N/A
§112.11(o), §112.15(o)	§112.7(e)(7)(xvii)	Submarine piping; environmental stresses.	N/A
§112.11(p), §112.15(p)	§112.7(e)(7)(xviii)	Inspections of submarine piping.	N/A

(1) This facility does not have field fabricated aboveground tanks and is exempt from this requirement.

ATTACHMENT II

CERTIFICATION OF SUBSTANTIAL HARM DETERMINATION

Certification of Substantial Harm Determination
40 CFR 112.20(e), 40 CFR 112.20(f)(1)

Facility Name: Orange and Rockland Utilities, Inc. – Hartley Road Substation

Facility Address: 157 Cheechunk Road, Goshen, NY

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?

Yes ___ No _x_

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground storage tank area?

Yes ___ No _x_

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments?

Yes ___ No _x_

4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula) such that a discharge from the facility would shut down a public drinking water intake?

Yes ___ No _x_

5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil discharge in an amount greater than or equal to 10,000 gallons within the last 5 years?

Yes ___ No _x_

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

Gregory Eiband — Senior Specialist – Environmental Services

Name (type or print) — Title

_____

Signature — Date

ATTACHMENT III

SPILL NOTIFICATION PROCEDURES

SPILL NOTIFICATION PROCEDURES

RESPONSIBILITIES

The following agencies must be contacted and notified of spill incidents as outlined below. If a member of the Environmental Services Department cannot be reached immediately, it shall be the responsibility of the Department Supervisor to make the mandatory notifications.

NOTIFICATION INFORMATION

The following information must be provided to the respective agencies when reporting a spill.

1. Your name and phone number.
2. Company name, address and phone number.
3. Name of person who notified you of spill.
4. Date and time of spill.
5. Location - street, town, county.
6. Name of water body involved or affected.
7. Type of oil spilled and quantity.
8. Cause of spill and responsible party.
9. Action taken.
10. Obtain spill number for records.

REGULATORY AGENCIES

A1. ***Location - <u>New York State.</u>***

A2. ***Spill Type***

1. ***<u>Oil into a body of water, stream, storm drain, sewer.</u>***

Immediate Notification Required

Agency:

(1) National Response Center Duty Officer
U.S. Coast Guard
All Hours: 800-424-8802

(2) NYSDEC Spill Hotline
All Hours: 800-457-7362

Note: In Rockland County if spill is associated with a Petroleum Bulk Storage tank, the following notification must also be made:

(3) Rockland County Department of Health
Catherine Quinn
Office Hours: (845) 364-2617
After hours: (845) 364-2000
Have operator contact individual on call

Note: In Rockland County if spill enters a sanitary sewer, the following notification must also be made:

(4) County of Rockland Sewer District No. 1
Joan Roth, Compliance Administrator
All Hours: (845) 365-6111

2. ***Oil onto land surfaces.***

Immediate Notification Required

Agency: (1) NYSDEC Spill Hotline - **Within two hours**
All Hours: 800-457-7362

B1. **Location - New Jersey.**

B2. **Spill Type**

1. **Oil into a body of water, stream, storm drain, sewer.**

Immediate Notification Required

Agency: (1) National Response Center Duty Officer
U.S. Coast Guard
All Hours: 800-424-8802

(2) NJDEP
All Hours: 1-877-927-6337

2. **Oil onto land surfaces.**

Immediate Notification Required

Agency: (1) NJDEP
All Hours: 1-877-927-6337

C1. **Location - Pennsylvania.**

C2. **Spill Type**

1. **Oil into a body of water, stream, storm drain, sewer.**

Immediate Notification Required

Agency: (1) National Response Center Duty Officer
U.S. Coast Guard
All Hours: (800) 424-8802

(2) Department of Environmental Protection
Office Hours: (570) 826-2511

Night/Weekends: (570) 826-2511

2. **Oil onto land surfaces.**

Immediate Notification Required

Agency: (1) Department of Environmental Protection
Office Hours: (570) 826-2511
Night/Weekends: (570) 826-2511

ORANGE & ROCKLAND PERSONNEL NOTIFICATIONS

ENVIRONMENTAL SERVICES SPILL NOTIFICATION LIST

Environmental Services Department must be notified of all spills and releases.

1. **PRIMARY CONTACT** (WHEN YOU FIND A SPILL/RELEASE CALL THIS ASAP):

O&R Control Center
(845) 577-3228/3185
Onsite workers discovering a release need only call the O&R Control Center. All other notifications will be made by Environmental Services.

ADDITIONAL INFORMATION/ALTERNATE CONTACTS:

Gregory Eiband

Business	(845) 577-3309
Residence	(201) 284-2081
Cell-phone	(347) 931-2890

Art Barikyan

Business	(845) 577-3440
Residence	(845) 359-6009
Cell #1	(845) 597-8333

Aileen Kolvenbach

Business	(845) 342-8902
Residence	(845) 858-7952
Cell #1	(914) 906-8747

Mark Travers

Business	(845) 342-8952
Reside 1	(845) 856-4220
Reside 2	(845) 858-0643
Cell #1	(914) 447-6918
Cell #2	(845) 521-9817

Jay Carregal

Business	(845) 5773238
Residence	(845) 786-2860
Cell #1	(845) 721-7422

Sue Napolitano

Business	(845) 783-5410
Residence	(845) 651-3147
Cell #1	(845) 674-5001

Chris McCallion

Business	(845) 577-3152
Residence	(201) 266-4420
Cell-phone	(845) 290-2372

Bobta Kim

Business	(845) 577-3577
Residence	(845) 480-5626
Cell #1	(845) 558-6644
Cell #2	(845) 656-6119

Ken Houseman

Business	(845) 577-3277
Residence	(845) 355-3026
Cell	(845) 821-5712

Ken McTighe

Business	(845) 577-3895
Residence	(845) 794-8135
Cell	(914) 447-3157

Maureen McDowell

Business	(845) 783-5407
Residence	(201) 693-8963
Cell #1	(845) 240-8693

Gwen Keeble
Section Manager
Environmental Services

Business	(845) 577-3534
Residence	(201) 327-7720
Cell #1	(917) 418-5764
Cell #2	(917) 923-9479

Maribeth McCormick
Technical Manager
Environmental Remediation

Business	(845) 783-5534
Residence	(845) 360-5004
Cell #1	(914) 557-1361
Cell #2	(845) 521-0913

Terry Foxe
Director – Environmental, Health, & Safety

Business	(845) 577-3780
Residence	(845) 365 6147
Cell #1	(914) 447-9798

2. ADDITIONAL NOTIFICATIONS:

Sal Muto
Section Manager – Substation Operations

Business	(845) 577-3204
Residence	(914) 686-2880
Cell	(914) 557-1367

Eric Glass
Manager – Substation Operations

Business	(845) 577-3051
Residence	(845) 359-1345
Cell	(845) 721-7445

Patrick Burke
Director – System Operations

Business	(845) 577-3653
Residence	(914) 909-0869
Cell	(646) 210-2753

3. CORPORATE COMMUNICATIONS MUST BE NOTIFIED OF ALL SIGNIFICANT OIL SPILLS OR SPILLS IMPACTING THIRD PARTIES OR OFF-SITE PROPERTIES.

Working Hours:

Mike Donovan

Business	(845) 577-2430
Cell	(914) 329-1999

Nights/Weekends:

On-Call Representative
Contact Communications Center

4. CLEANUP CONTRACTORS:

If any spill cannot be handled by O&R personnel, an O&R emergency-response contractor will be assigned to clean-up the spill. Environmental Services will decide if an emergency-response contractor is needed to respond to a spill.

ATTACHMENT IV

OIL SPILL RESPONSE PROCEDURES

ATTACHMENT IV

OIL SPILL RESPONSE PROCEDURES

IMMEDIATE ACTION

1. Determine the source of the leak or release and determine size of area impacted by leak/release.

2. Immediately notify the ORU Control Center at (845) 577-3228/3185, who will be responsible for contacting Environmental Services (see Spill Notification Procedures, Attachment III).

3. To the extent possible, immediately confine the spilled material and prevent spillage to surface waters, sewers, or storm drains by diking or damming with absorbents, digging diversion ditches or trenches, or constructing barriers from site-specific materials such as soil, wood, and plastic. Response should be in a defensive manner, containing spill from a safe distance and keeping it from spreading further and preventing exposures.

4. Keep the general public and nonessential personnel out of the spill area.

Note: Hartley Road Substation does not contain any PCB oil.

Cleanup Action for Spills

Except for small incidental spills, spill cleanup activities will be conducted by O&R's spill response contractor. A small incidental spill is a spill less than 5 gallons in capacity, confined to an impermeable surface (e.g., concrete floor), and is able to be completely cleaned up within 2 hours of detection.

1. Small Incidental Spills:

    - Don personal protective equipment (PPE)
    - Use spill response equipment to contain the release.
    - Plug, patch, or wrap leaking equipment to stop the source of the leak.
    - If applicable, check that containment drain valves are sealed closed.
    - Prevent water from entering spill area.
    - Apply absorbent materials, if available.
    - Cordon off area to limit tracking of spill.

2. All Other Spills:

    - Make sure ORU Control Center has been notified. All other spills will be cleaned up by an emergency response contractor.

AVAILABLE RESOURCES

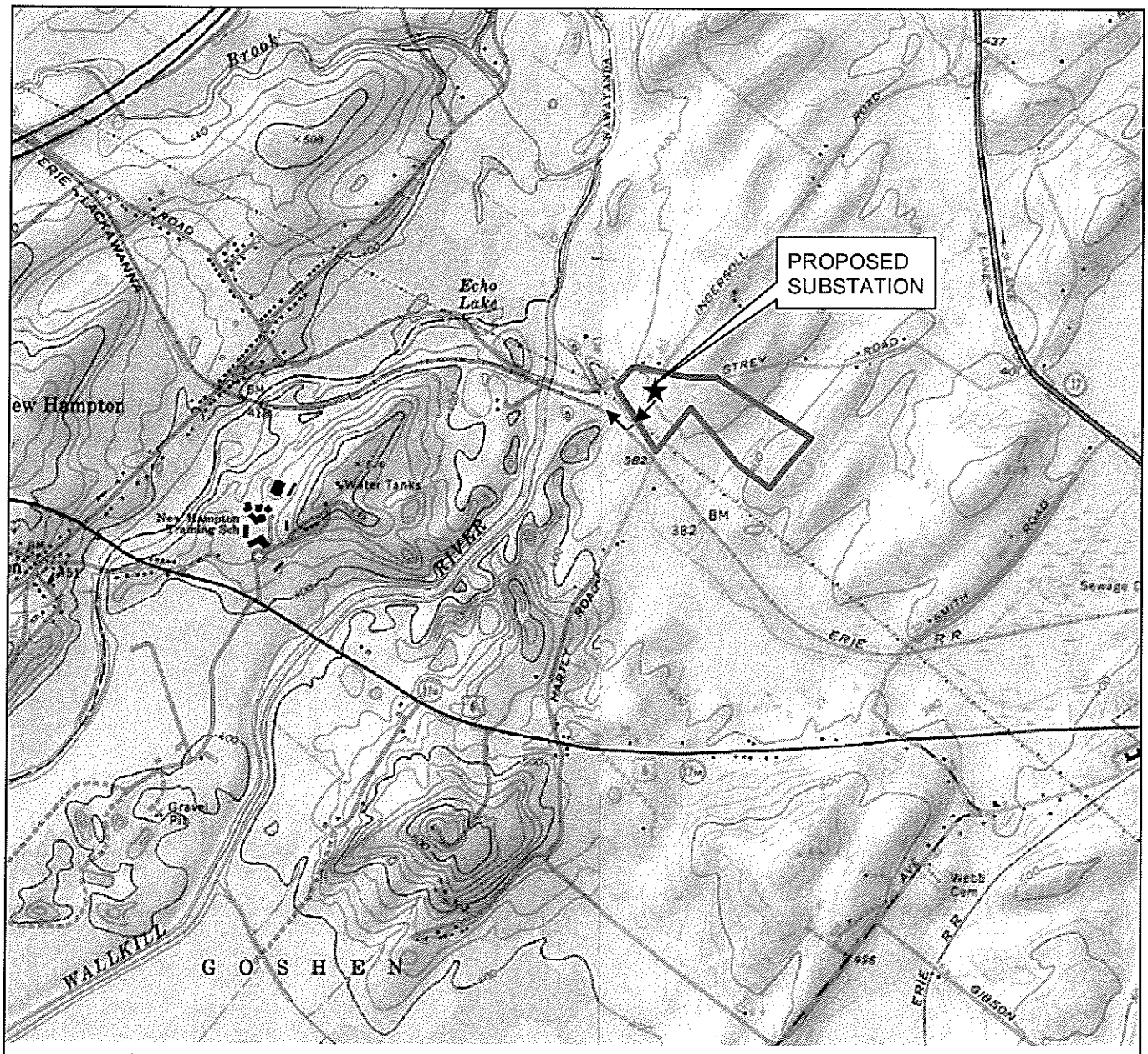
1. Company and contractor manpower will be committed to spill response and cleanup as required.

2. Equipment - Spill containment materials will be available in each of the divisional rooms. Backhoes and front loaders are available from the Operations Department. Mobile tankers with a capacity of 1,500 gallons each are available from the Substation Department for emergency oil storage. Contractor equipment is available as required.

3. Commercial Cleanup Contractors – An emergency response contractor is available on a 24-hour on-call basis as outlined in the Spill Notification Procedures. Environmental Services is authorized to call for assistance.

ATTACHMENT V

FACILITY LOCATION MAP



LEGEND

PROJECT AREA

PREDICTED FLOW PATH FROM FACILITY TO NEAREST NAVIGABLE WATER WAY

LATITUDE: 41° 24' 37.6"N
LONGITUDE: 74° 22' 08.1" N

UTM: 4584514.06 N
552744.60 E

ZONE: 18T

2,200 0 2,200

APPROXIMATE SCALE (FEET)

N

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PROJECT NO.	119978
DRAWN:	10/27/2011
DRAWN BY:	SC
CHECKED BY:	JGC
FILE NAME:	SLC11A237.MXD

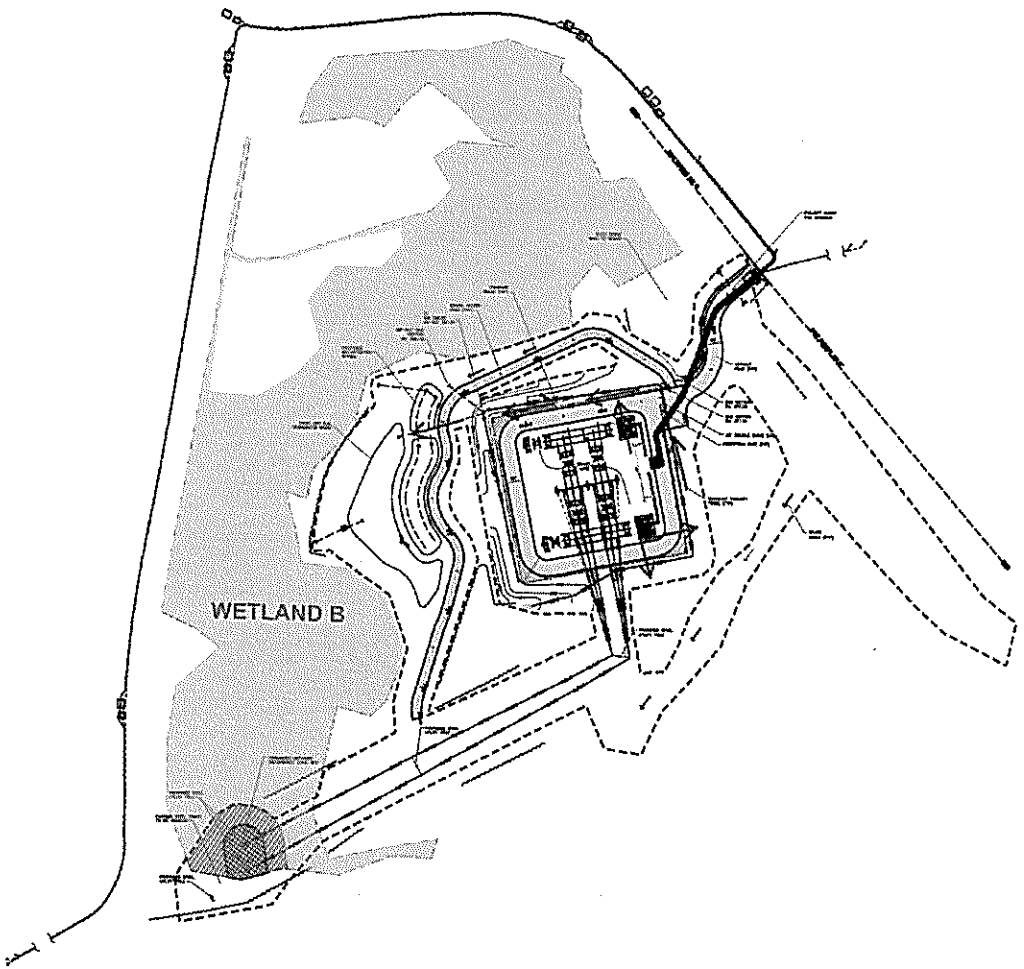
FACILITY LOCATION MAP

HARTLEY ROAD SITE
ORANGE & ROCKLAND UTILITIES, INC.
TOWN OF GOSHEN
ORANGE COUNTY, NEW YORK

FIGURE: 1

ATTACHMENT VI

FACILITY SITE PLAN



LEGEND

OVERLAND FLOW DIRECTION OF POTENTIAL SPILLS

N

0 75' 150' 300'

Approximate Scale: 1" = 150'

PLOTTED: 28 Oct 2011, 10:29am, SContreras

CAD FILE L:\2011\Projects\119978\ LAYOUT FIG 2
SALT LAKE CITY, UT

The information included on the graphical representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphical representation is at the sole risk of the party using or misusing the information.

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PROJECT NO.	119978
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DRAWN BY:	SC
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FILE NAME:	SLC11d200.dwg

PROPOSED SITE PLAN

HARTLEY ROAD SITE
ORANGE & ROCKLAND UTILITIES, INC.
TOWN OF GOSHEN
ORANGE COUNTY, NEW YORK

FIGURE
2

ATTACHMENT VII

MONTHLY SUBSTATION INSPECTION FORM

PAGE: 1 "THINK SAFETY *** WORK SAFELY" WR# 0712753042

TAKEN BY: WMS370C ON: 12/12/2007 @ 17.30 STATUS: 50 CO: 1 DIV: 2 JOB SVC: S
SUBST/SVC: 088/E DEAN LOC: 088 (EQ#000000088)
CREW HDQTR: 0094BG RE HOURS: 0.50 DATE REQD: 01/11/2008
MR CODE: 01-11-0088 SR CODE: M01 #1 INSPECTION

WORK TO BE PERFORMED: #1 INSPECTION - DEAN

COMMENTS:

DELAY CODE: N/A

DIRECTIONS: NORTH OF MINE TOWN ROAD, ABOUT .1 MILE SOUTHEAST
OF RT 293 HIGHLAND FALLS, NY

OUTAGE REQUEST# : N/A OUTAGE REQUIRED :
REQUEST SUBMITTED: OUTAGE SCHEDULED:
OUTAGE COMPLETED :

WORK ASSIGNMENT: CREW ID: N/A DATE ASSIGNED: @
WORK COMPLETION: CREW ID: N/A DATE ASSIGNED: @

FOLLOW-UP WORK REQD: SX ( ) RELATED WR#:

C/U CODE	DESCRIPTION	QUANT
NMR-.5MANHR	0.5 MAN HOUR FOR MR'S	1

REMARKS:
********** NO REMARKS AVAILABLE **********

** NUMBER OF STEPS ASSOCIATED WITH MR# 01-11-0088: 7
** PLEASE REFER TO THE FOLLOWING PAGES.

** CONTINUED ON NEXT PAGE...

** STEPS AND TASKS **

MR# 01-11-0088: #1 INSPECTION - DEAN
SUBST/SVC: 088/E DEAN LOC: 088 (EQ#000000088)
MR NOTES: N/A

MFR: N/A EQ GRP: 009 EQ TYP: 001 STYLE: N/A
VOLTAGE RATE: N/A CUR RATE: 0000
SERIAL NO: X QTY BIL KV: 0
EQP NOTES: N/A

STEP 1: BUS INSPECTION

TEST EQUIPMENT: NONE
TEST PROCEDURE: PERFORM VISUAL INSPECTION
TYPE MEASURE: OK
STEP NOTES: N/A

TASK	ANSWER	LOW STANDARD	HIGH STANDARD
1 CONNECTIONS-CHECK	_____	OK	
2 CHECK INSULATORS	_____	OK	
3 CHECK FITTINGS	_____	OK	

TASK COMMENTS: _____
_____
_____

STEP 2: FUSES-HI VOLTAGE INSPECTION

TEST EQUIPMENT: NONE
TEST PROCEDURE: PERFORM VISUAL INSPECTION
TYPE MEASURE: OK
STEP NOTES: N/A

TASK	ANSWER	LOW STANDARD	HIGH STANDARD
1 CONNECTIONS-CHECK	_____	OK	
2 CHECK INSULATORS	_____	OK	
3 CHECK FUSE TUBES	_____	OK	

TASK COMMENTS: _____
_____
_____

STEP 3: INSTRUMENT TRANSFORMER INSPECTION

TEST EQUIPMENT: NONE
TEST PROCEDURE: PERFORM VISUAL INSPECTION
TYPE MEASURE: OK
STEP NOTES: N/A

TASK	ANSWER	LOW STANDARD	HIGH STANDARD
1 CONNECTIONS-CHECK	_____	OK	

** CONTINUED ON NEXT PAGE...

** STEPS AND TASKS **

TASK COMMENTS: _____
_____
_____

STEP 4: LIGHTNING ARRESTER INSPECTION

TEST EQUIPMENT: NONE
TEST PROCEDURE: PERFORM VISUAL INSPECTION
TYPE MEASURE: OK
STEP NOTES: N/A

TASK	ANSWER	LOW STANDARD	HIGH STANDARD
1 CONNECTIONS-CHECK	_____	OK	
2 CHECK PORCELAIN	_____	OK	

TASK COMMENTS: _____
_____
_____

STEP 5: EQUIPMENT GROUNDS INSPECTION

TEST EQUIPMENT: NONE
TEST PROCEDURE: PERFORM VISUAL INSPECTION
TYPE MEASURE: OK
STEP NOTES: N/A

TASK	ANSWER	LOW STANDARD	HIGH STANDARD
1 INSTRUMENT TRSFR.	_____	OK	
2 POWER TRSFR.	_____	OK	
3 STRUCTURE	_____	OK	
4 FENCES	_____	OK	
5 GATES	_____	OK	

TASK COMMENTS: _____
_____
_____

STEP 6: TRANSFORMER INSPECTION

TEST EQUIPMENT: NONE
TEST PROCEDURE: PERFORM VISUAL INSPECTION
TYPE MEASURE: OK
STEP NOTES: N/A

TASK	ANSWER	LOW STANDARD	HIGH STANDARD
1 CONNECTIONS-CHECK	_____	OK	

** CONTINUED ON NEXT PAGE...

** STEPS AND TASKS **

2	BUSHINGS	_____	OK
3	TANKS & RADIATORS	_____	OK
4	TEMPERATURE	_____	OK
5	OIL LEVEL	_____	OK
6	LEAKS	_____	OK
7	GAUGES	_____	OK

TASK COMMENTS: _____

_____

_____

STEP 7: GENERAL SUBSTATION INSPECTION

TEST EQUIPMENT: NONE
TEST PROCEDURE: PERFORM VISUAL INSPECTION
TYPE MEASURE: OK
STEP NOTES: N/A

TASK		ANSWER	LOW STANDARD	HIGH STANDARD
1	PORCELAIN CLEANLINES	_____	OK	
2	SWITCHSTICKS	_____	OK	
3	WEEDS	_____	OK	
4	YARD SURFACE	_____	OK	
5	TREE CLEARANCES	_____	OK	
6	FENCES	_____	OK	
7	GATES	_____	OK	
8	RODENT EVIDENCE	_____	OK	
9	HOUSEKEEPING	_____	OK	
10	LOCKS	_____	OK	
11	DANGER SIGNS	_____	OK	

TASK COMMENTS: _____

_____

_____

********** END OF REPORT **********

ATTACHMENT VIII

AMENDMENT LOG

ATTACHMENT VIII

AMENDMENT LOG

All technical and/or substantive amendments to the plan, whether undertaken as part of the five-year review or otherwise, must be certified by a Professional Engineer (P.E.). Technical amendments require engineering judgment and occur as a result of changes in facility design, construction, operation, or maintenance that may materially affect the facility's potential to discharge oil. Examples of changes that may require amendment of the Plan include, but are not limited to: commissioning or decommissioning containers; replacement, reconstruction, or movement of containers; reconstruction, replacement, or installation of piping systems; construction or demolition that might alter secondary containment structures; changes of product or service; or revision of standard operation or maintenance procedures at a facility. An amendment must be prepared within six months, and implemented as soon as possible, but not later than six months following preparation of the amendment. Technical amendments require a P.E. certification and, in such case, the certification of this SPCC Plan must be provided in Section 2 – Certification Information.

Administrative amendments may be made by Orange and Rockland Utilities, Inc. without a P.E. certification. Examples of amendments that are *not* considered technical and thus do not require P.E. certification include changes to names or telephone numbers. Amendments which are incorporated into the body of this Plan shall be recorded below, noting the date of this incorporation and description of the amendment.

SPCC Plan Amendments

P.E. Certification Required (Yes/No)	Date	Responsible Person	Description	Page(s)

P.E. Certification Required (Yes/No)	Date	Responsible Person	Description	Page(s)

APPENDIX M
Archaeological Survey

PHASE IA AND IB ARCHAEOLOGICAL SURVEY
HARTLEY SUBSTATION
SECTION 12, BLOCK 1, LOT 1.7
TOWN OF GOSHEN, ORANGE COUNTY
NEW YORK

SEPTEMBER 2010

RICHARD GRUBB & ASSOCIATES, INC.
Cultural Resource Consultants

Phase IA and IB Archaeological Survey
Hartley Substation
Section 12, Block 1, Lot 1.7
Town of Goshen, Orange County
New York

By

Amy K. Raes

Principal Investigator:

Michael J. Gall

Prepared by:

Richard Grubb & Associates, Inc.
30 North Main Street
Cranbury, New Jersey 08512

Prepared for:

Birdsall Engineering, Inc.
65 Jackson Drive
Cranford, New Jersey 07016

Date: September 16, 2010

MANAGEMENT SUMMARY

OPRHP Project Review Number: Not Assigned

Involved State or Federal Agencies: SEQRA

Phase of Survey: IA and IB

Location Information

Location: Hartley Road
Minor Civil Division: Town of Goshen
County: Orange

Survey Area (Metric and English)

Length: 1966m/6450f
Width: 978m/3210f
Depth: Not Applicable
Number of Acres Surveyed: 4.9

U.S.G.S. 7.5 Minute Quadrangle Map: Goshen, NY

Archaeological Survey Overview

Number and Interval of Shovel Tests: 85 shovel tests at 15 meter (50-foot) intervals.

Number and Size of Units: Not Applicable

Width of Plowed Strips: Not Applicable

Surface Survey Transect Interval: Not Applicable

Results of Archaeological Survey

Number and Name of Prehistoric Sites Identified: None

Number and Name of Historic Sites Identified: Three identified stone farm rows

Results of Architectural Survey

Number of Buildings/Structures/Cemeteries Within Project Area: None
Number of Buildings/Structures/Cemeteries Adjacent to the Project Area: None
Number of Previously Determined NR-Listed or Eligible Buildings/Structures/ Cemeteries/Districts: None
Number of Identified Eligible Buildings/Structures/Cemeteries/Districts: None

Report Author(s): Amy K. Raes, MSc.

Date of Report: September 16, 2010

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PHASE IA: LITERATURE SEARCH AND SENSITIVITY ASSESSMENT

Project Description

The following report presents the results of a Phase IA and IB archaeological survey conducted within the Area of Potential Effects (APE) for the proposed Hartley Substation on Section 12, Block 1, Lot 1.7 between Hartley Road and Cheechunk Road in the Town of Goshen, Orange County, New York (Figures 1-2). The APE is located on a 48.732-acre (198,296 square meters) undeveloped, privately-owned parcel of land now or formerly owned by Orange and Rockland Utilities, Inc. (Figure 3). Proposed impacts associated with the project will occur within approximately 4.9 acres (19,89.60 square meters) tract and will consist of the construction of a electrical substation, proposed driveway, access road, one detention basin, and utilities corridor (Figure 3; Appendix A). The Phase IA archaeological survey was conducted to assess the archaeological sensitivity within the APE. The Phase IB archaeological survey was undertaken to determine the presence of any potentially significant archaeological resources within the APE.

This Phase IA and IB archaeological survey has been conducted pursuant to the intents and purposes of the State Environmental Quality Review Act (SEQRA) 6NYCRR Part 617 of the New York State Environmental Conservation Law and falls under the review authority of the OPRHP and meets the standards of the New York Archaeological Council (1994) and the New York State Office of Parks, Recreation and Historic Preservation (2005). The archaeological survey was performed by an archaeologist meeting the standards of 36 CFR 61.

The Phase IA and IB archaeological survey was conducted by Richard Grubb & Associates, Inc. of Cranbury, New Jersey for Birdsall Engineering, Inc. of Cranford, New Jersey. Archaeological fieldwork was performed on July 28, 2010 and August 23 and 24, 2010. Archaeological fieldwork was directed by Michael J. Gall, the Principal Investigator, and Amy K. Raes. This report was written by Amy K. Raes. Patricia McEachen performed graphics production and Sean Bratton performed data entry. Kim Croshier, of Croshier Archaeological Research, conducted background research. Paul McEachen, Christina Dunn and Richard Grubb were report editors. All field notes, photographs, and project documents are stored at the offices of Richard Grubb & Associates, Inc. in Cranbury, New Jersey.

Area of Potential Effects (APE)

The APE is defined in 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effect is influenced by the scale and nature of the undertaking and may be different for different kinds of effects cause[d] by the undertaking." Included within the APE are all locations where the undertaking may result in ground disturbance (see Figure 3). Based on the location of proposed construction activities, the APE is located in the northwestern section of Section 12, Block 1, Lot 1.7, south of Cheechunk Road, east of Echo Lake Road, and north of Hartley Road (see Figure 3; Appendix A).

The APE is characterized by agricultural fields, wetlands and wooded uplands (see Figure 3; Photographs 1-10). Slopes between 2 and 5% comprise the entirety of the APE (see Figure 3; Photographs 1 and 2). A wide band of wetlands borders the west side and intersects the southern portion of the APE (see Figure 3; Photograph 5). Mapped stone farm rows are also located within the APE (see Figure 3; Photographs 4 and 8).

Environmental/Physical Setting

The APE lies within the Hudson-Mohawk Lowlands and Taconic Mountains section of the Ridge and Valley Physiographic Province, which is underlain by Proterozoic and Ordovician-Age shale and sandstone (Isachsen et al. 2000). The Hudson-Mohawk Lowlands are predominantly underlain by shale and shaly sandstones (Cressey 1977).

The APE lies on moderately sloped, upland and lowland topography at an elevation ranging from 118 to 126 meters (388 to 415 feet) above mean sea level (see Figures 1 and 3) and is situated within a drainage divide between an unnamed tributary of the Wallkill River to the southwest and Cheechunk Creek to the southeast. The Wallkill River flows northeast into the Hudson River, which is a primary drainage. Wetlands associated with the an unnamed tributary of Wallkill River are located within and surround the northwestern and southwestern portions of the APE-Direct Effects (see Figures 3; Appendix A).

Soils within the APE are part of the Mardin-Erie Association, and consist of Mardin, Bath-Nassau, Unadilla, and Erie Series soils (Natural Resources Conservation Services 2008; Olsson 1981) (Figure 4; Table 1). Mardin Series soils (MdB) are located throughout the northwest section of the APE and Bath-Nassau Series soils (BnC) are situated along the eastern edge of the APE. Erie Series soils (ErB), Unadilla soils (UnB) and Chenago soils (CnB) are located in the

southern section of the APE. The APE is located primarily within a fallow agricultural field. Wooded sections within the APE consist of mature oak and maple forests. A grassy power line corridor owned by the Orange and Rockland Utilities, Inc. is situated at the southern end of the APE.

Table 1: Soils situated within the APE (based on Natural Resources Conservation Services 2008).

Name	Soil Horizon Depth cm (in)	Color	Texture, Inclusions	Slope	Drainage	Landform
Mardin Gravelly Silt Loam (MdB)	Ap 0-20(0-8 in) B2 20-50 (8-20 in) B'x 50-152 (20-60 in)	DkBrn YBrn OliveBrn	GrSiLo GrSiLo ChannerySiLo	3-15%	Mod. Well drained	Drumlinoid ridges, hills, till plains
Unadilla Silt Loam (UnB)	Ap 0-20 (0-8 in) B2 20-112 (8-44 in) IIC 112-152 (44-60 in)	Brn LtOliveBrn DkGryBrn	SiLo SiLo StratitiedVeryGrlSa	0-8%	Well drained	Lake plains
Erie Gravelly Silt Loam (ErB)	Ap 0-23 (0-9 in) B2 23-46 (9-18 in) Bx1t 46-79 (18-31 in) Bx2t 79-137 (31-54 in) C 137-177 (54-70 in)	DkBrn GryBrn OliveBrn OilveBrn OliveBrn	GrlSiLo ChannerySiLo ChannerySiLo ChannerySiLo ChannerySiLo	3-8%	Somewhat poorly drained	Drumlinoid ridges, hills, till plains
Bath-Nassau Channery Silt Loams (BnC)	Ap 0-23 (0-9 in) B21 23-74 (9-29 in) Bx 74-135 (29-53 in) IIR 135 (53-57 in)	DkBrn YBrn YBrn OliveBrn	ChannerySiLo ChannerySiLo Very ChannerySiLo Unweathered bedrock	8-15%	Excessivel y drained	Drumlinoid ridges, hills, till plains
Chenango Gravelly Silt Loam (CnB)	Ap 0-2315 (0-6 in) B2 15-71 (6-28 in) IIC 71-152 (28-60 in)	DkBrn DkBrn DkGryBrn	GrlSiLo VeryGrlSiLo StratifiedVeryGrlSiSa	3-8%	Somewhat excessively drained	Valley trains, terraces

Background Research

New York State Museum/ Office of Parks, Recreation, and Historic Preservation Site Files

No registered archaeological sites are situated within the APE. However, an examination of the New York State Museum (NYSM) and OPRHP site files and published references indicate that thirteen prehistoric sites are located within a one-mile radius of the APE (Table 2). The three most pertinent sites are NYSM 6200, NYSM 6199 and A071.06.00076, which are located within 0.8 kilometer (one half-mile) of the APE. Site NYSM 6200 is located south of the APE. No further information concerning this site was available at the OPRH. Site NYSM 6199 is situated north of the APE. No further information concerning this site was available. Site A071.06.00076 is located 182.8 meters (600 feet) southwest of the APE. This site was a possible prehistoric camp situated on a gentle upland slope, which overlooks the Cheechunk Creek. This site yielded a stemmed projectile point, two knife/scrapers and a flake, but was not considered to represent a potentially significant archaeological resource. Based on the absence of temporally diagnostic cultural material, no period of occupation could be assigned to this site. No information regarding temporal, functional, or cultural designation was present in NYSM site files for the remaining two NYSM sites (6198, 6171). Although no information regarding the temporal occupation of these sites are included in the site files, prehistoric resources in the Lower Hudson River drainage represent cultural expressions dating to the Paleo-Indian through Late Woodland Periods (Ritchie 1958; Funk 1976; Eisenberg 1978; Kraft 1991). Archaic and Early Woodland period archaeological resources have been documented in proximity to the APE.

Table 2: Registered archaeological sites within a one-mile radius of the APE.

NYSOPRHP Site #	Additional Site #	Distance from the APE m (ft)	Time Period	Site Type
N/A	NYSM 6199; Strong	24 (80)	Unidentified	Unidentified
N/A	NYSM 6200; Halcott	24 (80)	Unidentified	Unidentified
A071.06.0076	Al Turi Site A	182.8(600)	Unidentified	Camp
A071.06.0010	ORGO-14-F	426.7 (1400)	Archaic, Transitional, 18th Century	Prehistoric site; Historic cabin

Table 2: cont.

NYSOPRHP Site #	Additional Site #	Distance from the APE m (ft)	Time Period	Site Type
A071.06.0023	ORGO-13-F	518.2 (1700)	Unidentified	Unidentified
N/A	NYSM 6198; Hutt	548.6 (1800)	Unidentified	Unidentified
N/A	NYSM 6171; Sites	762 (2500)	Unidentified	Unidentified
A071.06.0077	Al Turi Site B	762 (2500)	Archaic	Camp/Workshop
A071.06.000138	Hendler Site	822.9 (2700)	Early Woodland	Camp
A071.19.000193	Huberth Site	822.9 (2700)	Archaic	Workshop
A071.19.0012	Echo Lake; OR-WW-05-F	883.9 (2900)	Archaic-Transitional	Unidentified
A71.19.0032	OR-WW-25-F	1036.3 (3400)	Unidentified	Unidentified
A071.06.0112	Orange County Jail	1066.8 (3500)	Prehistoric	Unidentified

National/State Register Files

No significant cultural resources are present within or adjacent to the APE. Two possible National Register eligible properties were recorded with a half-mile radius of the APE. The properties, located at 212 Cheechunk Road (No. 071.06.00126) and 331 Echo Road (No. 071.06.00130), were recorded as eligible for listing on the National Register; however, the survey forms were missing from the files at the New York OPRHP. No further information concerning the properties was available.

Cultural Resources Surveys

Background research indicates that no prior cultural resource surveys were conducted within the APE. However, four cultural resources surveys have been conducted within a one-mile radius of the APE (Hunter Research Associates 1987, 1988, 1989; Hartgen Archaeological Associates, Inc. 1997; Brockington and Associates, Inc. 1991; Oberon 1994; Richard Grubb & Associates, Inc. 2005; CITY/SCAPE 2006). In a Phase I archaeological survey of a sand and gravel mining site conducted 500 feet southwest of the APE, Hunter Research Associates (1987) identified two possible prehistoric archaeological sites. Site A071-06-0076 was located 182.8 meters (600 feet) west of the APE but was not recommended for further study (Hunter Research Associates 1987). During the Phase II investigations, Hunter Research Associates (1988) identified the limits of Site A0-71-06-0077, a camp site or lithic reduction station, located 762 meters (2,500 feet) southwest of the APE. Phase III investigations identified Site A071-06-0077 as a lithic reduction station and short-term occupation site dating from Middle Archaic through Middle Woodlands time periods (Hunter Research Associates 1989). Hafted points, staged bifaces, hammerstones and debitage accounted for the majority of the artifact assemblage.

During a Phase I cultural resources survey for the County Jail Facility project, located 518 meters (1,700 feet) southwest of the APE, Hartgen Archaeological Associates (1997) identified a sparse scatter of chert debitage on a ridge top 701 meters (2,300 feet) southeast of the APE. The prehistoric debitage consisted of five chert flakes which were confined to the plowzone. No further investigations were recommended. Hartgen Archaeological Associates (1997) also identified site A07106.000112, located roughly 883.9 meters (2,900 feet) east of the APE, which interpreted to represent a small, ephemeral tool refining station of unknown temporal or cultural designation. The site was not considered to represent a potentially significant archaeological site (Hartgen Archaeological Associates, Inc. 1997).

Brockington and Associates, Inc. (1991) conducted a Phase IB archaeological survey 60.9 meters (200 feet) southwest of the APE to determine the significance of two previously identified prehistoric archaeological sites. Due to the low density of artifacts and absence of features, no further work was recommended for these two sites. Oberon (1994) conducted Phase IB and Phase II cultural resource surveys, also 60.9 meters (200 feet) southwest of the APE, which identified three prehistoric archaeological sites. The sites were characterized as small, short-use camps and the potential for further archaeological study to produce significant cultural information was considered low. No additional survey was recommended.

Richard Grubb & Associates, Inc. (2005) conducted a Phase IA and IB archaeological survey and identified the Hendler site (A071.06.0138) approximately 822.9 meters (2700 feet) east of the APE. The site represents an Early Woodland Period hunting and tool-processing campsite and a Phase II investigation was recommended as the site was considered to represent a potentially significant archaeological resource. CITY/SCAPE: Cultural Resource Consultants

(2006) conducted Phase II investigations at the Hendler Site but did not yield any further data concerning the archaeological significance of this site. No further work was recommended.

Prehistoric Period

Due largely to the effects of time and changes in the natural environment, prehistoric archaeological resources are highly ephemeral and often difficult to locate. In order to organize information from the archaeological record about the pre-European occupants of the New World, archaeologists have devised a three-stage framework. This culture history is constantly changing and undergoing reorganization whenever new evidence is unearthed. The culture history of the pre-Contact Period Native inhabitants in New York is divided into three broad time periods: Paleo-Indian 10,000-6000 B.C., Archaic 6000-1000 B.C., and Woodland 1000 B.C.-A.D. 1600 (Ritchie 1980). Much synthesis of these periods has been undertaken and need not be repeated here. Basic information for each time period is provided in Table 3. Further details on New York prehistory can be accessed in the following sources: Funk (1976), Ritchie (1980), Diamond (1999).

Table 3: New York prehistory.

Time Frame	Period	Characteristics
1000-1350 A.D.	(Late Woodland)	-occupation of unfortified hamlets, camps -long houses and wigwams -foraging with limited agriculture -flexed burials -collarless, cord-decorated ceramic vessels -triangular projectile points
1000 B.C.-1000 A.D.	Early/Middle Woodland	-hunter-gatherers, spring/summer congregation and fall/winter dispersal -large and small camps -band-level society with first evidence of community identity -mortuary ceremonialism -extensive trade networks for exotic raw materials -shellfish exploitation
1000-7000 B.C.	Archaic	-hunter-gatherers -large and small camps -band level society -mortuary ceremonialism -extensive trade networks for exotic raw materials -first use of ceramic vessels
7000-9000 B.C.	Paleo-Indian	-first human occupation of New York -hunters of caribou and now-extinct Pleistocene mammals -fluted projectile points -small camps -band level society

Historical Background/Map Research

After Orange County was formed in 1683 (Ruttenber and Clark 1881:20-21; Hedley 1908), the APE and vicinity was located within a tract of land included in the Wawayanda Patent, part of which was purchased in 1721 to form the Town of Goshen (Ruttenber and Clark 1881:521). The APE is currently situated in the Town of Goshen.

The first Europeans to settle in the Town of Goshen were English of Presbyterian faith, who arrived during the early-eighteenth century. These early settlers included the Everett, Carpenter, Gale, Jackson, Webb, Bradner, and Denton families, among others, many of whom settled in the Village of Goshen, located about 4,023 meters (13,200 feet) southeast of the APE (Eager 1846-184; Ruttenber and Clark 1881:521; Gregg 1908:223). These and other early families were attracted to the area's rich arable soils, which enabled the development of the town's agricultural community. The agricultural industry remained a staple, lucrative element in the town's economic development throughout the eighteenth and nineteenth centuries. By the 1880s, in relation to the rest of the State of New York, Orange County ranked first in dairy production, second in hay and corn production, and third in wheat and potatoes (Morrison 1908:638). This development also spurred gradual settlement and population growth.

A review of historic maps indicates that settlement near the APE was sparse during the eighteenth and nineteenth centuries, and that no structures were erected within the APE during that time period (De Witt 1802; Burr 1839; Sidney 1851; French et al. 1859; Beers 1875) (Figures 5 though 9). The 1802 De Witt map (see Figure 5) and the 1839 Burr Map

(see Figure 6) record the APE as the property of L. Symmes or Symes. By 1851, a saw mill had been erected approximately 91 meters (300 feet) southwest of the APE at what is now the southern corner of Hartley Road and Cheechunk Road (see Figures 7 and 8) but was razed by 1875 (see Figure 9). A building owned by W. Strong, located 91.4 meters (300 feet) northwest of the APE was situated at the northwest corner of Cheechunk Road and Owens Road (see Figure 7). The 1859 French, Wood and Beers map depicted this building, still labeled as the property of W. Strong, 152.4 meters (500 feet) further west of the APE-Direct Effects; no longer at the corner of Owens Road but along a bend in Cheechunk Road (see Figure 8). By 1875, however, the building was one again recorded at the corner of Owens Road and now labeled B.B. Strong (see Figure 9). The 1908 U.S.G.S. map depicts this structure and another at the corner of Cheechunk Road and Owens Road (Figure 10). Both of these structures are still extant today. The inhabitants of this farmstead may have cleared and farmed much of the land within the APE. Stone farm rows in the APE indicate that it was historically used for agricultural purposes (see Figure 3).

Despite the sparse development in the immediate vicinity of the APE, the nearby Hamlet of Goshen experienced rapid development and served as the social, commercial, religious, educational, and political center for the surrounding area (Eager 1846-1847:502-505). Taverns, hotels, churches, public schools, and a variety of craftsmen, including blacksmiths, wheelwrights, and millers, serviced the local community (Ruttenber and Clark 1881).

This hamlet and the surrounding community were also serviced by a network of roads, which enabled farmers to bring their crops to market. The new, improved road system, including the creation of turnpikes during the early nineteenth century, enabled travelers, traders, merchants, and farmers to easily transverse the countryside and visit larger market areas such as Albany and New York City (Eager 1846-1847:52-57; Ruttenber and Clark 1881:111-116). By the 1830s, the Erie Railroad, located 91.4 meters (300 feet) south of the APE, which bisected the Village of Goshen, offered another form of transportation for farmers, as well as travelers. The railroad allowed farmers within the community to transport large, heavy loads of crops across the rolling hills and undulating terrain to other towns in the county and state (Ruttenber and Clark 1881:118). In addition to the railroad, an electric railroad was constructed north of Cheechunk Road outside of the APE, which connected to the Erie Railroad at the Village of Goshen (see Figure 7). As the road infrastructure improved, settlement in the Town of Goshen increased.

While settlement in the Town of Goshen increased during the nineteenth and twentieth centuries, the APE remained undeveloped, and no structures are depicted within the APE on twentieth century maps (see Figures 1 and 10). Despite the lack of development, the APE has continued to be utilized for agricultural purposes. Today, agricultural pursuits continue to dominate in Town of Goshen, with light industrial and commercial development scattered throughout the town.

Sensitivity Assessment

An evaluation of archaeological potential is based upon environmental factors (topography and hydrology), presence of recorded cultural resources in the files at the NYSM and the OPRHP, a review of historic maps, and a site visit.

Prehistoric Resources
The proximity of known prehistoric resources, topographic setting, and distance from water suggest that the APE has a high potential for containing prehistoric archaeological resources.

Historic Resources
Based on primary- (maps) and secondary-source research and the absence of historic structures within the APE, the sensitivity for historic archaeological resources is considered low.

Based on the sensitivity for prehistoric resources, Richard Grubb & Associates recommends that a Phase IB archaeological survey be conducted in archaeologically sensitive areas of the APE.

Site Visit

A site visit was conducted on July 28, 2010 and included a visual inspection of the APE. The APE was characterized by a mixture of dense forest of mature and sapling oak and maple trees and an agricultural field (see Photographs 1-3 and 7) and the topography in the APE sloped in a southwest direction (see Figure 2). In addition, three stone farms rows were identified within the APE.

Existing disturbance within the APE is minimal and consists of soil plowing associated with the use of the property for agricultural purposes. However, a small portion of the APE, measuring roughly 30.5 meters wide by 30.5 meters long (100 feet wide by 100 feet long), has been disturbed by the previous grading and construction of a 50-meter (165-foot) wide right-of-way for the Orange and Rockland Utilities corridor.

Testing Recommendations

Based on topographic settings, existing conditions, and sensitivity for prehistoric archaeological resources, Richard Grubb & Associates recommended that the APE be investigated through a strategy of systematic subsurface archaeological testing.

PHASE IB: FIELD INVESTIGATION

Research Goals and Design

The purpose of the Phase IB archaeological survey is to identify any potentially significant archaeological resources within the APE. Based on the high sensitivity for prehistoric archaeological resources, a subsurface testing strategy was devised to sample and identify potentially intact prehistoric archaeological deposits within the APE. The upland topographic setting suggested that a prehistoric site, if present, would likely be situated in relatively shallow archaeological contexts. A research design was chosen to test the APE at systematic (i.e., 15 meter) sampling intervals in places where impacts are proposed and where slopes were less than 12%. This strategy meets the standards of the New York Archaeological Council (1994).

National Register of Historic Places Criteria

Potentially significant historic properties include districts, structures, objects, or sites which are at least 50 years old and which meet at least one National Register criterion. Criteria used in the evaluation process are specified in the Code of Federal Regulations, Title 36, Part 60, National Register of Historic Places (36 CFR 60.4). To be eligible for inclusion in the National Register of Historic Places, a historic property(s) must possess:

> the quality of significance in American History, architecture, archaeology, engineering, and culture [that] is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history, or
>
> (b) that are associated with the lives of persons significant in our past, or
>
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components lack individual distinction, or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

The physical characteristics and historic significance of the overall property are examined when conducting National Register evaluations. While a property in its entirety may be considered eligible based on Criteria A, B, C, and/or D, specific data is also required for individual components therein based on date, function, history, and physical characteristics, and other information. Resources that do not relate in a significant way to the overall property may contribute if they independently meet the National Register criteria.

A contributing building, site, structure, or object adds to the historic architectural qualities, historic associations, or archeological values for which a property is significant because a) it was present during the period of significance, and possesses historic integrity reflecting its character at that time or is capable of yielding important information about the period, or b) it independently meets the National Register criteria. A non-contributing building, site, structure, or object does not add to the historic architectural qualities, historic associations, or archeological values for which a property is significant because a) it was not present during the period of significance, b) due to alterations, disturbances, additions, or other changes, it no longer possesses historic integrity reflecting its character at that time or is incapable of yielding important information about the period, or c) it does not independently meet the National Register criteria.

Field Methods and Procedures

Archaeological fieldwork was conducted by Richard Grubb & Associates staff on August 23 and 24, 2010 and included a visual inspection of the APE and subsurface archaeological testing. The archeological survey was directed by Michael J. Gall (Principal Investigator). Dave Strohmeier (Crew Chief) supervised field crew, which consisted of Adrienne Jarczewski, Alexis Platvoet, Jennifer Falchetta, and Tara DosSantos.

Based on the location of proposed construction impacts, subsurface testing within the APE was undertaken in the form of shovel test pits (STPs), which were placed at systematic sampling intervals to determine the presence or absence of potentially significant archaeological resources.

A grid was established over the APE with compasses and tape measures. Existing roads, stone fence lines, and other landmarks were used for orientation. Shovel test pits were assigned northing and easting coordinates (eg. N1000/E1000) based on their location to separate datums situated in the APE. The southwest corner of the APE was arbitrarily assigned a coordinate of N50/E100, and each STP was assigned a northing and easting based on its relation to this datum. The STPs were excavated at 15-meter (50-foot) intervals throughout the APE.

The location of each STP was plotted on a project base map (Figure 11). Shovel test pits measured approximately 45 centimeters (17 inches) in diameter and extended into culturally sterile subsoils. All soils were sifted through six-millimeter (1/4-inch) wire mesh screen in order to recover all artifacts, regardless of age or cultural affiliation. Crew members recorded soil information on standardized field forms (Appendix B). Shovel test pits were immediately backfilled and restored to original contours following completion of each STP.

Artifacts, if present, were to be placed in re-sealable bags along with standardized tags denoting their provenience, including test number, level, depth, and stratum. However, no artifacts were encountered during the investigations. All field notes, photographs, and project documents are housed at the offices of Richard Grubb & Associates in Cranbury, New Jersey.

Results

A total of 88 STPs were plotted at 15-meter (60-foot) intervals in the APE. However, due to obstructions, including stone fences and an active wasp hive, a total of 3 STPs were not excavated. A variety of topographic features also were investigated during subsurface archaeological testing, including lowlands and side slope settings.

APE

A total of 85 STPs were excavated within the APE. Soils encountered within the APE typically consisted of a 30-centimeter (11 inch) thick dark grey-brown or brown silt loam topsoil with shale and rock inclusions (A-horizon), followed by a yellowish brown rocky silt clay loam subsoil (B-horizon). The excavation of 50 STPs was stopped by bedrock at an average depth of 43 centimeters (17 inches). No prehistoric or historic artifacts were found and no cultural features were encountered during STP excavations. However, three stone farm rows bisected the APE. The stone farm rows were recorded on a Historic Resource Inventory form, which can be found in Appendix C of this report.

CONCLUSION AND RECOMMENDATIONS

The Phase IA and IB archaeological survey consisted of background research, a sensitivity assessment, a site visit, and the excavation of STPs throughout the APE. Neither prehistoric nor historic cultural materials were recovered within the APE. None of the three identified, surficially exposed stone farm rows are considered to represent potentially significant archaeological resources. No further archaeological survey is recommended. Further, while no standing structures are located within the APE, 212 Cheechunk Road, eligible for listing on the National Register of Historic Places, is located roughly 150 feet northwest of the APE. However, in correspondence dated November 3, 2010, the OPRHP indicated that as part of a SEQRA permit, an architectural survey would not be required for the property located at 212 Cheechunk Road.

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1908 15' Quadrangle: Goshen, NY.

1957 7.5' Quadrangle: Goshen, NY.

1969 7.5' Quadrangle: Middletown, NY (Photoinspected 1976).

FIGURE LIST:

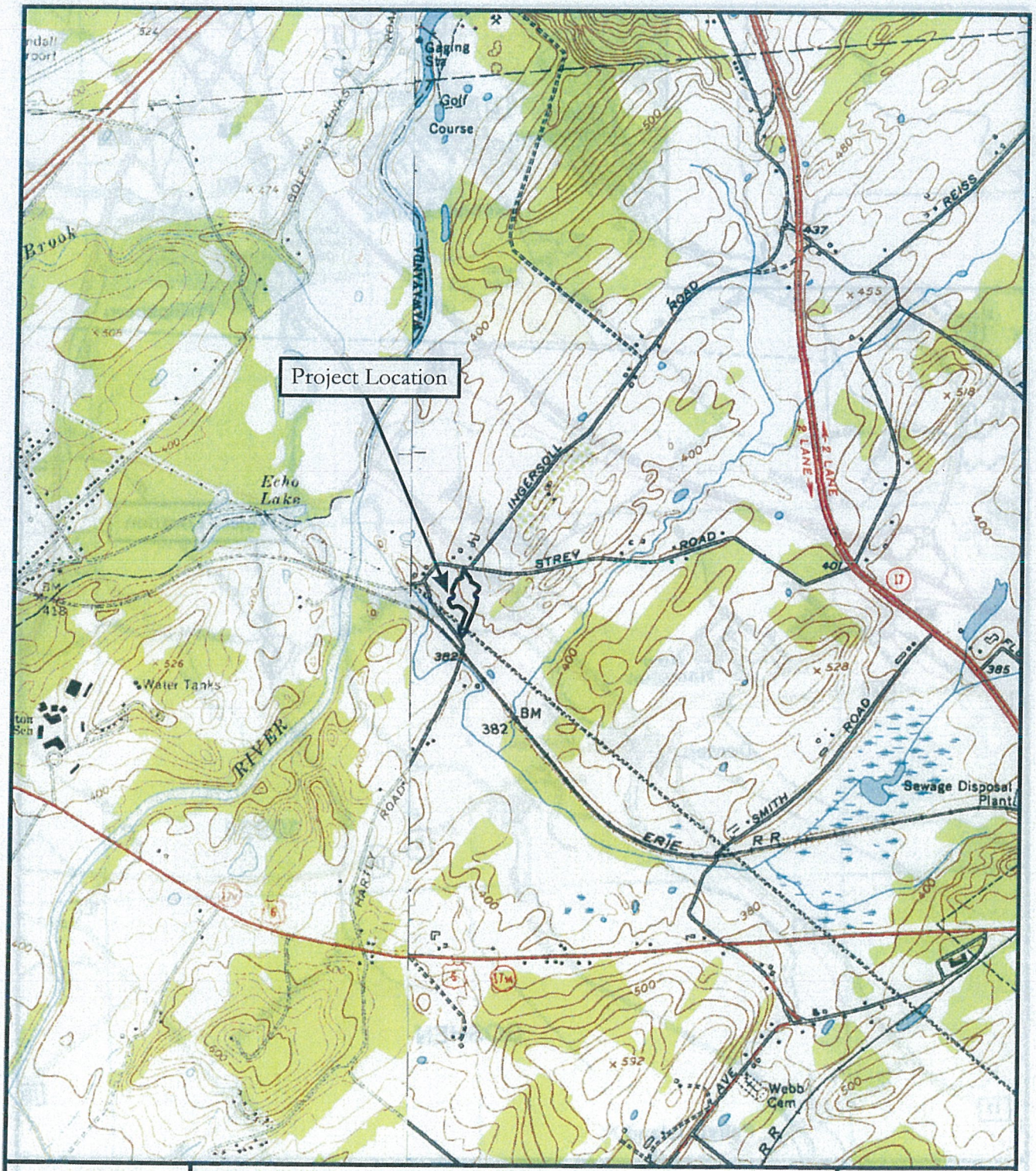

Figure 1:

U.S.G.S. Map (from 1969 U.S.G.S. 7.5' Quadrangles: Middletown, NY (photoinspected 1976), and 1957 Goshen, NY).

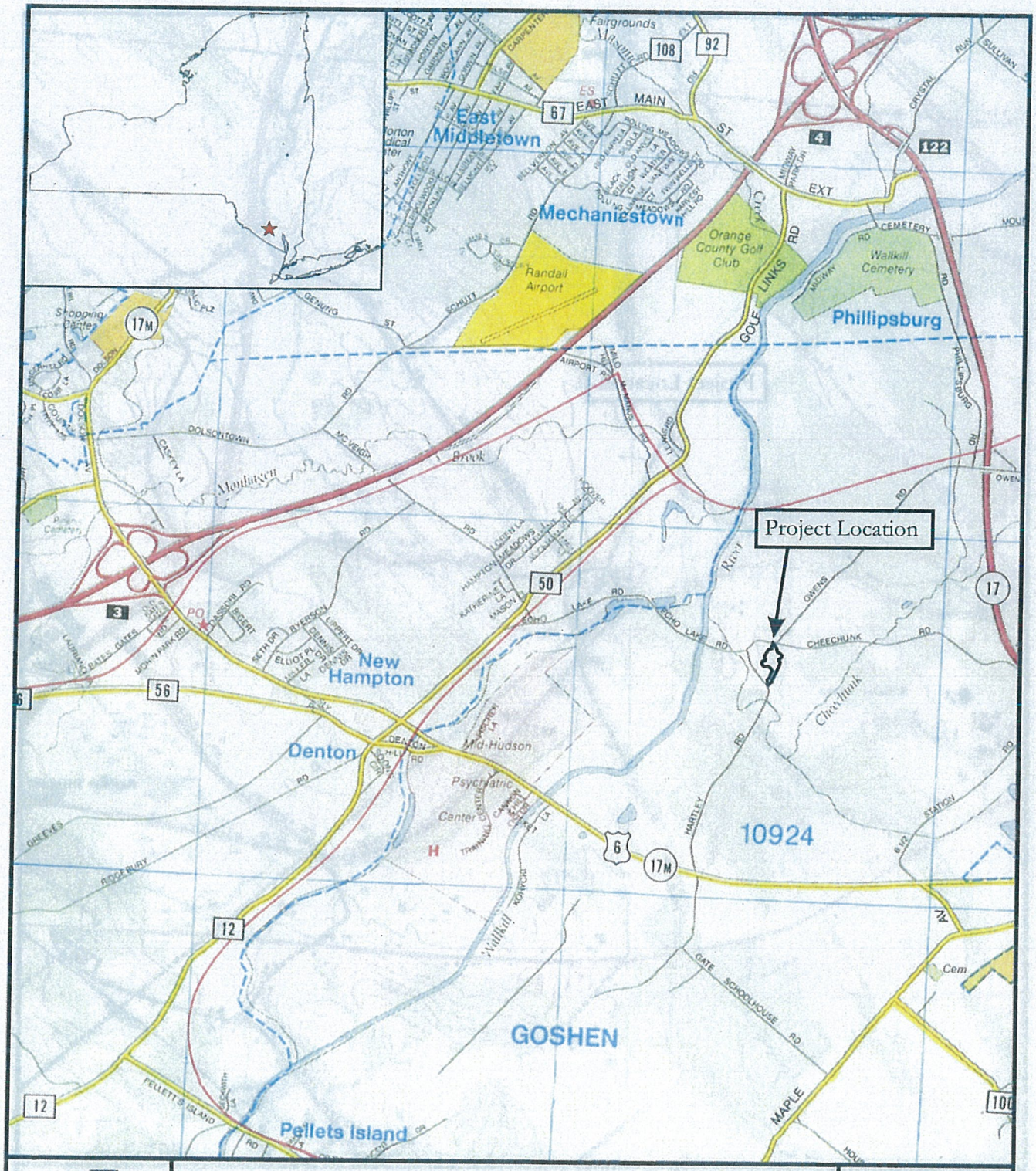

Figure 2:

County Map
(from 2000 Hagstrom Map Company, Inc., Street Map of Orange County, New York).

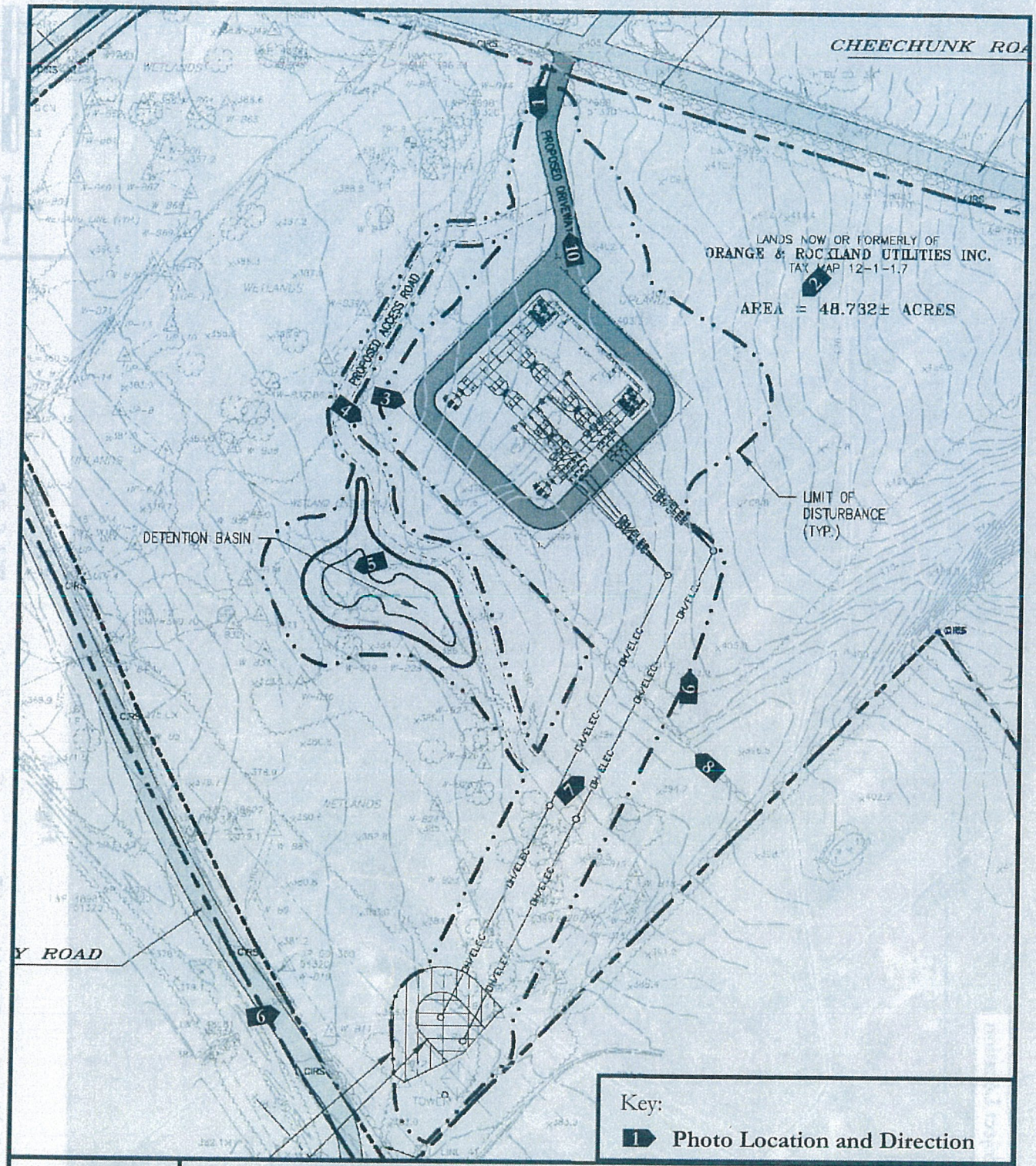

Figure 3:

Construction Plan showing slopes and photograph locations.

Figure 4:

Soils Map (from 2008 Natural Resources Conservation Service, Web Soil Survey, http://websoilsurvey.nrcs.usda.gov).

N W E S

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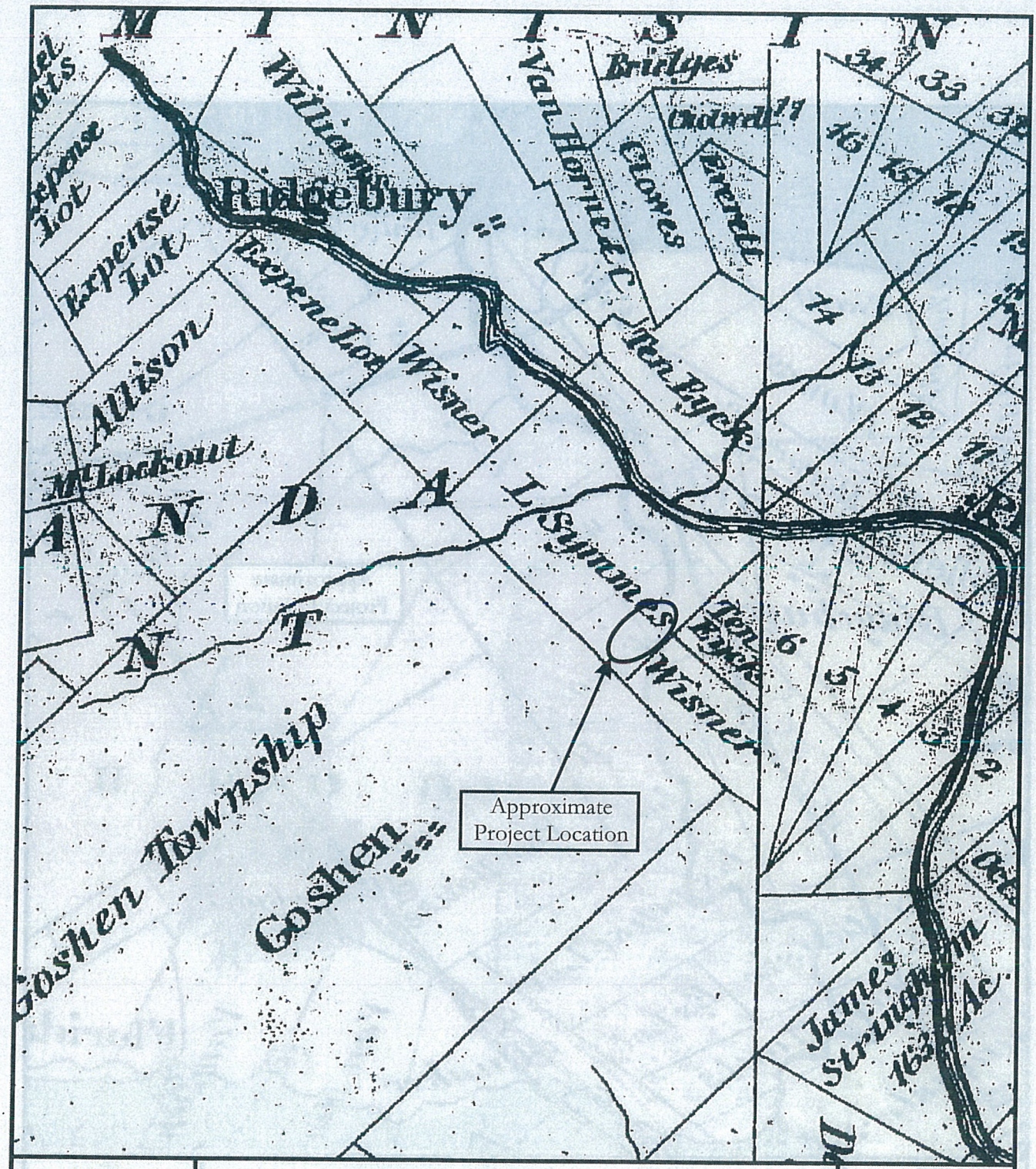


Figure 5:

1802 Simeon De Witt, Map of Land Patents
from Original Surveys.

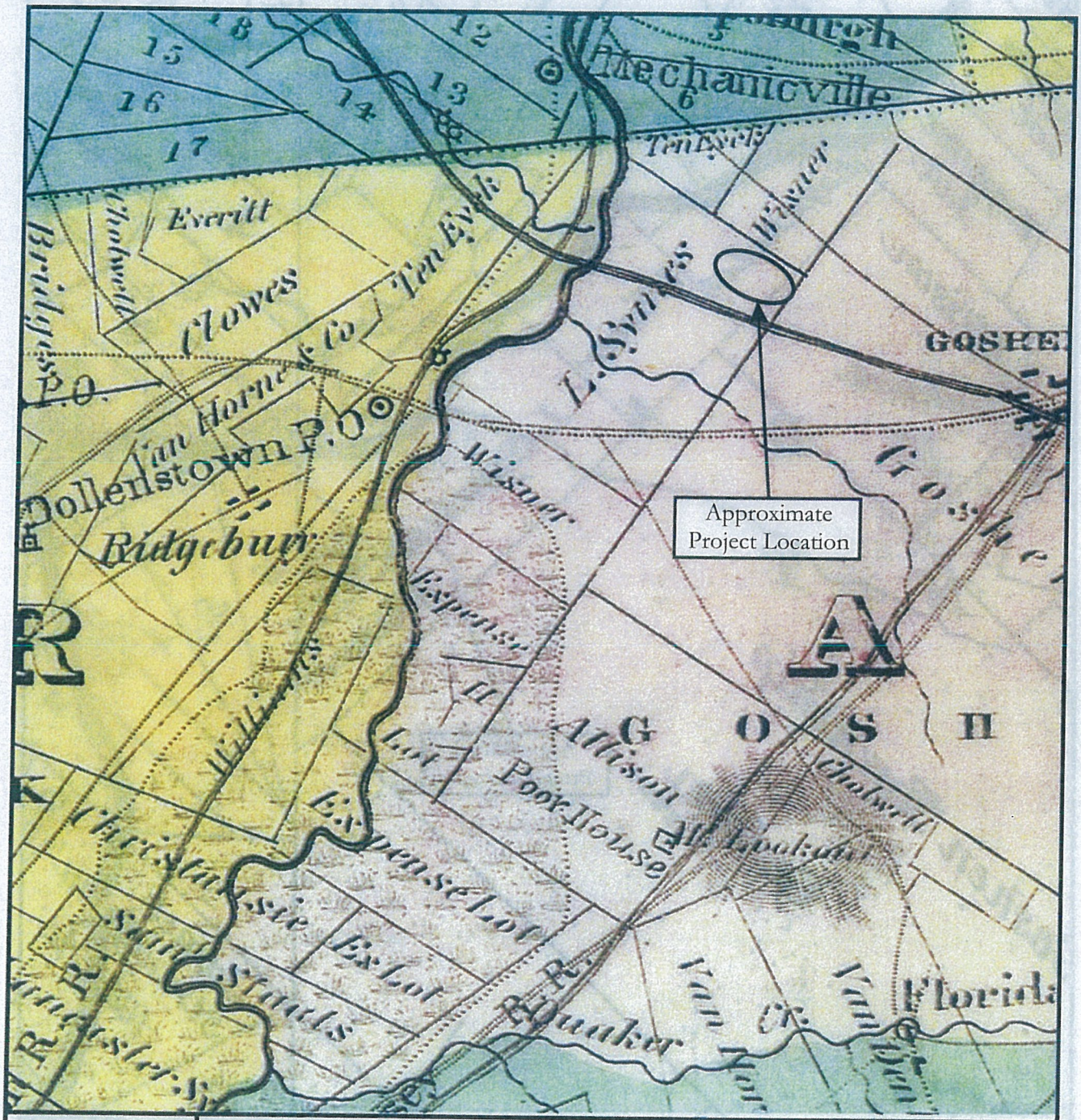
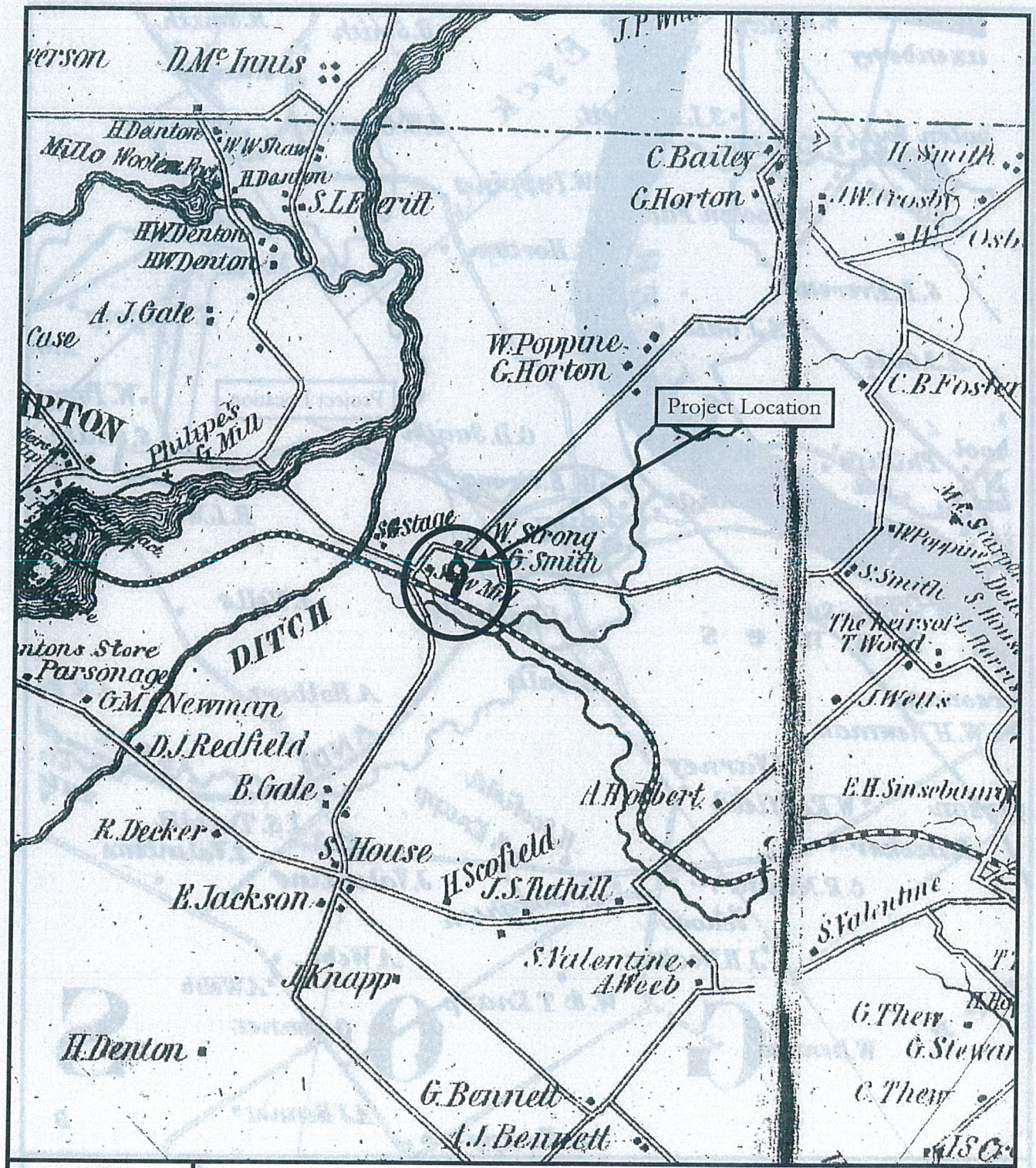


Figure 6:

1839 David H. Burr, Map of the Counties of Orange and Rockland.



RGA

Figure 7:

1851 J.C. Sidney, Map of Orange County, New York.

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Figure 8:

1859 F.F. French et al., Map of Orange and Rockland Co., New York.

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Figure 9:

1875 F.W. Beers, *County Atlas of Orange, New York.*

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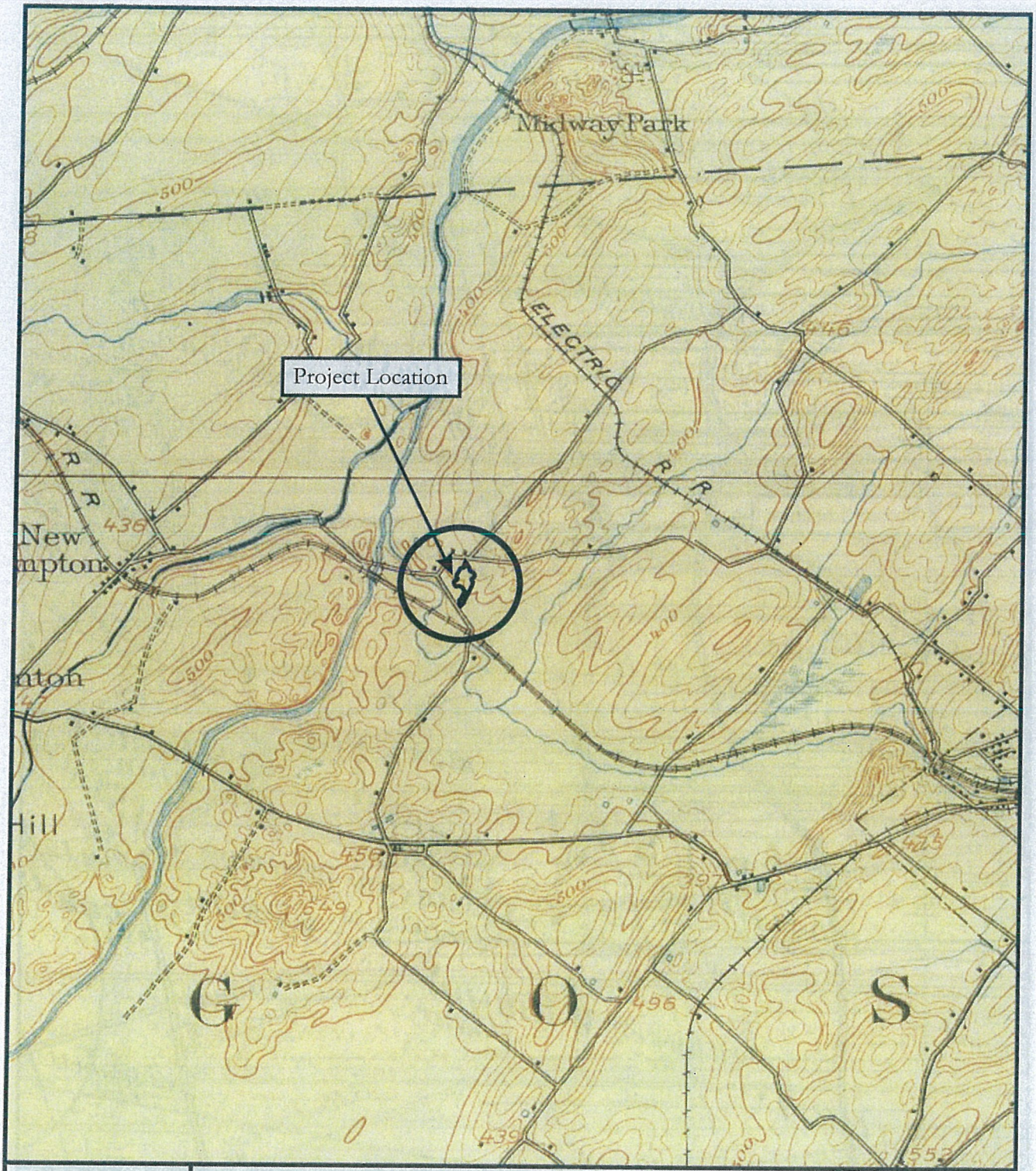


Figure 10:

1908 U.S.G.S. 15′ Quadrangle: Goshen, NY.

PHOTOGRAPH LIST (SEE FIGURE 3 FOR PHOTOGRAPH LOCATIONS):

Photograph 1:

Overview of the proposed driveway and the location of the proposed electrical substation (arrow).
Photo view: Southeast
Photographer: Amy Raes
Date: July 28, 2010

Photograph 2:

Overview of the proposed location of the electrical substation.
Photo view: Southwest
Photographer: Amy Raes
Date: July 28, 2010

Photograph 3:

View from the proposed access drive towards the center of the proposed electrical substation.
Photo view: East
Photographer: Amy Raes
Date: July 28, 2010

Photograph 4:

View of the stone farm row from the proposed access drive.
Photo view: Southeast
Photographer: Amy Raes
Date: July 28, 2010

Photograph 5:

Overview of the proposed detention basin and the vicinity of the wetlands (arrow).
Photo view: Southwest
Photographer: Amy Raes
Date: July 28, 2010

Photograph 6:

Overview of the existing Orange and Rockland utilities corridor from Hartley Road.
Photo view: Northeast
Photographer: Dave Strohmeier
Date: August 24, 2010

Photograph 7:

Overview of the oak and maple forest and the proposed utility corridor.
Photo view: Northeast
Photographer: Amy Raes
Date: July 28, 2010

Photograph 8:

View of the stone farm row near the proposed utility corridor.
Photo view: West
Photographer: Dave Strohmeier
Date: August 24, 2010

Photograph 9:

Overview of the proposed electrical substation location.
Photo view: North
Photographer: Dave Strohmeier
Date: August 24, 2010

Photograph 10:

Overview of shovel test pit excavation within the proposed driveway.
Photo view: Northwest
Photographer: Dave Strohmeier
Date: August 24, 2010

APPENDIX A: PROJECT DOCUMENTS

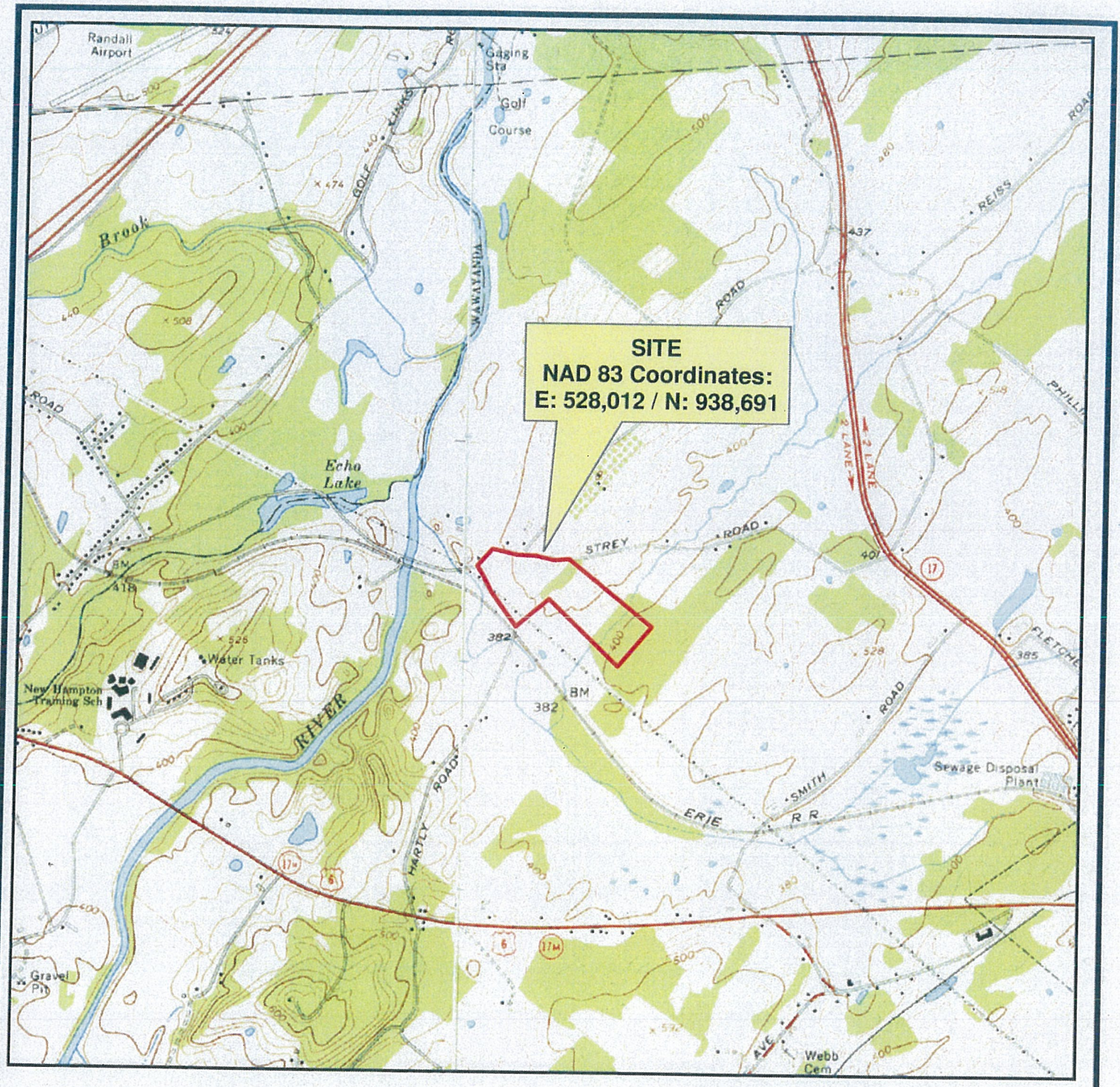


FIGURE 1: APPROXIMATE SITE LOCATION OUTLINED ON A 7.5-MINUTE SERIES QUADRANGLE, GOSHEN, NY

USGS SITE LOCATION MAP

N
W E
S

ORANGE & ROCKLAND UTILITIES, INC.

Section 12. Block 1, Lot 1.7
Town of Goshen
Orange County, New York

CMX
20 WATERVIEW BLVD.
P.O. BOX 5245
PARSIPPANY, NJ 07054
TEL. (973) 299-7970 FAX (973) 334-5588

SCALE	DATE	DRAWN BY	PROJECT #
1" = 2,000'	1-4-10	DJC	090472602

APPENDIX B

APPENDIX B: SHOVEL TEST PIT LOG

APPENDIX B: SHOVEL TEST PIT LOG

NORTH	EAST	DEPTH cm (feet)	STRATUM	COLOR	TEXTURE	ARTIFACTS
1000	1700	00-20 (0.0-0.65)	A	Brn	SiLo, Rock & Rts	NCM
		20-38 (0.65-1.25)	B	Ybrn	SiLo, Rock & Rts	NCM
						Stopped by Rock
1050	1600	00-27 (0.0-0.9)	A	Dk GBrn	SiLo, Rock	NCM
		27-58 (0.9-1.9	B	Brn	SiLo, Rock	NCM
1050	1650	00-24 (0.0-0.8)	A	Blk	SiClLo	NCM
		24-46 (0.8-1.5)	B	Olive GBrn	SiClLo	NCM
						Stopped by Rock
1100	1600	00-30 (0.0-1.0)	A	Dk Brn	SiLo, Shale & Rock	NCM
		30-60 (1.0-2.0)	B	Ybrn	SiClLo, Shale & Rock	NCM
1100	1650	00-23 (0.0-0.75)	A	Dk Brn	SiLo, Shale	NCM
		23-43 (0.75-1.4)	B	Dk Brn / Brn	SiCl, Shale	NCM
						Stopped by Rock
1100	1700	00-20 (0.0-0.65)	A	Blk	SiLo, Shale	NCM
		20-32 (0.65-1.05)	B	Blk, Ybrn	SiLo, Shale	NCM
						Stopped by Rock
1150	1600	00-15 (0.0-0.5)	A	Blk	SiClLo, Shale	NCM
		15-40 (0.5-1.3)	B	Olive Brn	SiClLo, Shale	NCM
						Stopped by Rock
1150	1650	00-27 (0.0-0.9)	A	Blk	SiClLo	NCM
		27-58 (0.9-1.9)	B	Ybrn / Olive Brn	SiClLo	NCM
1200	1600	00-22 (0.0-0.7)	A	Dk GBrn	SiLo, Rock	NCM
		22-31 (0.7-1.0)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Bedrock
1200	1650	00-19 (0.0-0.6)	A	Dk GBrn	SiLo, Rock	NCM
		19-37 (0.6-1.2)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Bedrock
1250	1250	00-30 (0.0-1.0)	A	Dk GBrn	SiLo, Rock	NCM
		30-52 (1.0-1.7)	B	Ybrn	SiLo, Rock	NCM
					SiLo, Rock	
1250	1300	00-24 (0.0-0.8)	A	Dk GBrn	SiLo, Shale	NCM
		24-43 (0.8-1.4)	B	Ybrn	SiLo, Shale	NCM
						Stopped by Bedrock
1250	1550	00-28 (0.0-0.9)	A	Dk GBrn	SiLo, Shale & Rock	NCM
		28-47 (0.9-1.55)	B	Dk Ybrn	SiLo, Shale & Rock	NCM
						Stopped by Bedrock
1250	1600	00-24 (0.0-0.8)	A	Dk GBrn	SiLo, Rock	NCM
		24-46 (0.8-1.5)	B	Ybrn	SiLo, Rock	NCM
						Stopped by Rock
1300	1200	00-20 (0.0-0.65)	A	Brn	SiLo, Shale & Rock	NCM
		20-50 (0.65-1.65)	B	Ybrn	SaSiLo, Shale & Rock	NCM
1300	1250	00-24 (0.0-0.8)	A	Dk GBrn	SiLo, Rock	NCM
		24-55 (0.8-1.8)	B	Ybrn	SiLo, Rock	NCM

NORTH	EAST	DEPTH cm (feet)	STRATUM	COLOR	TEXTURE	ARTIFACTS
1300	1300	00-15 (0.0-0.5)	A	Dk GBrn	SiLo, Shale	NCM
		15-46 (0.5-1.5)	B	Ybrn	SiLo, Shale	NCM
1300	1550	00-14 (0.0-0.45)	A	Dk GBrn	SiLo, Rts & Rock	NCM
		14-35 (0.45-1.15)	B	Brn	SaSiLo, Rock	NCM
						Stopped by Bedrock
1300	1600	00-24 (0.0-0.8)	A	Dk GBrn	SiLo, Rock	NCM
		24-49 (0.8-1.6)	B	Ybrn	SiLo, Rock	NCM
						Stopped by Rock
1350	1200	00-28 (0.0-0.9)	A	Brn	SiLo, Shale & Rock	NCM
		28-57 (0.9-1.85)	B	Ybrn	SaSiLo, Shale & Rock	NCM
1350	1250	00-21 (0.0-0.7)	A	Dk GBrn	SiLo, Rock	NCM
		21-52 (0.7-1.7)	B	Ybrn	SiLo, Rock	NCM
1350	1300	Test not excavated - active wasp hive in area				
1350	1350	00-25 (0.0-0.8)	A	Brn	SiLo	NCM
		25-55 (0.8-1.8)	B	Ybrn	SiLo	NCM
1350	1400	00-28 (0.0-0.9)	A	Dk Brn	SiLo	NCM
		28-41 (0.9-1.35)	B	Ybrn	SiLo	NCM
						Stopped by Bedrock
1350	1450	00-06 (0.0-0.2)	O	Dk GBrn	SiLo	NCM
		06-24 (0.2-0.8)	A	Dk GBrn	SiLo, Rock	NCM
		24-49 (0.8-1.6)	B	Brn	SiLo, Rock	NCM
						Stopped by Rock
1350	1500	00-18 (0.0-0.6)	A	Brn	SiLo, Shale	NCM
		18-49 (0.6-1.6)	B	Olive Brn	SiLo, Shale	NCM
1350	1550	00-24 (0.0-0.8)	A	Dk GBrn	SiLo, Rts & Rock	NCM
		24-57 (0.8-1.85)	B	Brn	SaSiLo, Rock	NCM
1350	1600	00-21 (0.0-0.7)	A	Dk GBrn	SiLo, Rock	NCM
		21-52 (0.7-1.7)	B	Ybrn	SiLo, Rock	NCM
1400	1200	00-29 (0.0-0.95)	A	Brn	SiLo, Shale & Rock	NCM
		29-61 (0.95-2.0)	B	Ybrn	SaSiLo, Shale & Rock	NCM
1400	1250	00-17 (0.0-0.55)	A	Dk GBrn	SiLo, Rock	NCM
		17-47 (0.55-1.55)	B	Ybrn	SiLo, Rock	NCM
1400	1300	00-24 (0.0-0.8)	A	Dk GBrn	SiLo, Shale	NCM
		24-46 (0.8-1.5)	B	Ybrn	SiLo, Shale	NCM
						Stopped by Bedrock
1400	1400	00-26 (0.0-0.85)	A	Dk Brn	SiLo	NCM
		26-34 (0.85-1.1)	B	Ybrn	SiLo	NCM
						Stopped by Bedrock
1400	1500	00-15 (0.0-0.5)	A	Brn	SiLo, Shale	NCM
		15-40 (0.5-1.3)	B	Olive Brn	SiLo, Shale	NCM
						Stopped by Bedrock

NORTH	EAST	DEPTH cm (feet)	STRATUM	COLOR	TEXTURE	ARTIFACTS
1400	1550	00-25 (0.0-0.8)	A	Dk GBrn	SiLo, Rts & Rock	NCM
		25-50 (0.8-1.6)	B	Ybrn	SaClLo, Rock	NCM
1450	1350	00-20 (0.0-0.7)	A	Brn	SiLo	NCM
		20-50 (0.7-1.65)	B	Ybrn	SiLo	NCM
1450	1500	Test not excavated - Fell on rock wall				
1450	1550	Test not excavated - Fell on rock wall				
1500	1100	00-24 (0.0-0.8)	A	Dk GBrn	SiClLo, Shale	NCM
		24-55 (0.8-1.8)	B	Olive Brn	SiClLo, Shale	NCM
1500	1150	00-20 (0.0-0.7)	A	Dk GBrn	SiLo	NCM
		20-40 (0.7-1.3)	B	Brn	SiClLo	NCM
						Stopped by Rock
1500	1200	00-28 (0.0-0.9)	A	Brn	SiLo, Shale & Rock	NCM
		28-42 (0.9-1.4)	B	Ybrn	SaSiLo, Shale & Rock	NCM
						Stopped by Bedrock
1500	1250	00-17 (0.0-55)	A	Dk GBrn	SiLo, Rock	NCM
		17-43 (0.55-1.4)	B	Ybrn	SiLo, Rock	NCM
					SiLo, Rock	Stopped by Rock
1500	1300	00-27 (0.0-0.9)	A	Dk GBrn	SiLo, Shale	NCM
		27-43 (0.9-1.4)	B	Ybrn	SiLo, Shale	NCM
						Stopped by Bedrock
1500	1350	00-14 (0.0-0.45)	A	Brn	SiLo	NCM
		14-36 (0.45-1.2	B	Ybrn	SiLo	NCM
						Stopped by Rock
1500	1400	00-30 (0.0-1.0)	A	Brn	SiLo	NCM
		30-40 (1.0-1.3)	B	Ybrn	SiLo	NCM
						Stopped by Bedrock
1500	1450	00-06 (0.0-0.2)	O	Dk GBrn	SiLo	NCM
		06-27 (0.2-0.9)	A	Dk GBrn	SiLo, Rock	NCM
		27-46 (0.9-1.5)	B	Brn	SiLo, Rock	NCM
1500	1500	00-21 (0.0-0.7)	A	Brn	SiLo, Shale	NCM
		21-52 (0.7-1.7)	B	Ybrn	SiLo, Shale	NCM
1500	1550	00-24 (0.0-0.8)	A	Dk GBrn	SiLo, Rock	NCM
		24-45 (0.8-1.5)	B	Ybrn	SiLo, Rock	NCM
						Stopped by Bedrock
1550	1100	00-18 (0.0-0.6)	A	Dk GBrn	SiLo, Shale	165
		18-52 (0.6-1.7)	B	Olive Brn	SiLo, Shale	NCM
1550	1150	00-25 (0.0-0.8)	A	Dk GBrn	SiLo, Roots	NCM
		25-39 (0.8-1.3)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Bedrock
1550	1200	00-34 (0.0-1.1)	A	Dk GBrn	SiLo	NCM
		34-60 (1.1-2.0)	B	Ybrn	SiLo	NCM
						Stopped by Rock

NORTH	EAST	DEPTH cm (feet)	STRATUM	COLOR	TEXTURE	ARTIFACTS
1550	1250	00-15 (0.0-0.5)	A	Dk GBrn	SiLo, Rock	NCM
		15-46 (0.5-1.5)	B	Ybrn	SiLo, Rock	NCM
1550	1300	00-09 (0.0-0.3)	A	Dk GBrn	SiLo	NCM
		09-27 (0.3-0.9)	R	Ybrn	Shale	NCM
						Stopped by Bedrock
1550	1350	00-20 (0.0-0.65)	A	Dk GBrn	SiLo	NCM
		20-38 (0.65-1.25)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Rock
1550	1400	00-35 (0.0-1.15)	A	Brn	SiLo	NCM
		35-55 (1.15-1.8)	B	Ybrn	SiLo	NCM
						Stopped by Bedrock
1550	1450	00-06 (0.0-0.2)	O	Dk Brn	SiLo, Rock	NCM
		06-27 (0.2-0.9)	A	Dk GBrn	SiLo, Rock	NCM
		27-52 (0.9-1.7)	B	Ybrn	SiLo, Rock	NCM
						Stopped by Rock
1550	1500	00-18 (0.0-0.6)	A	Brn	SiLo, Shale	NCM
		18-43 (0.6-1.4)	B	Ybrn	SiLo, Shale	NCM
						Stopped by Bedrock
1600	1100	00-15 (0.0-0.5)	A	Dk GBrn	SiLo, Shale	NCM
		15-46 (0.5-1.5)	B	Olive Brn	SiLo, Shale	NCM
1600	1150	00-20 (0.0-0.7)	A	Dk GBrn	SiLo	NCM
		20-44 (0.7-1.45)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Bedrock
1600	1200	00-35 (0.0-1.15)	A	Dk GBrn	SiLo	NCM
		35-58 (1.15-1.9)	B	Ybrn	SiLo	NCM
						Stopped by Rock
1600	1250	00-12 (0.0-0.4)	A	Dk GBrn	SiLo, Rock	NCM
		12-40 (0.4-1.3)	B	Ybrn	SiLo, Rock	NCM
					SiLo, Rock	Stopped by Rock
1600	1300	00-15 (0.0-0.5)	A	Dk GBrn	SiLo, Shale	NCM
		15-46 (0.5-1.5)	B	Ybrn	SiLo, Shale	NCM
1600	1350	00-24 (0.0-0.8)	A	Dk GBrn	SiLo	NCM
		24-50 (0.8-1.65)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Rock
1600	1400	00-35 (0.0-1.15)	A	Brn	SiLo	NCM
		35-50 (1.15-1.65)	B	Ybrn	SiLo	NCM
						Stopped by Bedrock
1600	1450	00-03 (0.0-0.1)	O	Dk Brn	SiLo, Rock	NCM
		03-27 (0.1-0.9)	A	Dk GBrn	SiLo, Rock	NCM
		27-58 (0.9-1.7)	B	Ybrn	SiLo, Rock	NCM
1600	1500	00-18 (0.0-0.6)	A	Brn	SiLo, Shale	NCM
		18-49 (0.6-1.6)	B	Ybrn	SiLo, Shale	NCM
1650	1100	00-18 (0.0-0.6)	A	Dk GBrn	SiLo, Shale	NCM
		18-52 (0.6-1.7)	B	Olive Brn	SiLo, Shale	NCM

NORTH	EAST	DEPTH cm (feet)	STRATUM	COLOR	TEXTURE	ARTIFACTS
1650	1150	00-25 (0.0-0.8)	A	Dk GBrn	SiLo	NCM
		25-49 (0.8-1.6)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Rock
1650	1200	00-29 (0.0-0.95)	A	Dk GBrn	SiLo	NCM
		29-50 (0.95-1.65)	B	Ybrn	SiLo	NCM
1650	1250	00-21 (0.0-0.7)	A	Dk GBrn	SiLo, Rock	NCM
		21-44 (0.7-1.45)	B	Ybrn	SiLo, Rock	NCM
1650	1300	00-21 (0.0-0.7)	A	Dk GBrn	SiLo, Shale	NCM
		21-52 (0.7-1.7)	B	Ybrn	SiClLo, Shale	NCM
1650	1350	00-28 (0.0-0.9)	A	Dk GBrn	SiLo	NCM
		28-58 (0.9-1.9)	B	Ybrn	SiClLo, Rock	NCM
1650	1400	00-30 (0.0-1.0)	A	Brn	SiLo	NCM
		30-50 (1.0-1.65)	B	Ybrn	SiLo	NCM
						Stopped by Rock
1700	1100	00-24 (0.0-0.8)	A	Dk GBrn	SiLo, Shale	NCM
		24-49 (0.8-1.6)	B	Olive Brn	SiLo, Shale	NCM
1700	1150	00-20 (0.0-0.7)	A	Dk GBrn	SiLo	NCM
		20-38 (0.7-1.25)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Bedrock
1700	1200	00-33 (0.0-1.1)	A	Dk GBrn	SiLo	NCM
		33-43 (1.1-1.4)	B	Ybrn	SiLo	NCM
						Stopped by Rock
1700	1250	00-30 (0.0-1.0)	A	Dk GBrn	SiLo, Rock	NCM
		30-49 (1.0-1.6)	B	Ybrn	SiLo, Rock	NCM
1700	1300	00-27 (0.0-0.9)	A	Dk GBrn	SiLo, Shale	NCM
		27-49 (0.9-1.6)	B	Ybrn	SiLo, Shale	NCM
						Stopped by Bedrock
1700	1350	00-23 (0.0-0.75)	A	Dk GBrn	SiLo	NCM
		23-38 (0.75-1.25)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Rock
1700	1400	00-29 (0.0-1.0)	A	Brn	SiLo	NCM
		29-53 (1.0-1.75)	B	Ybrn	SiLo	NCM
						Stopped by Bedrock
1750	1100	00-24 (0.0-0.8)	A	Dk Brn	SiCl, Shale	NCM
		24-55 (0.8-1.8)	B	Olive Brn	SiClLo, Shale & Pbs	NCM
1750	1150	00-26 (0.0-0.85)	A	Dk GBrn	SiLo, Rock	NCM
						Stopped by Bedrock
1750	1200	00-30 (0.0-1.0)	A	Dk GBrn	SiLo	NCM
						Stopped by Bedrock
1750	1250	00-21 (0.0-0.7)	A	Dk GBrn	SiLo, Rock	NCM
		21-52 (0.7-1.7)	B	Ybrn	SiLo, Rock	NCM

NORTH	EAST	DEPTH cm (feet)	STRATUM	COLOR	TEXTURE	ARTIFACTS
1750	1300	00-34 (0.0-1.1)	A	Dk GBrn	SiLo, Shale	NCM
		34-55 (1.1-1.8)	B	Ybrn	SiLo, Shale	NCM
						Stopped by Bedrock
1750	1350	00-18 (0.0-0.6)	A	Dk GBrn	SiLo	NCM
		18-48 (0.6-1.57)	B	Ybrn	SiClLo, Rock	NCM
1750	1400	00-23 (0.0-0.75)	A	Brn	SiLo	NCM
		23-40 (0.75-1.3)	B	Ybrn	SiLo	NCM
						Stopped by Bedrock
1800	1050	00-21 (0.0-0.7)	A	Dk GBrn	SiLo	NCM
		21-40 (0.7-1.3)	B	Ybrn	SiClLo, Rock	NCM
						Stopped by Rock
1800	1100	00-25 (0.0-0.8)	A	Dk GBrn	SiLo	NCM
		25-40 (0.8-1.3)	B	Ybrn	SiLo, Rock	NCM
						Stopped by Rock

KEY:
NCM = No Cultural Material

APPENDIX C

APPENDIX C: HISTORIC RESOURCE INVENTORY FORM

HISTORIC RESOURCE INVENTORY FORM

NYS OFFICE OF PARKS, RECREATION
& HISTORIC PRESERVATION
P.O. BOX 189, WATERFORD, NY 12188
(518) 237-8643

OFFICE USE ONLY
USN:

IDENTIFICATION

Property name(if any) Hartley Road Substation

Address or Street Location Section 12, Block 1, Lot 1.7

County Orange Town/City Goshen Village/Hamlet: _____

Owner AL Turi Landfill, Inc. Address _____

Original use Agricultural field Current use Agricultural field

Architect/Builder, if known _____ Date of construction, if known _____

DESCRIPTION

Materials -- please check those materials that are visible

Exterior Walls:	☐ wood clapboard	☐ wood shingle	☐ vertical boards	☐ plywood	
	☒ stone	☐ brick	☐ poured concrete	☐ concrete block	
	☐ vinyl siding	☐ aluminum siding	☐ cement-asbestos	☐ other: _____	
Roof:	☐ asphalt, shingle	☐ asphalt, roll	☐ wood shingle	☐ metal	☐ slate
Foundation:	☐ stone	☐ brick	☐ poured concrete	☐ concrete block	

Other materials and their location: _____

Alterations, if known: _____ Date: _____

Condition: ☐ excellent ☒ good ☐ fair ☐ deteriorated

Photos

Provide several clear, original photographs of the property proposed for nomination. Submitted views should represent the property as a whole. For buildings or structures, this includes exterior and interior views, general setting, outbuildings and landscape features. Color prints are acceptable for initial submissions.

Please staple one photograph providing a complete view of the structure or property to the front of this sheet. Additional views should be submitted in a separate envelope or stapled to a continuation sheet.

Maps

Attach a printed or drawn locational map indicating the location of the property in relationship to streets, intersections or other widely recognized features so that the property can be accurately positioned. Show a north arrow. Include a scale or estimate distances where possible.

Prepared by: Richard Grubb & Associates **address:** 30 North Main Street, P.O. Box 434, Cranbury, New Jersey 08512

Telephone: 609-655-0692 **email** mail@richardgrubb.com **Date** September 9, 2010

(See Reverse)

PLEASE PROVIDE THE FOLLOWING INFORMATION

IF YOU ARE PREPARING A NATIONAL REGISTER NOMINATION, PLEASE REFER TO THE ATTACHED INSTRUCTIONS

Narrative Description of Property: Briefly describe the property and its setting. Include a verbal description of the location (e.g., north side of NY 17, west of Jones Road); a general description of the building, structure or feature including such items as architectural style (if known), number of stories, type and shape of roof (flat, gabled, mansard, shed or other), materials and landscape features. Identify and describe any associated buildings, structures or features on the property, such as garages, silos, privies, pools, gravesites. Identify any known exterior and interior alterations such as additions, replacement windows, aluminum or vinyl siding or changes in plan. Include dates of construction and alteration, if known. Attach additional sheets as needed.

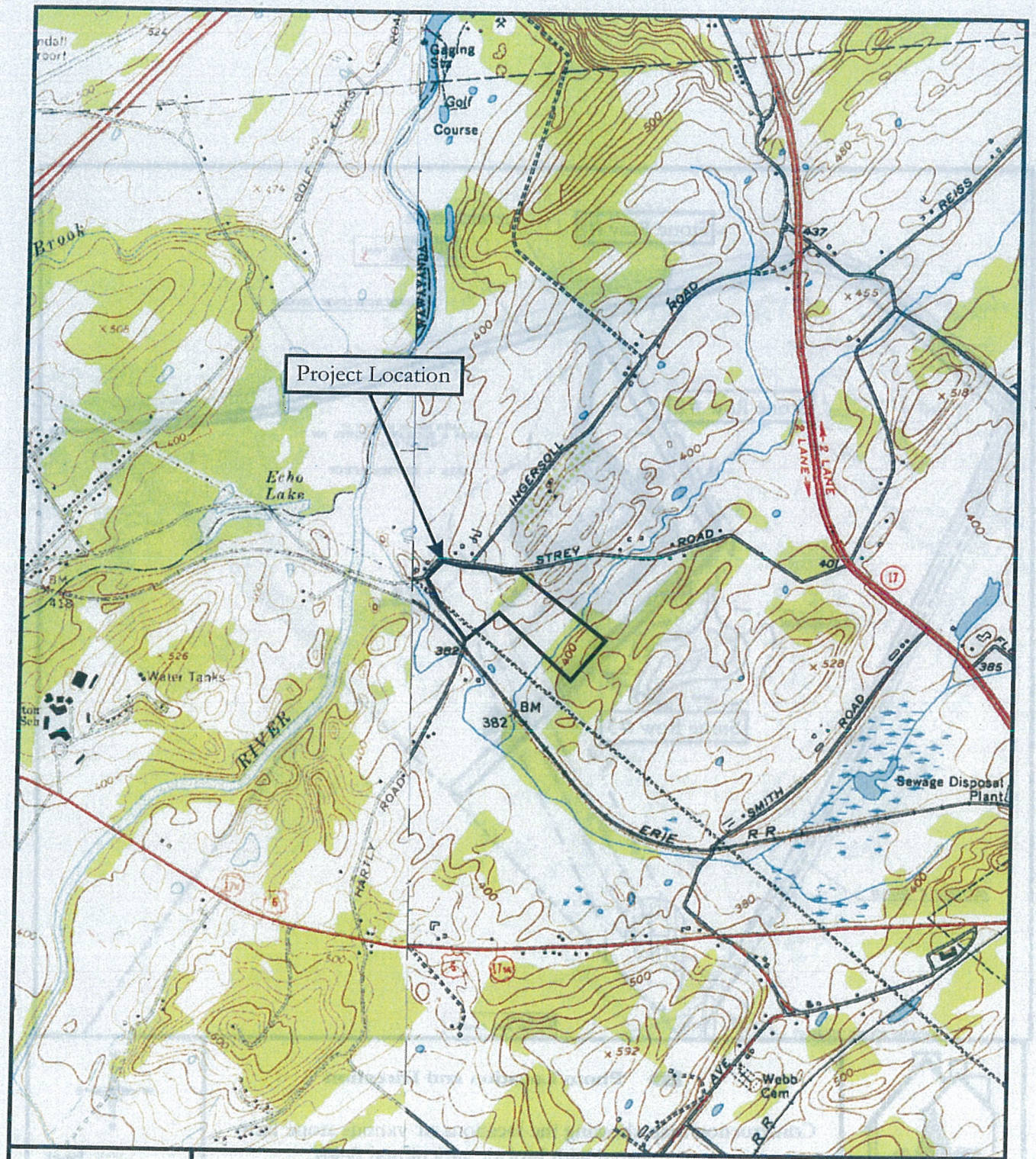
The APE is located in the west portion of Section 12, Block 1, Lot 1.7 in the Town of Goshen, Orange County, New York. The APE is situated south of Cheechunk Road, east of Echo Lake Road, and north of Hartley Road. The setting is characterized by agricultural fields and wooded uplands. The field stone rows are located throughout the APE.

The structure of interest consists of three stone farm rows. The first stone farm row (#1; see attached figure) stretches along Cheechunk Road for 179.8 meters (590 feet). This stone farm row is periodically interrupted, which may have been for access to the agricultural fields. The second stone farm row (#2) connects to the center of the first stone row, is oriented along a northeast/southwest access and measures 91 meters (300 feet) in length before turning and continuing as a third row (#3) to the southeast for 131 meters (430 feet).

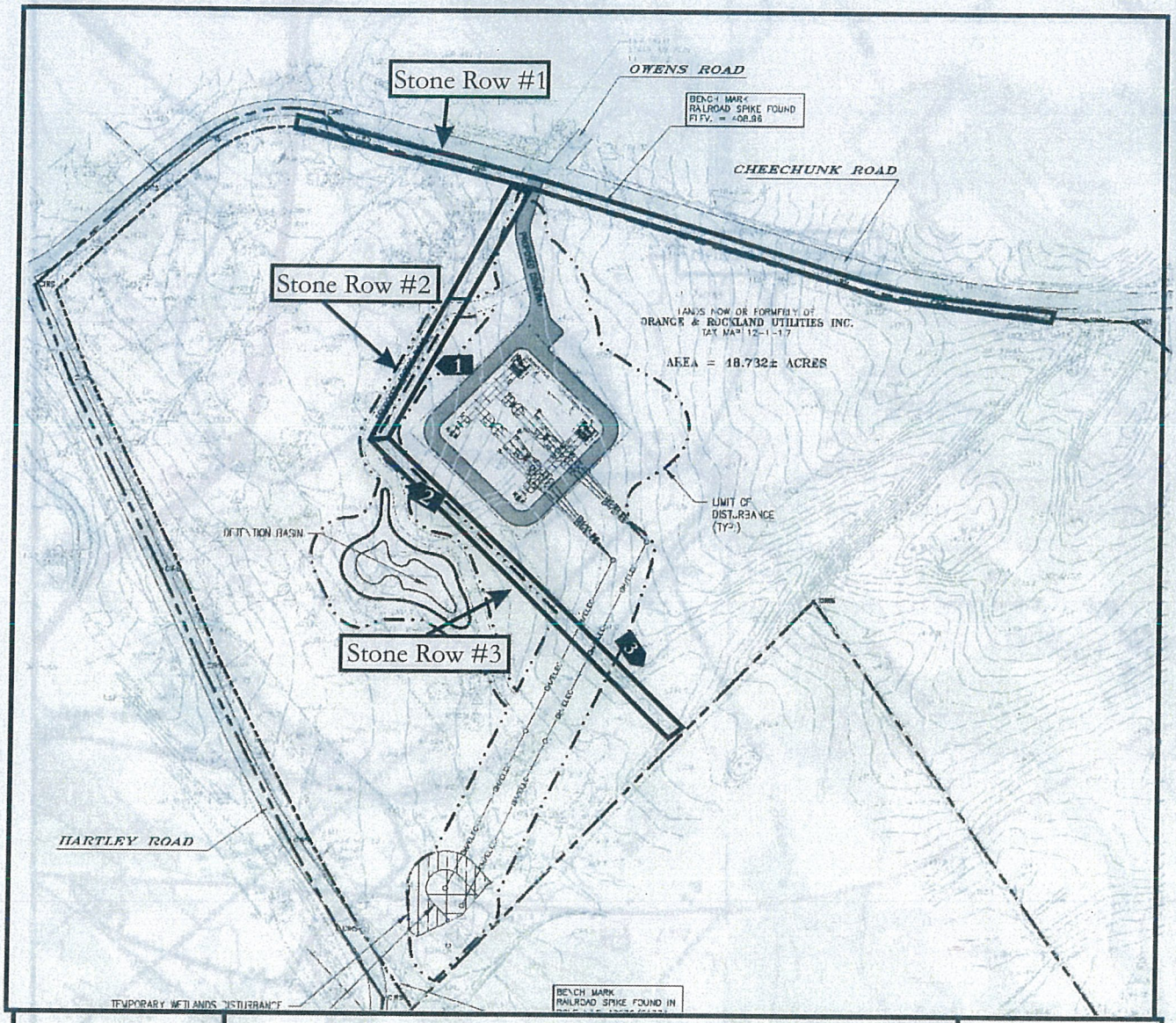
There are no other known structures or buildings associated with the stone rows. The date of construction is also unknown, although presumed to have been established as early as the nineteenth century.

Narrative Description of Significance: Briefly describe those characteristics by which this property may be considered historically significant. Significance may include, but is not limited to, a structure being an intact representative of an architectural or engineering type or style (e.g., Gothic Revival style cottage, Pratt through-truss bridge); association with historic events or broad patterns of local, state or national history (e.g., a cotton mill from a period of growth in local industry, a seaside cottage representing a locale's history as a resort community, a structure associated with activities of the "underground railroad."); or by association with persons or organizations significant at a local, state or national level. Simply put, why is this property important to you and the community. Attach additional sheets as needed.

The stone farm rows are associated with the historic use of the APE as an agricultural field and formed by removal of large stones from fields and putting them in a row by the field's edge to enable construction. The stone rows were constructed by hand. The majority of the stone farm rows are intact and represent historic agricultural field boundaries and historic delinations of property. This stone farm row is not considered to represent a potentially significant archaeological resource.



U.S.G.S. Map (from 1969 U.S.G.S. 7.5′ Quadrangles: Middletown, NY (photoinspected 1976) and 1957 Goshen, NY).



RGA

1 **Photo Location and Direction**

Construction map showing the locations of various stone farm rows associated with historic agricultural fields.

N
W E
S

Feet

0 90

Photograph 1:

Overview of the Stone Farm Row Two.
Photo view: West
Photographer: Amy Raes
Date: July 28, 2010

Photograph 2:

Overview of the Stone Farm Row Three
Photo view: Northwest
Photographer: Amy Raes
Date: July 28, 2010

Photograph 3:

Overview of Stone Farm Row Three.
Photo view: Southeast
Photographer: Amy Raes
Date: July 28, 2010

APPENDIX D

APPENDIX D: ANNOTATED BIBLIOGRAPHY

Authors:	Amy Raes
Title:	Phase IA and IB Archaeological Survey, Hartley Substation, Section 12, Block 1, Lot 1.7, Town of Goshen, Orange County, New York
Date:	September 2010
RGA Database Title	Hartley Road
RGA Project No.:	2010-174NY
State:	New York
County	Orange
Municipality:	Town of Goshen
U.S.G.S. Quad:	Middletown and Goshen, New York
Drainage Basin:	Wallkill River, Hudson River, Atlantic Ocean
Regulation:	SEQRA
Project Type:	Substation
Project Sponsor:	Orange and Rockland Utilities, Inc.
Client:	Birdsall Engineering, Inc.
Level of Survey:	Phase IA and IB
Cultural Resources:	Three stone farm rows

APPENDIX N
Subsurface Investigation

DiGioia Gray
& Associates

July 12, 2010

Project 2010-101-03

Michael Homenick, PE
Senior Civil Engineer
Transmission & Substation Engineering
Orange & Rockland Utilities, Inc. (O&R)
390 West Route 59
Spring Valley, NY 10977

Subsurface Exploration Report
Hartley Road 138kV Substation
Orange County, Goshen, New York

Dear Mr. Homenick,

DiGioia, Gray & Associates, LLC (DGA) is pleased to present this report summarizing the results of our subsurface exploration for the proposed Hartley Substation in Orange County, New York. This report was prepared in accordance with DGA's Project Scope Proposal dated May 25, 2009 and the General Services Agreement (LS-03658-5-57) dated March 19, 2010 for O&R. The project was authorized by O&R on May 25, 2010.

Location and Proposed Facilities

The project site is located within the central portion of Orange County, just west of the town of Goshen, New York. The property is owned by O&R and located south of the intersection created by Owens Road and Cheechunk Road. DGA understands the new substation will generally be square shaped and occupy an area about 200 feet long by 200 feet wide. It is anticipated that the station will include mat foundations for the heavy equipment, spread footings for smaller equipment and support structures and drilled pier foundations for the take-off structure. The substation grade has not been established.

Physiology

The topography surrounding the proposed substation site generally ranges between 380 and 420 feet above mean sea level according to the Goshen 7.5 Minute USGS Topographic Map presented in Figure 1 and as shown on the plan drawing presented in Figure 2.

The site location is in the Hudson-Mohawk Lowlands which is a part of the Valley and Ridge Province. This province is characterized by relatively elongated and parallel mountain ridges, oriented northeast/southwest, and separated by long continuous valleys with a trellised drainage pattern. The site is part of the lowland valley section generally referred to as the Great Valley created largely by the actions of groundwater and surface water slowly dissolving and eroding the relatively softer bedrock (shale and limestone) that underlie much of the region. Surficial geologic deposits distributed throughout the valley area consist of various types of glacial and outwash deposits associated with continental glaciation with few bedrock outcrops.

Soils/Geology

The substation area is mostly covered by the Mardin gravelly silt loam classification according to the United States Department of Agriculture [USDA], Soil Conservation Service [SCS] 1981 Orange County, New York report. These loamy soils are derived predominately from acid sedimentary rock. Predominate soil classification is gravelly silt to five feet in depth. This soil type is described as moderately well-drained and commonly contains perched water from the underlying fragipan subsoil.

The geology of this area is the result of preglacial orogenic activity and subsequent erosion by glacial and outwash processes. The surficial bedrock of the area is the Normanskill Formation of the Trenton Group with the predominant rock types of shale, fine sandstone and siltstone. Depths to bedrock at this particular location are relatively shallow according to the USGS Open File Report 97-241, Geohydrology and Water Quality of the Wallkill River Valley near Middletown, New York. In addition, the USGS Open File Report 97-241 indicates a stabilized water table contour near the substation site at approximate elevation 380 feet, according to nearby well sites.

Subsurface Exploration

SJB Drilling, Inc. (SJB) of Albany, New York drilled six borings between June 15 and June 17, 2010. SJB services were provided under the Orange & Rockland Utilities Geotechnical Engineering Analysis and Design Contract provided to DGA. The test boring depths and locations of the borings were provided by DGA and field located by O&R. Some locations were moved from the staked position for rig access and to avoid tree clearing to the extent possible. A CME-550X rubber-tired drill rig was used to make the borings. The approximate locations of the borings are shown on Figure 2. O&R is anticipated to survey the moved boring locations and establish the actual boring elevations. DGA monitored the drilling activities on a full-time basis and classified the soil and rock samples. An O&R approved Health and Safety Plan was utilized for safe work practices, guidelines and hazard identification. The field classification sheets for the borings are attached in Appendix A.

Soil samples were obtained in conjunction with the Standard Penetration Tests (ASTM Test Designation D 1586 - Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils) generally conducted at 4-foot intervals to rock. Soil sampling was completed by using a 2-inch outside diameter split-barrel sampler driven into the soil in four 6-inch increments with a 140-pound automatic hammer falling a distance of 30-inches. The number of hammer blows required to drive the sampler each 6-inch interval was recorded, with the cumulative number of blows for the middle two (2) 6-inch intervals designated as the "Standard Penetration Resistance" or N-value. Hollow stem augers were used to advance the borings.

Soil sampling was terminated upon refusal of the split barrel sampler in the borings and auger refusal was encountered. Sample refusal occurred when the sampler required 50 blows of the hammer with advancement of a maximum 0.5 feet. Upon termination of soil sampling and augering, bedrock coring was started. Bedrock was sampled using a diamond bit with an NQ-II double-tube core barrel that provides a 1.99-inch diameter core (ASTM: D 2113-83). These samples were visually identified, the cores measured, and the percentage of core recovery and

Rock Quality Designation (RQD) values were calculated. The rock core description, the core recovery for each core interval and the RQD (expressed in percent) values for each core run are recorded on the field classification sheets in Appendix A. Core recovery percentage and RQD values provide a qualitative indication as to the physical and engineering properties of the rock mass.

Groundwater readings were taken prior to coring activities and following the completion of drilling at each boring location. The readings are recorded on the tops of the field classification sheets in Appendix A. Most borings were dry prior to coring and at the completion of drilling where side wall collapse did not occur. In general, groundwater is typically found at the soil and rock interface due to the density contrast. Some indications of water were recorded at this interval. It should be noted, however, that ground water levels fluctuate due to variations in rainfall, temperature, site grading or other factors not evident when these measurements were made. These fluctuations should be considered in preparing design drawings, specifications and construction plans.

Following immediately after completion of each boring, the hole was backfilled with the auger soil cuttings to the original ground surface. No compaction was used in the backfilling process.

Subsurface Conditions

The subsurface exploration encountered mostly residual derived soil. Organic topsoil was encountered up to a depth of 0.8 feet. The underlying soil was mostly granular consisting of loose to medium dense silty sand and rock fragments with a few soft to medium stiff silty clay and rock fragment lenses. Decomposed rock was encountered at a depth ranging from 1.5 feet in Boring B-3 to 14.0 feet in Boring B-2.

The top of rock appears to slope toward the southwest. Top of rock ranged from 5.5 feet in Boring B-2 to 14.2 feet in Boring B-4. Approximately ten feet of rock was cored in each boring. In general, relatively medium hard shale with some sandstone/siltstone lenses was encountered in the borings. Some relatively widely-spaced and tight fracturing/jointing sets with slight to moderate weathering were observed in the core samples. The RQD for the rock core ranged from 0 to 80% in the core runs. The average RQD of the rock core was 46%.

Foundation Design Recommendations

If a cut and fill subgrade level is to be constructed, the design should anticipate relatively shallow rock and a limited soil material amount to the east and north of the substation area. Flood elevations of the nearby Wallkill River and tributary should also be examined to reduce substation site complications from inundation.

Frost depth is 54 inches near this area according to Table C-1 of the Unified Facilities Criteria (UFC) 3-310-01 Manual. Shallow foundations should bear a minimum of 4.5 feet below finished grade to reduce the probability of damage due to frost heave. Any soft cohesive soil below the footing subgrade should then be removed and replaced with compacted granular material or crushed stone. The backfill should be placed in 8-inch loose lift thicknesses and compacted using a segmented wheel or sheepsfoot roller and compacted to at least 95% of the

maximum dry density obtainable according to ASTM D1557 (modified proctor test).

Shallow foundations may be designed for an allowable net bearing pressure of 3000 psf (pounds per square foot). The minimum footing width should be two feet. Footings so designed are estimated to settle less than 1 inch and the estimated differential settlements are smaller. Structures should not be partially supported on rock and partially on soil unless a specific settlement analysis indicates that the anticipated movements are tolerable. The base of all footing excavations should be free of loose or soft material, frozen soil, or water prior to placing concrete.

The entire subgrade below slabs and mats should be proof-rolled with five passes of heavy construction compaction equipment. Any soft or loose soils encountered should be overexcavated and replaced with well compacted granular material or crushed rock. Floor slabs, if anticipated, should be underlain by at least four inches of inert, durable, hard aggregate and a moisture retarder. (Note that a moisture retarder will not totally prevent moisture from occurring beneath or on top of floor slabs.) ASTM A615 Deformed Bars (Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement) should be used for concrete reinforcement. Type A706 Deformed Bars (Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement) should not be used.

Drilled shaft foundations are suitable for the proposed take-off structure. It is understood that the computer program, MFAD, will be used for the design of the drilled shafts. The recommended parameters for the design of the take-off structure drilled shaft foundation are based on the Boring B-3 data. These parameters and layers should be adjusted to reflect the final grade and the presence of any proposed fill.

Type	Avg N	Depth (ft)	Classification	Moist Unit Weight (pcf)	Saturated Unit Weight* (pcf)	Angle of Internal Friction (degrees)	Undrained Shear Strength q_u (tsf)	Lateral Modulus Elasticity (E_D) (ksi)	s_u (ksf)	Adhesion Factor α
Gran-fill#		Proposed fill	Compacted Granular Fill (Dense)	125		35		3.0		1
Gran	18	0.0 – 1.5	Silty Sand – some rock fragments (M Dense)	120		30		1.0		1
Gran	+50	1.5 -6.5	Decomposed Rock (Very Dense)	135		38		6.0		1
Rock		6.5 – 16.5	Shale (Medium Hard)		145	40	3.1	60.0	3.1	1

Granular Fill – Proposed fill placed for new substation grade when compacted in accordance with this report
* For highest anticipated groundwater levels - assume groundwater at 6.5 ft

Soil parameters were based on published correlations using soil descriptions and SPT values and should be considered best estimates of properties that would be otherwise laboratory determined. No reduction factors are applied to the soil properties. The ultimate rock-concrete side-shear strength is estimated as 50 psi. Drilled shafts should be designed for the acceptable lateral deflection criteria as established by O&R. The moment design capacity of the foundations should be 0.60 (strength factor) times the ultimate (nominal) geotechnical capacity from MFAD. The uplift and compression design capacities should equal the nominal capacity

affected by a factor of 0.5. DGA recommends a side shear analysis instead of a cone model for uplift. The lateral earth pressure coefficient should be based on the "at-rest" condition, Ko = 1-sin α. The compression foundations should be designed the same as the uplift foundations. If some the foundations are loaded laterally and vertically, then both MFAD and uplift calculations should be run separately and the larger foundations should control.

Drilled pier foundations should be designed and constructed according to the current version of the ACI documents, "Design and Construction of Pier Foundations," ACI 336.3R-93, and "Specification for Construction of Drilled Piers," ACI 336.1-01. The drilled pier foundations are anticipated to encounter rock relatively close to the ground surface. Casing may be necessary to maintain an open hole. Groundwater was not encountered in the borings, but should be anticipated during drilled shaft construction near the top of rock interval.

Site Grading

Unsuitable materials, water, frozen soil, loose soil, soft soil, organic materials, coal, and pyritic strata should be removed prior to placing fill for any site grading. The entire subgrade should be proof-rolled where space permits with five passes of heavy construction compaction equipment. Any soft or loose soils encountered should be overexcavated and replaced with well-compacted granular backfill.

Where the slope of the existing subgrade exceeds six horizontal to one vertical, keys should be excavated into stable soils or rock. The keys should be 5 to 15 feet wide at vertical intervals no greater than 5 feet.

Springs encountered should be drained with a permanent subsurface drain having adequate capacity and a suitable discharge.

Cohesive soils and non-resistant rock that can be broken down to cohesive soils should be placed and compacted in loose lifts no greater than 8 inches in thickness. Compaction should be accomplished using a segmented wheeled or a sheepsfoot roller.

The maximum particle size for each material type should not exceed 2/3 the loose lift thickness. Determine the maximum dry density for cohesive soils and non-resistant rock fill according to ASTM D1557 (Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort). Recommended criteria for compaction are as follows:

Purpose of Fill	Cohesive Fill (% of maximum dry density)
1. Sub-grades of roads, floor slabs, tanks and mats	95
2. Embankments not supporting structures and greater than three feet below finished subgrade	90
3. Landscaped areas not supporting structures and with slopes flatter than 3 horizontal to 1 vertical	85

The unit weight and water content of soils should be corrected for soils containing oversized particles according to ASTM D4718 (Standard Practice for

Correction of Unit Weight and Water Content for Soils Containing Oversize Particles). Rock fill should not be used for support of structures unless specifically recommended herein.

Slag or pyritic materials which are potentially expansive should not be used as fill or backfill where expansion may cause damage or would be undesirable.

Drainage Pond

Boring B-6 was drilled within the intended pond location. The boring was advanced to a depth of 5.5 feet where the top of rock was encountered. The soil underlying the topsoil from a depth of 0.6 feet to 4.4 feet was residually derived comprised of mostly medium stiff silty clay with rock fragments. Decomposed rock was encountered at 4.4 feet in depth. No groundwater was identified within the shallow soil horizon. Due to the limited soil depth and absence of a groundwater horizon observed in the soil zone, the pond size or location may need adjusting according to O&R.

Design Review

This report has been prepared to aid Orange & Rockland Utilities, Inc., in the design of the foundations and site grading for this project. Its scope is limited to the specific project and location described herein and represents our understanding of the significant aspects relative to soil and foundation considerations. If there are differences in the locations of the proposed facilities and/or design features from those described herein, DGA should be informed so we may, if necessary, modify or revise our recommendations and determine if additional exploration, testing and analyses are warranted for final design of the facilities. DGA should be permitted to provide inputs to the preparation of the foundation construction plans and specifications. An experienced representative should monitor any additional exploration, earthwork construction, and foundation construction so that these aspects of the project are constructed according to the intent of our recommendations and so that any unanticipated foundation conditions might be recognized and properly reconciled.

Respectfully submitted,
DiGioia, Gray & Associates, LLC

Paul G Cass

Paul G Cass, PE
Project Manager

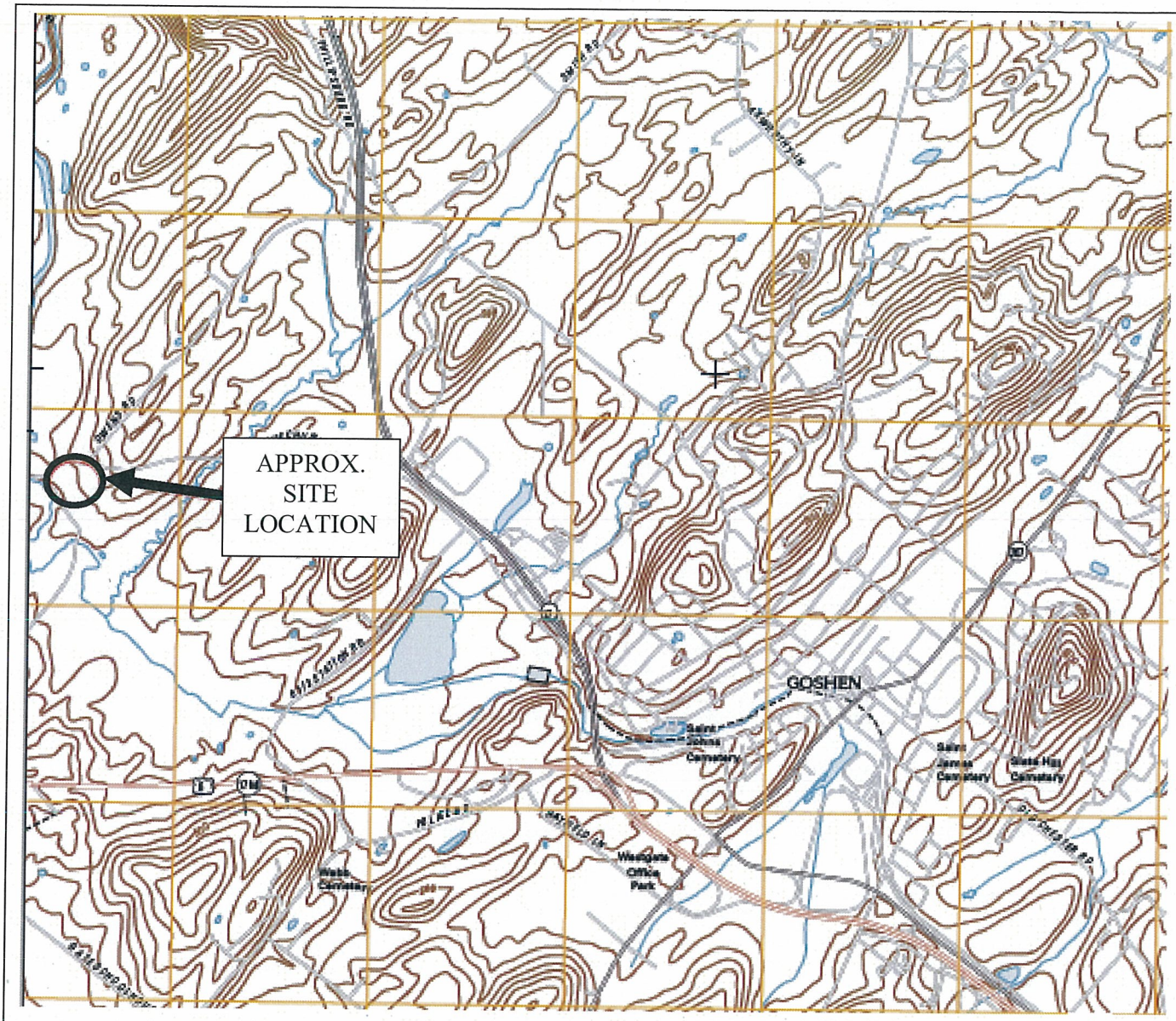
Ryan W. Fandray

Ryan W. Fandray
Environmental Geologist

PGC:RWF/bas

References

Olsson, Karl S., United States, Washington 1981. United States Department of Agriculture. Soil Survey of Orange County, New York, Soil Conservation Service, Cornell University. Agricultural Experiment Station.



APPROX. SCALE: 1 IN. = 2000 FT.

CONTOUR INTERVAL 20 FEET

SOURCE: USGS 7.5 MINUTE GOSHEN, NY 2010 QUADRANGLE

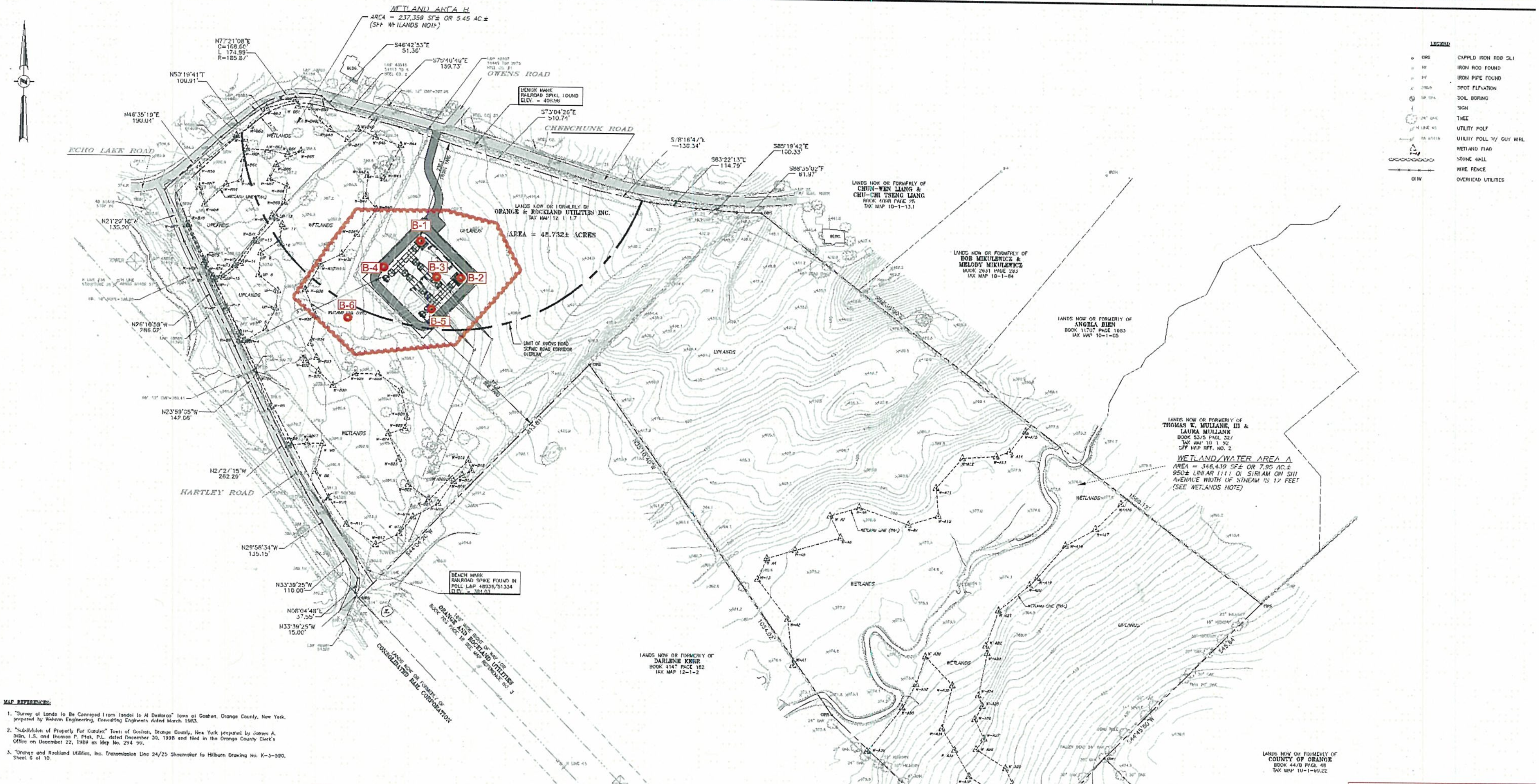
QUADRANGLE LOCATION

FIGURE 1

DiGioia Gray & Associates

USGS TOPOGRAPHIC SITE MAP
PROPOSED HARTLEY ROAD SUBSTATION
GEOTECHNICAL EXPLORATION
GOSHEN, NEW YORK
ORANGE COUNTY

DGA PROJECT # 2010-101-03



MAP REFERENCES:

1. "Survey of Lands to Be Conveyed From Iandoi to Al DeMarco" Town of Goshen, Orange County, New York, prepared by Wehran Engineering, Consulting Engineers dated March 1983.
2. "Subdivision of Property For Curulex" Town of Goshen, Orange County, New York prepared by James A. Dillin, L.S. and Thomas P. Ptak, P.L. dated December 30, 1998 and filed in the Orange County Clerk's Office on December 22, 1989 as Map No. 294 99.
3. "Orange and Rockland Utilities, Inc. Transmission Line 24/25 Shoemaker to Hilburn Drawing No. K-3-590, Sheet 6 of 10.

B-1 Boring Locations by DGA (May 25, 2010) and Figure # by DGA (July 8, 2010) - all other information on drawing remains unchanged

MAP NOTES:

1. BOUNDARY INFORMATION SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED DURING THE MONTH OF APRIL 2006 BY C.T. MALE ASSOCIATES, P.C.
2. NORTH ORIENTATION AND PLANING BASE PER MAP REFERENCE NO. 1.
3. OFFSET DISTANCES SHOWN HEREON THAT ARE REFERENCING OBJECTS SHOWN NEAR PROPERTY LINES ARE LABELED ON THE SIDE OF THE PROPERTY LINE THAT THE OFFSET DISTANCE IS WRITTEN.
4. ELEVATIONS SHOWN HEREON WERE OBTAINED USING USC&GS BENCHMARK M78 1935.
5. TOPOGRAPHIC INFORMATION SHOWN HEREON WAS PREPARED FROM AERIAL STEREO PHOTOGRAMMETRY PREPARED BY ROBINSON AERIAL SURVEYS, INC. AND FLOWN ON MARCH 11, 2006. DATA SHOWN WAS TAKEN FROM DIGITALLY COMPILED MANUSCRIPTS. NATIONAL MAPPING STANDARDS INDICATE THAT 90% OF ALL CONTOURS SHOWN SHALL BE CORRECT TO WITHIN ONE HALF (1/2) OF THE CONTOUR INTERVAL, AND THE REMAINING 10% SHALL NOT BE IN ERROR BY MORE THAN THE CONTOUR INTERVAL.
6. PARCEL IS SUBJECT TO THE RIGHTS OF THE TRAVELING PUBLIC TO A 3 ROD (49.5 FEET) RIGHT OF WAY PER SECTION 189 OF THE NEW YORK STATE HIGHWAY LAW.
7. UNDERGROUND FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN PLOTTED FROM DATA OBTAINED FROM PREVIOUS MAPS AND RECORD DRAWINGS. SURFACE FEATURES SUCH AS CATCH BASIN RIMS, MANHOLE COVERS, WATER VALVES, GAS VALVES, ETC. ARE THE RESULT OF FIELD SURVEY UNLESS NOTED OTHERWISE. THERE MAY BE OTHER UNDERGROUND UTILITIES, THE EXISTENCE OF WHICH IS NOT KNOWN TO THE UNDERSIGNED. SIZE AND LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES. DIG SAFELY NEW YORK MUST BE NOTIFIED PRIOR TO CONDUCTING TEST BORINGS, EXCAVATION AND CONSTRUCTION.
8. NO ATTEMPT WAS MADE TO LOCATE ANY UNDERGROUND UTILITIES.
9. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF AN UP TO DATE ABSTRACT OF TITLE OR TITLE REPORT AND IS THEREFORE SUBJECT TO ANY EASEMENTS, COVENANTS, RESTRICTIONS OR ANY STATEMENT OF FACT THAT SUCH DOCUMENTS MAY DISCLOSE.
10. SUBJECT TO ALL LEGALLY ENFORCEABLE COVENANTS, EASEMENTS, RESTRICTIONS, CONDITIONS AND AGREEMENTS OF RECORD.
11. CORNER MARKERS SET AS INDICATED ON APRIL 13, 2006.

ARCH 0 1 2 3
ENGRG 0 1 2 3
REDUCTION RATIO

BULK REQUIREMENTS

ZONING DISTRICT: RU	REQUIRED	PROPOSED
MAX. FLOOR AREA RATIO	SEE NOTE 2 BELOW	N/A
MINIMUM LOT AREA	SEE NOTE 2 BELOW	48.732 ACRES
MINIMUM LOT WIDTH	SEE NOTE 2 BELOW	300 L.F.
MINIMUM FRONT YARD DEPTH	SEE NOTE 2 BELOW	238 L.F.
MINIMUM SIDE YARD DEPTH	SEE NOTE 2 BELOW	372 L.F.
TOTAL SIDE YARDS	SEE NOTE 2 BELOW	372 L.F.
MINIMUM REAR YARD DEPTH	SEE NOTE 2 BELOW	N/A
MAXIMUM BUILDING HEIGHT -TAKE OFF STRUCTURE -SWITCHGEAR	SEE NOTE 2 BELOW	16.5' SWITCHGEAR
MINIMUM STREET FRONTAGE	SEE NOTE 2 BELOW	2,640 L.F.

NOTES:
1. PUBLIC UTILITY FACILITIES ARE PERMITTED IN A "RU" ZONE BY SPECIAL PERMIT ISSUED BY THE TOWN BOARD.
2. SUBJECT TO CONDITIONS IMPOSED BY PLANNING BOARD.

WETLANDS NOTE:

1. WETLANDS FLAGGED & FIELD LOCATED BY CMC NOVEMBER 24, 2009 AND DECEMBER 2, 2009, AND BEING AS SHOWN ON A PLAN ENTITLED "WETLAND DELINEATION PLAN FOR ORANGE AND ROCKLAND UTILITIES, INC.", PREPARED BY CMC AND DATED 12/22/2009.

REFERENCE DRAWINGS:

K-F-6427	EXISTING SITE SURVEY (SHEET 1 OF 6)
K-F-6427	WETLANDS DELINEATION PLAN (SHEET 2 OF 6)
K-F-6427	ELECTRICAL PLAN (SHEET 4 OF 6)
K-F-6427	ELECTRICAL ELEVATIONS (SHEET 5 OF 6)
K F 6427	LANDSCAPE PLAN (SHEET 6 OF 6)

FIGURE 2

DIGIOIA GRAY & ASSOCIATES
CONSULTING ENGINEERS AND SCIENTISTS

REV	REVISION	DWN	DES	CHKD	DATE

ORANGE AND ROCKLAND UTILITIES, INC.
PEARL RIVER NEW YORK

HARTLEY SUBSTATION

SITE PLAN

ENGINEERING REVIEW: DEPT. / SIGNATURE / DATE — CIVIL/SURVEY; TELECOM/MET.; TRANS & SUB; RELAY

APPROVED / DATE
☐ PERMIT
☐ BID
☐ CONSTRUCTION
☐ RECORD
☐

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

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APPROVED :
DRAFTED : MDD
CHECKED :
PROJ. NO : 06.6115
DATE : 04/04/06

DWN J.M.

SCALE	STATION NO.	DRAWING NUMBER			SHEET	REV.
1" = 100'	0013	K	F	6427	3 OF 6	A

C.T. MALE ASSOCIATES, P.C.
50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299
ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CIVIL ENGINEERING
ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES

SHEET 1 OF 1
DWG. NO: 06-351

Appendix A
Boring Logs

SOILS

DENSITY OF GRANULAR SOILS BASED ON STANDARD PENETRATION RESISTANCE

DESIGNATION	STANDARD PENETRATION RESISTANCE (BLOWS/FOOT)
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	OVER 50

CONSISTENCY OF COHESIVE SOILS IS BASED ON FIELD AND/OR LABORATORY TESTS

CONSISTENCY	UNC COMPRESSIVE STR (TONS PER SQUARE FOOT)	FIELD IDENTIFICATION
VERY SOFT	LESS THAN 0 25	EASILY PENETRATED SEVERAL INCHES BY FIST
SOFT	0 25 TO 0 50	EASILY PENETRATED SEVERAL INCHES BY THUMB
MEDIUM STIFF	0 50 TO 1 0	CAN BE PENETRATED SEVERAL INCHES BY THUMB WITH MODERATE EFFORT
STIFF	1 0 TO 2 0	READILY INDENTED BY THUMB BUT PENETRATED ONLY WITH GREAT EFFORT
VERY STIFF	2.0 TO 4 0	READILY INDENTED BY THUMBNAIL
HARD	MORE THAN 4 0	INDENTED WITH DIFFICULT BY THUMBNAIL

ADDITIONAL TERMS USED IN THE DESCRIPTION OF SOILS:

AND	INDICATES APPROXIMATELY EQUAL AMOUNTS OF MATERIALS, SUCH AS A SAND AND GRAVEL MIXTURE IF THE MATERIALS OCCUR IN THIN SEPARATE SEAMS, IT IS NOTED IN THE DETAILED WORD CLASSIFICATION THE THICKNESS IS GIVEN WHERE POSSIBLE.
SOME	INDICATES A SIGNIFICANT AMOUNT OF THE ACCESSORY MATERIAL EXAMPLE: MEDIUM DENSE SILTY SAND - SOME GRAVEL
TRACE	INDICATES A MINOR AMOUNT OF THE ACCESSORY MATERIAL EXAMPLE LOOSE SILTY SAND - TRACE OF GRAVEL
INTERBEDDED	USED TO DESCRIBE THIN ALTERNATING SEAMS THICKNESS IS GIVEN WHERE POSSIBLE EXAMPLE: HARD INTERBEDDED SILT AND CLAY (APPROXIMATELY 1/16" THICK)

ROCK

TERM	DEFINITION
SEAM	THIN (12 INCHES OR LESS) PROBABLY CONTINUOUS LAYER
SOME	INDICATES SIGNIFICANT (15 TO 40 PERCENT) AMOUNTS OF THE ACCESSORY MATERIAL EXAMPLE: ROCK COMPOSED OF SANDSTONE (70%) AND SEAMS OF SHALE (30%) WOULD BE SANDSTONE - SOME SHALE SEAMS
FEW	INDICATES MINOR (0-15 PERCENT) AMOUNTS OF THE ACCESSORY MATERIAL EXAMPLE: ROCK COMPOSED OF SANDSTONE (90%) AND SEAMS OF SHALE (10%) WOULD BE SANDSTONE - FEW SHALE SEAMS
INTERBEDDED	USED TO INDICATE THIN OR VERY THIN ALTERNATING SEAMS OF MATERIAL OCCURRING IN APPROXIMATELY EQUAL AMOUNTS EXAMPLE: ROCK COMPOSED OF SANDSTONE (50%) AND SHALE (50%) SEAMS WOULD BE INTERBEDDED SANDSTONE AND SHALE.

THE DEGREE OF BROKENNESS OF THE ROCK IS DESCRIBED BY ONE OF THE FOLLOWING TERMS:

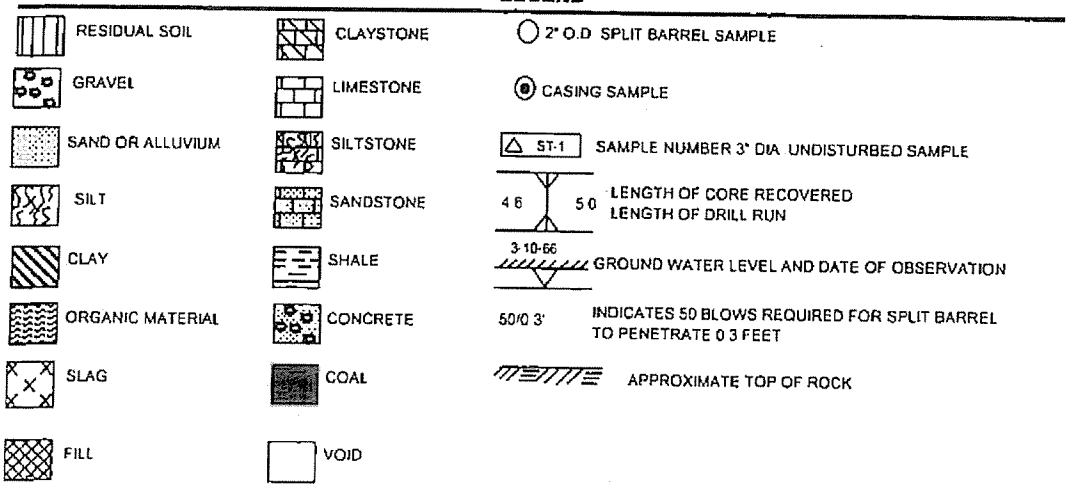
DESCRIPTIVE TERMS	ABBREVIATION	SPACING
VERY BROKEN	(V BR)	LESS THAN 2 INCHES
BROKEN	(BR)	2 INCHES - 1 FOOT
BLOCKY	(BL)	1 FOOT - 3 FEET
MASSIVE	(M)	3 FEET - 10 FEET

RQD-ROCK QUALITY DESIGNATION IS CUMULATIVE LENGTH OF PIECES OF CORE EQUAL TO OR GREATER THAN FOUR INCHES IN LENGTH DIVIDED BY THE TOTAL LENGTH OF CORE RUN, EXPRESSED AS A PERCENTAGE

THE FOLLOWING BASIC NAMES ARE APPLIED TO SEDIMENTARY ROCK:

ROCK TYPE	CHARACTERISTICS
SANDSTONE	MADE UP PREDOMINANTLY OF GRANULAR MATERIALS RANGING BETWEEN 1/16 AND 2MM IN DIAMETER
SILTSTONE	MADE UP OF GRANULAR MATERIALS LESS THAN 1/16 MM IN DIAMETER FRACTURES IRREGULARLY, MEDIUM THICK TO THICK BEDDED
CLAYSTONE	VERY FINE GRAINED ROCK MADE UP OF CLAY MATERIALS FRACTURES IRREGULARLY, VERY SMOOTH TO TOUCH GENERALLY HAS IRREGULARLY SPACED PITTING ON SURFACE OF DRILLED CORES
SHALE	A FISSILE VERY FINE GRAINED ROCK FRACTURES ALONG BEDDING PLANES
LIMESTONE	ROCK MADE UP PREDOMINANTLY OF CALCITES (CA CO3) EFFERVESCES UPON THE APPLICATION OF HYDROCHLORIC ACID
COAL	ROCK CONSISTING MAINLY OF ORGANIC REMAINS

LEGEND



DGA

Consulting Engineers and Scientists

PROJECT O&P HARTLEY SUBSTATION - GOSHEN, NY — BORING NO B-1

ELEVATION _____ GWL 0 HRS DRY - PRIOR TO CORE — PROJECT NO 10-101-03

— HRS DRY AT COMPLETION

DATE 6/15/2010 — CLASSIFIED BY R.W. FANDRAY — PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	ROD (%) OR TORVANE	DESCRIPTION: PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
	2 3 4	S-1 0			M. Dense	BRN	SILTY SAND - SOME ROCK	SM	DRILLED AT STAKE LOCATION
2.0		Rec: 2.0					FRAGMENTS AND CLAY (MOIST)		TOPSOIL TO 0.4' (OL)
									FRAGMENTS ± 1" ø
4.0				4.0					-GRAVEL WITH CUTTINGS ± 1" ø
	50/0.2	S-2 Rec: 0.0			V. Dense	GRY	DECOMPOSED SANDSTONE & SHALE	SP	
									SLIGHTLY WEATHERED
8.0									DIFFICULT AUGURING 5.5'-9.5'
	100/0.2	S-3 Rec: 0.2							
9.5				9.5			9.5		AUGER REFUSAL 9.5'
	4.7 / 4.7	R-1	100	95	M. HARD	GRY	SHALE - SOME SANDSTONE SEAMS INTERBEDDED	BR.	T.D.H. @ 9.5'
									BEDDING DIP ≈ 15-25°
14.7									-FINE SANDY SEAMS
	5.0 / 5.0	R-2	100	69					
19.2				19.2			19.2		
							B.O.H. @ 19.2'		

REMARKS ** 4¼" I.D. HSA, SPT, AUTO HAMMER, NX CORING TOOLS W/WATER

ECS Services, Inc., CME 55 Skid Rig, Driller: Tom Faires

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING B-1

2010-101-03

DGA

Consulting Engineers and Scientists

PROJECT O&R - Hartley Site, Goshen NY

BORING NO B-2

ELEVATION _____ GWL 0 HRS Pre-Core → Dry

PROJECT NO 2010-101-03

0 HRS (Hole Collapsed)

DATE 12/16/2010 CLASSIFIED BY R.W. Faudray

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
	3 3	S-1 0			Loose	BRN	Silty Sand - Some	SM	Topsoil To 0.8 (OH)
2.0	4 4	Rec: 2.1					Rock Fragments		Moist
									- Auger Difficulty
4.0				4.0			4.0		@ 3.5 - 5.5'
	50/0.4	S-2 0			V. Dense	Gry	Decomposed Rock (Shale)	SP	Moist to Dry
5.5		Rec: 0.2		5.5			5.5		Auger Refusal 5.5'
6.0	2.5/6.0	1.0 3.0	0		Moderate	Gry	Shale - Few Sandstone	WR	"DR @ 5.5'
8.0	Core	To 9.0'					Seams		- Begin Core @ 6.0'
							(Uphon Weathering)		
							To 9.0'	BR	- Competent Rock
	4.9/5.0	5.2	78	80					@ 9.0'
14.0				14.0			14.0		
							- T.O.H. @ 14.0'		

REMARKS ** 4¼" I.D. HSA, SPT, Auto Hammer, NX Coring Tools w/ Water, STB Services, Inc.)
CME 55 Swamp Buggy, Driller: Tom Farrell

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING B-2

2010-101-03

DGA

Consulting Engineers and Scientists

PROJECT O&R - HARTLEY SITE - GOSHEN, NY — BORING NO B-3

ELEVATION _____ GWL ▽HRS DRY - (PRESSURE) — PROJECT NO 2010-101-03

▽HRS HOLE COLLAPSED @ 2.0'

DATE 06/16/2010 — CLASSIFIED BY R.D. FARRELLY — PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION: PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
	5/8/10 50/0.2	S-1 0 Rec: 1.7		1.5	M. DENSE	BRN	SILTY SAND AND ROCK FRAGMENTS	SM	DRILLED APPROX. 25' EAST OF STAKED LOCATION DUE TO ACCESS
4.0	50/0.6	S-2 0 REC: 0.4		5.8	V. DENSE	GRY	DECOMPOSED ROCK	SM	REMARKS* O&R LIMITS TREE CUTTING
5.8							5.8		5.8' AUGER REFUSAL
6.5	CASE TO 6.5'				M. HARD	GRY	SHALE - SOME SANDY (INTERBEDDED) SEAMS (V. FINE) (MODERATELY WEATHERED 6.5-9.1')	BR.	T.O.R. @ 5.8'
	4.0/5.0	R-1 80 36							BEGIN CORE @ 6.5'
									-BEDDING DIP ≈ 20-30°
									-CONJUGATED BEDDING IN SANDY SEAMS
11.5				11.3			11.3		
	5.0/5.0	R-2 100 74			M. HARD	GRY	SANDSTONE (V. FINE) - SOME SHALE SEAMS (INTERBEDDED)	BR.	-HIGH ANGLE FRACTURES 6.9-7.8'
16.5				16.5			16.5		
							B.O.H. @ 16.5'		

REMARKS** 4¼" I.D. HSA, SPT, AUTO HAMMER, NX CORING TOOLS W/WATER, SJB SERVICES, INC. CME 55 SWAMP, FINNED, DRILLER: TOM FARRELL

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

Consulting Engineers and Scientists

DGFA

PROJECT O&R - Hamley Sub, Gosben NY

BORING NO B-4

ELEVATION _____ GWL ~~0~~HRS 13.8 (2nd - Cored)

PROJECT NO 2010-101-03

~~0~~HRS 9.0

DATE 06/15/2010 @21, 06/16/2010

CLASSIFIED BY G.W. FARRELL

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION: PROFILE	SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
	3 3 2 1	S-1 0 Rec: 2.0			SOFT	BRN	SILTY CLAY - SOME ROCK FRAGMENTS	CL	TOPSOIL TO 0.3' (OH) *0.25-0.5 TSF MOIST
4.0									
	15 44 50/3"	S-2 0 Rec: 2.0		4.5	V. DENSE	BRN/GRY	4.5 DECOMPOSED BOULDER - SOME SILTY CLAY	GP	(ALLUVIAL) DIFFICULT TO AUGER 5.0-11.4' MOIST
6.0									
8.4	50/2.4	S-3 0							
9.4				9.4			9.4		
	13 15 19 35	S-4 0 Rec: 2.0			DENSE	BRN	SILTY CLAY AND CLAYEY SAND - SOME ROCK FRAGMENTS AND GRAVEL	CL/SC	(ALLUVIAL) MOIST - SOME DAMP ZONES
14.0				14.0			14.2		
14.2	50/0.2	S-5 Rec: 0.8		14.2	V. DENSE	GRY	WEATHERED ROCK	GP	AUGER REFUSAL
	5.0/5.0	R1	100 42		M. HARD	GRY	SHALE - SOME SANDSTONE SEAMS INTERBEDDED	V. BR. BR.	TOP @ 14.2' - START CORE @ 14.5' - BROKEN @ 15.1' - CALCITE VEINING
19.5									
	3.8/3.8	R-2	100 24				- HIGHLY WEATHERED ZONE 19.8-22.1	V. BR. BR.	BROKEN - DIP ≈ 30-40°
23.3				23.3			23.3 B.O.H. @ 23.3		

REMARKS ** 4¼" I.D. HSA, SPT, AUTOHAMMER, NX CORING TOOLS & WATER. SJB Service, Inc. CME 55 SWAMP BUGGY, DRILLER: TOM FARRELL

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING B-4

2010-101-03

Consulting Engineers and Scientists

DGA

PROJECT O&B - LIBERTY SUB - GOSHEN, NY

BORING NO B-5

ELEVATION _____ GWL 0 HRS Dry (Pre Core)

HRS _____

PROJECT NO 2013-101-03

DATE 06/17/2013 CLASSIFIED BY R.W. FARRELL

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
	2 3 4 5	S-1 0 Rec: 2.0			Loose	BRN	SILTY SAND - SOME ROCK FRAGMENTS & CLAY	SM	TOPSOIL TO 0.8'
2.0									MOIST
4.0							SOME SAND TO - SANDY CLAY AND ROCK FRAGMENTS	V	
	31 33 50/0.4	S-2 0 Rec: 1.2		5.0	V	V	5.0	SM/CL	≈ 0.5 TSF DUET
					V. Loose	GRY/BRN	DECOMPOSED ROCK	SM	
8.0									AUGER DRILLING 0-8.5'
7.5	50/0.3	S-3 0		7.5	V	V	7.5	V	AUGER REFUSAL @ 8.5'
					M. HARD	GRY	SILTY SHALE - SOME SANDSTONE & SILTSTONE SEAMS (SLIGHTLY WEATHERED) (FRACTURED)	BR	T.O.B. @ 8.5'
	4.8/5.0	R-1 94% 44							Bedding @ 20-35° - Few Subvertical Joints - Some Calcite Filled Fractures
13.5									11.9-12.7'
	4.7/5.0	R-2 94% 28							Highly Fractured Zone 17.1'-17.5' (Weathered)
18.5				18.5	V	V	18.5	V	
							T.O.B. @ 18.5'		

REMARKS ** 4 1/4" I.D. HSA, SPT, AUTO HAMMER, NX CORING TOOLS BY DATA SUB SERVICES, INC, CME 55 SWAMP BUGGY. DRILLER: TOM FARRELL

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING B-5

2013-101-03

DGA

Consulting Engineers and Scientists

PROJECT O&R HARTLEY ROAD SUBSTATION - GOSHEN, NY

BORING NO B-6

ELEVATION _____ GWL 0 HRS DRY

PROJECT NO 2010-10-02

HRS _____

DATE 06/7/2010 CLASSIFIED BY R.W. FARNRAY

PAGE 1 of 1

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	AT STAKED LOCATION: REMARKS*
1	2	3	4	5	6	7	8	9	10
	3 3 2 1	S-1 0 Rec: 1.2			M. STIFF	BRN	SILTY CLAY - SOME ROCK FRAGMENTS AND GRAVEL	cl	TOPSOIL TO 0.6' (OH) *0.75 TSF
4.0				4.4			4.4		
5.5	26 50/3"	S-2 0 Rec: 0.4		5.5	V. Dense	5BG/6/1	Decomposed Rock - 5.5 TRACE CLAY	gc	- LOW MOISTURE CONTENT - TRACE CLAY
							B.O.H. @ 5.5'		AUGER REFUSAL AT 5.5' TOR @ 5.5'

REMARKS ** 4¼" ID, HSA, SPT, AUTO HAMMER SJB Services, Inc.,
CME 55 SWAMP BOGGY, DRILLER: TOM FARRELL

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING B-6

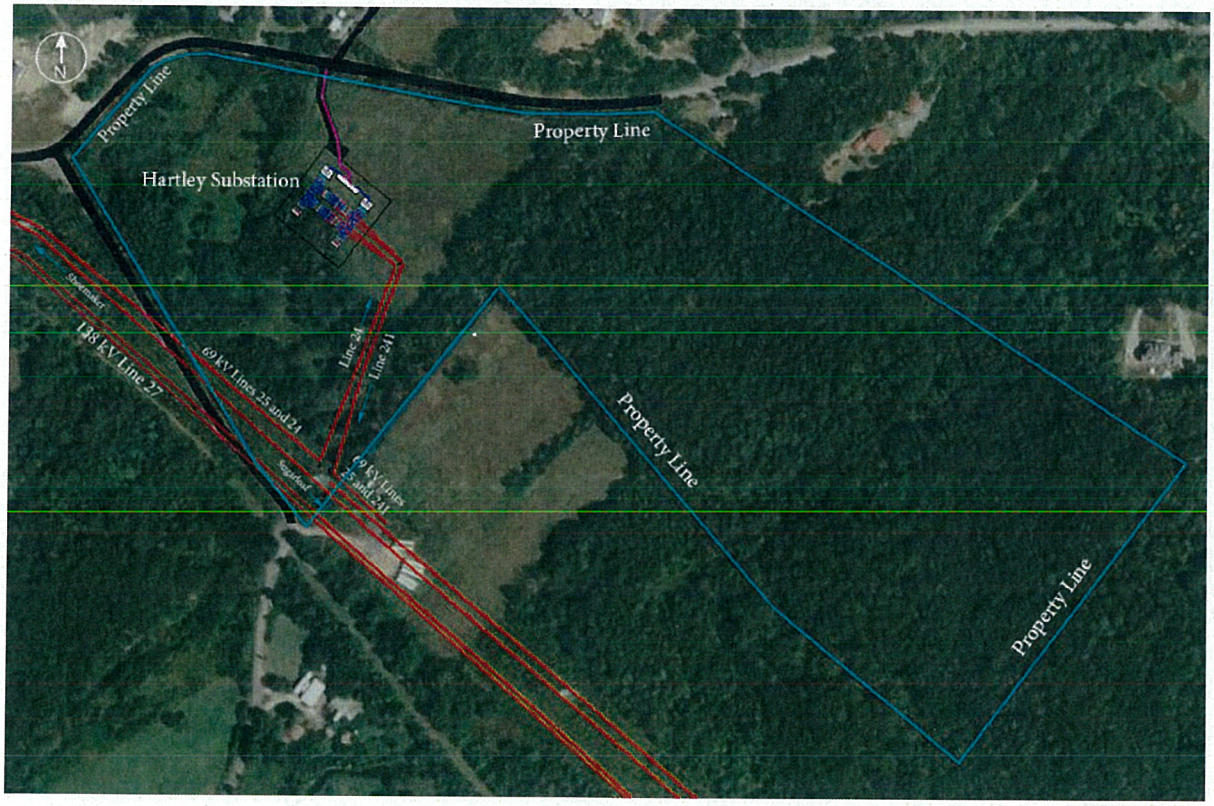
2010-10-02

APPENDIX O
Magnetic Field Modeling Assessment Report

MAGNETIC FIELD
MODELING ASSESSMENT

FOR THE

PROPOSED HARTLEY SUBSTATION



Prepared for
Orange & Rockland Utilities, Inc.
390 Route 59
Spring Valley, NY 10977

Prepared by
Enertech Consultants
494 Salmar Avenue, Suite #200
Campbell, California 95008

October 6, 2010

NOTICE

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Prepared by
Enertech Consultants of Santa Clara, Inc.
Campbell, California

EXECUTIVE SUMMARY

Orange & Rockland Utilities, Inc. is proposing to construct a new electric power substation, the "Hartley Substation", which is located outside the town of Goshen, in Orange County, New York. Orange & Rockland retained Enertech to perform a magnetic field assessment for the existing site and for the proposed substation configuration. This evaluation consisted of computer modeling of the power-frequency magnetic fields resulting from operation of the substation.

A computer model was developed for the existing site and for the proposed substation based upon engineering and design drawings supplied by Orange & Rockland. Once each of the models was developed, magnetic field calculations were performed using loading information provided by Orange & Rockland. Calculations were performed around the proposed substation location, as well as creating contour maps of the immediate area surrounding the substation site.

The existing site presently has two overhead 69 kV transmission lines and one overhead 138 kV transmission line routed through a portion of the site. Calculated magnetic field levels along the proposed substation property line reach 15.6 mG at the location where the existing 138 kV transmission line crosses the proposed property line (under 2010 peak loading conditions). Field levels attenuate with distance away from the transmission line.

For the proposed Hartley Substation configuration, calculated magnetic field levels range from about 0.0 mG to 25.6 mG around the substation location for a 2012 projected loading scenario. The location where the highest magnetic field level is calculated around the proposed substation location is where the existing overhead 69 kV transmission line circuits (Lines 24 and 25) cross the property line. Increased magnetic field levels also occur over the six underground 13.2 kV distribution lines exiting the substation onto Cheechunk Road (about 8.5 mG for the 2012 projected loading scenario).

Presently, there are no federal health-based magnetic field standards. Although there are no federal health standards in the United States specifically for 60 Hertz magnetic fields, some organizations have developed guidelines: the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the American Conference of Governmental Industrial Hygienists (ACGIH), and the Institute of Electrical and Electronics Engineers (IEEE). All of these guidelines are much higher than the calculated magnetic field levels around the proposed substation (maximum of 25.6 mG). In addition, there are at least two states that have adopted engineering-based guidelines or standards for transmission line magnetic fields (New York and Florida). The state of New York has a 200 mG limit at the edge of the right-of-way for overhead transmission lines under maximum loading conditions. Calculated magnetic field levels along the proposed property line of the substation are again much lower than this state limit.

Calculated magnetic field levels are based on computer modeling of the existing power line and the proposed substation design and loading as provided by Orange & Rockland. If the proposed substation design or loading conditions differ significantly from modeled conditions, then calculated magnetic field levels could differ significantly from those presented in this report.

1.0 INTRODUCTION

Orange & Rockland Utilities, Inc. is proposing to construct a new electric power substation, the "Hartley Substation", which is located outside the town of Goshen, in Orange County, New York. Orange & Rockland has proposed to construct this substation to address increased load demands from customers within the immediate area. Orange & Rockland retained Enertech to perform a magnetic field assessment for the proposed substation project. This evaluation consisted of computer modeling of the power-frequency magnetic fields for the existing overhead transmission lines present at the proposed substation site (two 69 kV transmission lines - Lines 24 and 25, and one 138 kV transmission line - Line 27) under 2010 peak loading conditions, and for the proposed substation configuration with associated transmission line modifications under a projected loading condition.

The proposed Hartley Substation would tap into an existing 69 kV transmission line (Line 24), routing it into the proposed substation and routing a new 69 kV transmission line (Line 241) back onto the existing right-of-way. Three new utility poles would be installed at the tap location to replace an existing utility pole. Two new steel utility poles would also be installed to route the overhead 69 kV transmission lines (Lines 24 and 241) from the existing right-of-way into the proposed substation. The proposed Hartley Substation would convert 69 kV electrical power to 13.2 kV, utilizing two transformers, circuit breakers, buswork, and a control house with switchgear. Underground distribution feeders would supply 13.2 kV electric power from the substation to nearby customers. Magnetic fields were calculated for this proposed substation and transmission line configuration using a 2012 projected loading condition.

This report describes the magnetic field evaluation which Enertech performed. Section 2 of this report provides a general description of magnetic fields. Section 3 describes the computer modeling software used for the magnetic field calculations. Section 4 provides a description of the existing site, the proposed substation configuration, the computer model for the proposed substation configuration under various load conditions, and the calculation results. Section 5 discusses various standards and guidelines, while Section 6 presents a discussion of the computer modeling results and report conclusions.

2.0 MAGNETIC FIELDS – GENERAL DESCRIPTION AND UNITS OF MEASURE

2.1 GENERAL DESCRIPTION OF MAGNETIC FIELDS

Any object with an electric charge on it has a voltage (potential) at its surface and can create an electric field [(1)]. When electrical charges move together (an electric current), they create a magnetic field which can exert forces on other electric currents. All currents create magnetic fields [(1, 2, 3, 4)]. Magnetic fields occur throughout nature and are one of the basic forces of nature. The strength of the magnetic field depends on the magnitude of the current, the configuration/size of the source, spacing between conductors, and distance from the source[1].
Magnetic fields can be unchanging in direction (also called static), as in the case of direct current (DC), or alternating in direction, as in the case of alternating current (AC). Static magnetic fields

[1] Electric fields are a function of voltage, while magnetic fields are a function of current. Magnetic field levels can increase due to changes in current (loading) and phasing arrangement/configuration. Lower voltage lines may have higher loads, which may produce higher magnetic fields. Higher voltage lines may have lower loads, but due to increased phase separation, may also have higher magnetic fields.

occur in nature. The earth has a natural static magnetic field of about 550 mG (0.550 Gauss) in the Orange County, New York area [5]. Some electrical devices operate on a DC system, while others operate on an AC system. The magnetic field from AC sources (such as most electrical power lines, electrical equipment, residential wiring and appliances) changes direction at a rate of 60 cycles per second or 60 Hertz [1].

Magnetic fields are vector fields that have both direction and magnitude as a function of position relative to the field source [4]. Magnetic fields produced by electric currents are also time-varying phasors at the same frequency as the current (60 Hertz power-frequency) [4, 6]. Since magnetic fields can vary due to location from a source and at different points in time, magnetic field measurements represent a snapshot in time of magnetic field levels [4]. Since the vector components and phase angles of the magnetic field are not always known, the root-mean-square (rms) value of the magnetic field is often used to characterize the intensity of the field, despite its complicated variations in space and time (B_{rms}=SQRT[$B_x^2 + B_y^2 + B_z^2$]) [7].

Magnetic fields can be present due to a variety of different field sources. Contributions from multiple field sources are not simply cumulative in determining the resulting magnetic field level, since magnetic fields are vectors and phasors, and thus, add vectorially [4]. When the vectors are in opposite directions the fields cancel, and when the vectors are in the same direction they add. The magnetic field at any point in space is the vector sum of the field contributions from all sources (at each instant in time) [4]. Magnetic fields from multiple sources are influenced by the distance relative to each source, the amount of current on each source, and the configuration of the source (i.e., the arrangement of the current-carrying conductors associated with the source). Since the spatial and time components of magnetic fields from various sources are not always known, a good estimation of their additive effect assumes that they will add in quadrature as an rms value. For example, if an appliance produces a magnetic field of 10 mG and the magnetic field near a wall is 1 mG, then the resulting magnetic field would be:

$$\sqrt{10^2 + 1^2} = 10.05 \text{ mG}.$$

Power frequency magnetic fields are encountered frequently in everyday life. For example, typical AC household appliances produce magnetic fields. The magnetic field for a large number of appliances was measured by the Illinois Institute of Technology Research (IITRI) for the U.S. Navy [8] and by Enertech [9] for the Electric Power Research Institute (EPRI). Typical values for appliances are presented in Table 1.

2.2 UNITS OF MEASURE

Magnetic flux densities (B) are reported in units of gauss (G), or more typically in units of milliGauss (mG), which are equal to one-thousandth of a gauss (i.e., 1 mG = 0.001 G). Some technical reports also use the unit Tesla (T) or microTesla (μT; 1 μT = 0.000001 T) for magnetic flux densities. The conversion between these units is 1 mG = 0.1 μT and 1 μT = 10 mG.

Table 1 Magnetic Fields From Household Appliances [8]		
Appliance	AC Magnetic Field (mG)	
	12" Away	Maximum
Electric Range	3 to 30	100 to 1,200
Electric Oven	2 to 5	10 to 50
Garbage Disposal	10 to 20	850 to 1,250
Refrigerator	0.3 to 3	4 to 15
Clothes Washer	2 to 30	10 to 400
Clothes Dryer	1 to 3	3 to 80
Coffee Maker	0.8 to 1	15 to 250
Toaster	0.6 to 8	70 to 150
Crock Pot	0.8 to 1	15 to 80
Iron	1 to 3	90 to 300
Can Opener	35 to 250	10,000 to 20,000
Mixer	6 to 100	500 to 7,000
Blender, Popper, Processor	6 to 20	250 to 1,050
Vacuum Cleaner	20 to 200	2,000 to 8,000
Portable Heater	1 to 40	100 to 1,100
Fans/blowers	0.4 to 40	20 to 300
Hair Dryer	1 to 70	60 to 20,000
Electric Shaver	1 to 100	150 to 15,000
Color TV	9 to 20	150 to 500
Fluorescent Fixture	2 to 40	140 to 2,000
Fluorescent Desk Lamp	6 to 20	400 to 3,500
Circular Saws	10 to 250	2,000 to 10,000
Electric Drill	25 to 35	4,000 to 8,000

3.0 DESCRIPTION OF THE COMPUTER MODELING SOFTWARE

A computer model was developed of the proposed Hartley Substation to calculate magnetic field levels associated with its operation. The software program "EMF Workstation 2009", which is the latest EPRI magnetic field computer modeling program, was used to perform these magnetic field calculations. The EMF Workstation 2009 software can model the magnetic fields in and around transmission and distribution substations. EMF Workstation 2009 can also model substation equipment such as underground cables, power transformers, buswork, circuit breakers, and capacitor banks. The software can produce two-dimensional magnetic field contour maps of the calculation results, as well as calculation values along a predefined route.

4.0 DESCRIPTION AND MODELING OF THE PROPOSED HARTLEY SUBSTATION

4.1 DESCRIPTION OF THE EXISTING SUBSTATION SITE

The proposed Hartley Substation site is a vacant wooded property located outside the town of Goshen in Orange County, New York. The site is bounded to the west by Hartley Road, to the north by Echo Lake Road, and Cheechunk Road and to the east by forested private property. Presently there is a double circuit 69 kV transmission line (Lines 25 and 24) and a single circuit 138 kV transmission line (Line 27) which is routed northwest-to-southeast across a portion of the proposed substation site (on the southern edge of the proposed substation site).

Figure 1 presents an aerial photograph of the existing site. The location of the proposed substation property line boundary is shown as a blue outline in the figure. The location of the proposed substation is also overlaid onto the figure. Existing overhead 69 kV and 138 kV transmission lines are located along the southern portion of proposed substation site and cross a portion of the property site.

Figure 1. The Proposed Hartley Substation Property Site with Property Line Boundary and Existing Transmission Lines

4.2 DESCRIPTION OF THE PROPOSED HARTLEY SUBSTATION

The proposed Hartley Substation would convert 69 kV electrical power to 13.2 kV electrical power for distribution to neighboring consumers. The proposed substation would be an outdoor substation, with two transformers, circuit breakers, buswork, and control house with switchgear.

One of the existing 69 kV transmission lines (Line 24, which is closest to the proposed substation) would be tapped to provide electrical power into the substation. Line 24 would be routed into the proposed substation and a new 69 kV transmission line (Line 241) would be routed back onto the existing right-of-way. These two 69 kV circuits would be connected through buswork inside of the substation. Two power transformers would also be connected through this buswork, where 69 kV electrical power would be converted to 13.2 kV electrical power. The 13.2 kV electrical power would be routed through buswork into switchgear and distributed to six proposed 13.2 kV underground distribution circuits. The six underground circuits would be routed out of the substation along the driveway access road to connect into the existing distribution system (two circuits routed to Owens Road and the four remaining circuits to Cheechunk Road, with two circuits ending along Hartley Road).

Three new utility poles would be installed at the tap location to replace an existing utility pole. These new poles would support the three 69 kV transmission lines (Lines 24, 25, and 241) and allow the two transmission lines (Lines 24 and 241) to enter and exit the right-of-way for routing to the proposed substation. The existing utility pole at this location would be removed. Two new steel utility poles would also be installed to route the overhead 69 kV transmission lines (Lines 24 and 241) from the existing right-of-way over to the proposed substation.

Figure 2 presents a diagram of the proposed Hartley Substation overlaid onto an aerial photograph of the property site. As shown in Figure 2, one of the existing 69 kV transmission line circuits (Line 24) is tapped and routed into the proposed substation. The new 69 kV transmission line circuit (Line 241) is routed back from the substation to the existing transmission line right-of-way. Underground distribution circuits, shown as pink lines in Figure 2, are routed from the proposed substation down the substation access road to surrounding streets to connect into the existing distribution system.

Figure 3 presents a detailed drawing of the proposed substation as prepared by Orange and Rockland. This figure illustrates the layout of the substation equipment, including the substation buswork, transformer locations, circuit breakers, and control house/switchgear locations.

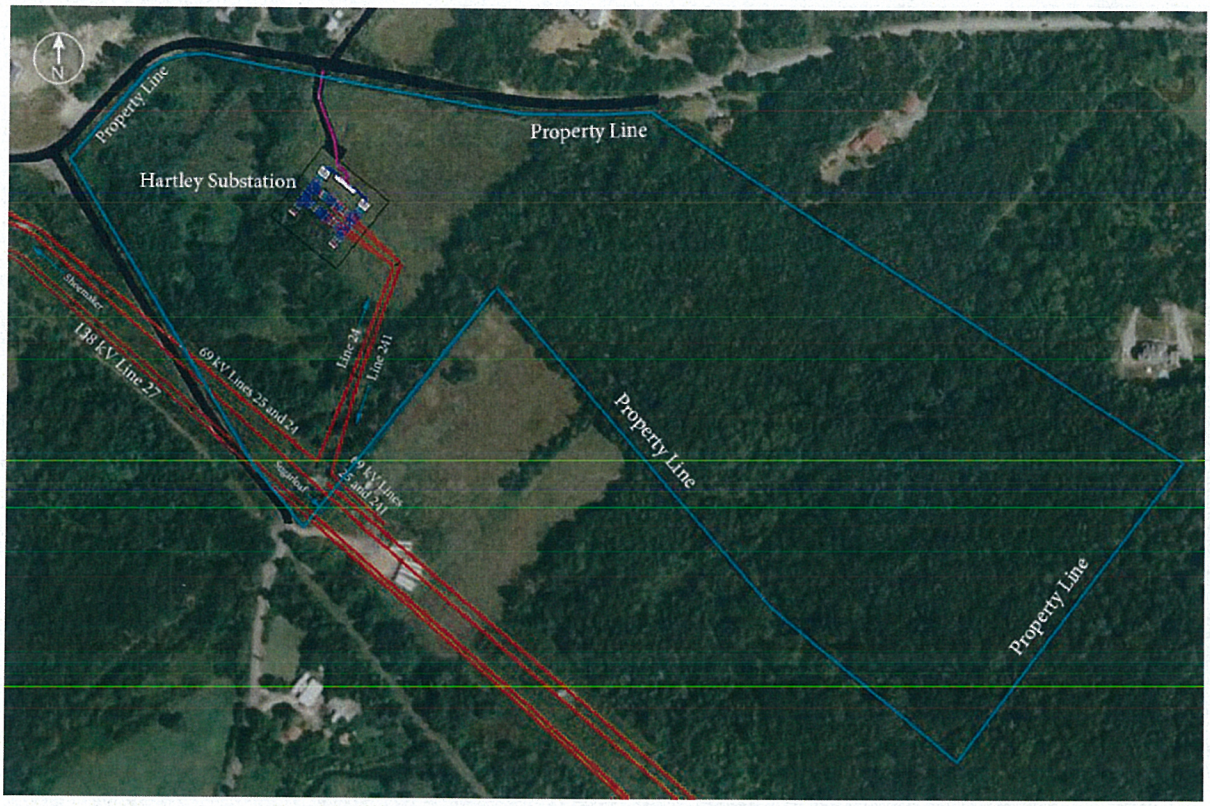

Figure 2. The Proposed Hartley Substation Computer Model Overlaid Onto an Aerial Photograph of the Property Site

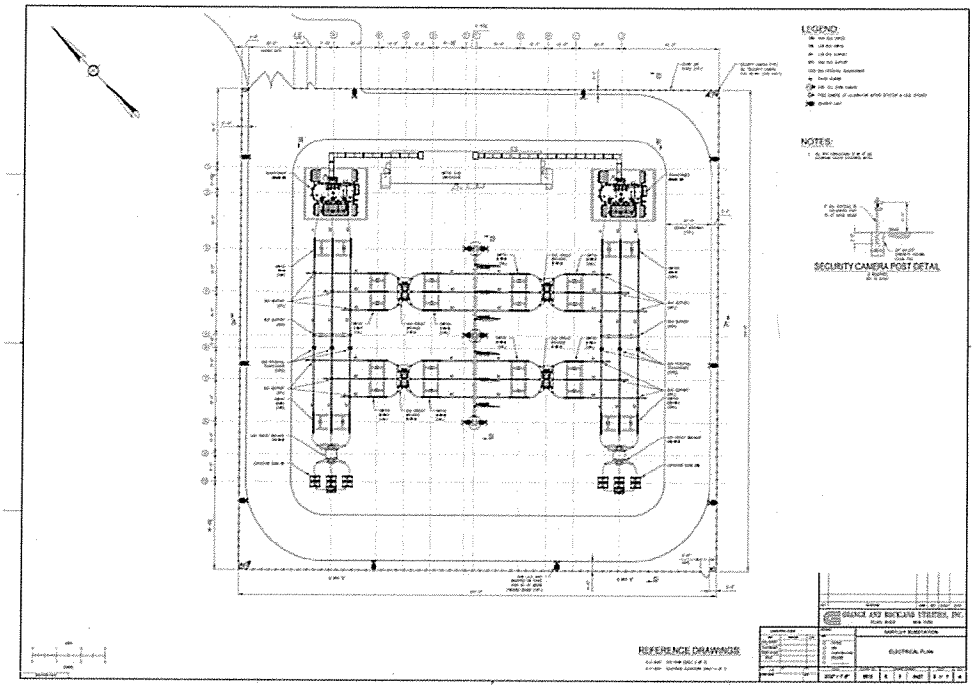

Figure 3. Drawing of the Proposed Hartley Substation

4.3 SUBSTATION GEOMETRY INFORMATION

A computer model was developed for the existing site and for the proposed Hartley Substation. Each computer model was developed using various engineering drawings, one-line diagrams, plan & profile drawings, phasing and loading conditions, and other information provided by Orange & Rockland.

Loading information for the transmission and distribution circuits was provided by Orange & Rockland. For loading within the proposed substation switchgear, a 90% reduction factor was assumed. This reduction was modeled to represent the shielding factor caused from the metal-clad switchgear cabinets which houses the energized conductors. For the underground distribution circuits a 75% load reduction was applied to represent the magnetic field shielding factor caused from multi-point grounding of metallic cable sheaths and resulting eddy current reductions to the magnetic fields along the underground duct routes to Cheechunk Road, Owens Road, Echo Lake Road, and Hartley Road.

For the existing overhead 69 kV transmission lines (Lines 24, and 25) and 138 kV transmission line (Line 27), a peak 2010 loading was reported by Orange & Rockland as:

- Line 24 = 31 Amps
- Line 25 = 139 Amps
- Line 27 = 402 Amps

For the proposed substation configuration, a 2012 projected loading scenario was used based upon equipment specifications by Orange & Rockland. Loading conditions for the proposed Hartley Substation are illustrated in Figure 4 for the 2012 projected load.

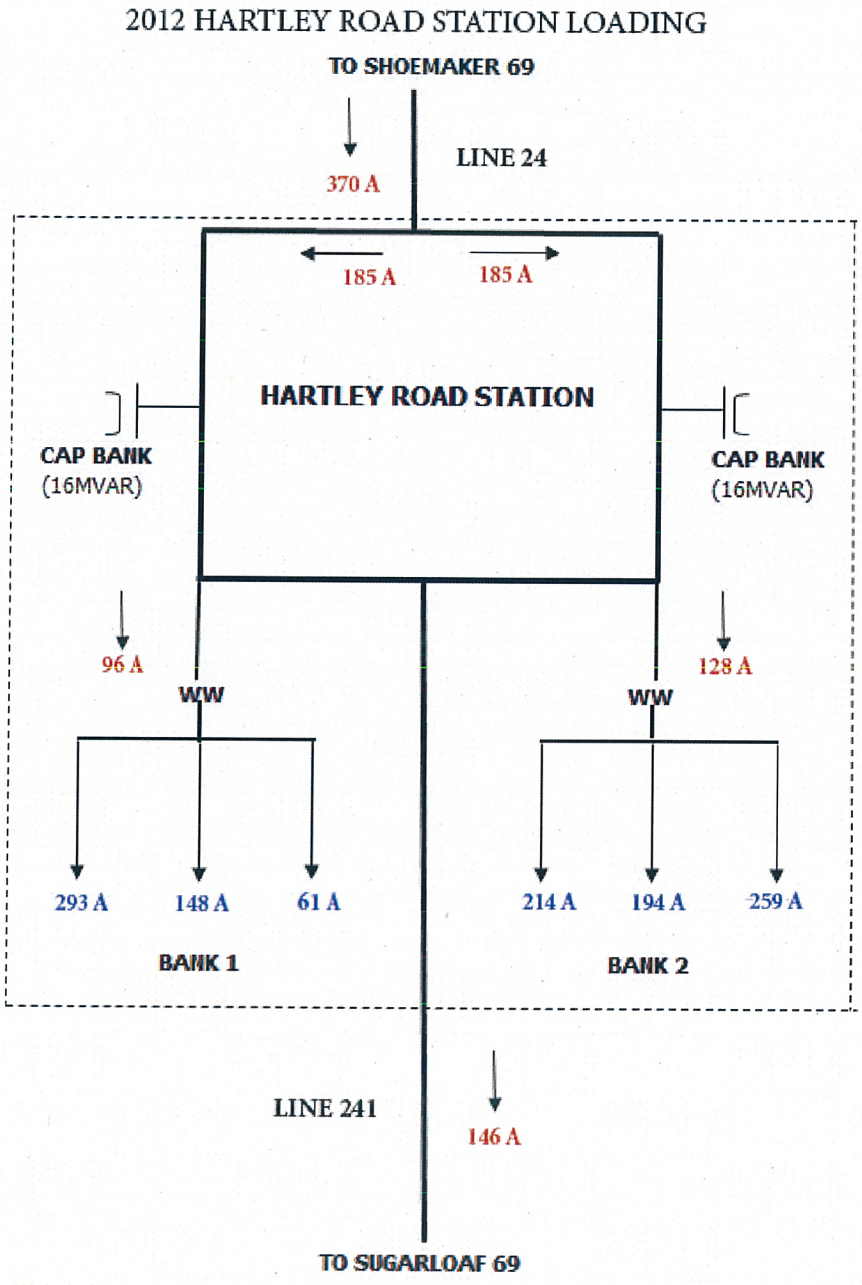

Figure 4. Projected 2012 Load Case Used for Computer Modeling of the Proposed Hartley Substation

4.4 MODELING RESULTS FOR THE EXISTING CONFIGURATION

A calculated magnetic field contour map is presented in Figure 6 for the existing double circuit 69 kV transmission lines and the single circuit 138 kV transmission line configuration under 2010 peak loading conditions. The computer model calculated magnetic field levels at a height of 1 meter above ground in accordance with IEEE Standards [10,11]. Contour levels are shown in units of mG.

As shown in Figure 5, the existing overhead 69 kV transmission lines (Lines 24 and 25) and the 138 kV transmission line (Line 27) are the dominant magnetic field source within the proposed property site. The highest calculated magnetic field level for the existing overhead transmission line configuration is approximately 15.6 mG near centerline of the 138 kV circuit using 2010 peak loading conditions. Field levels attenuate with distance away from the transmission lines.

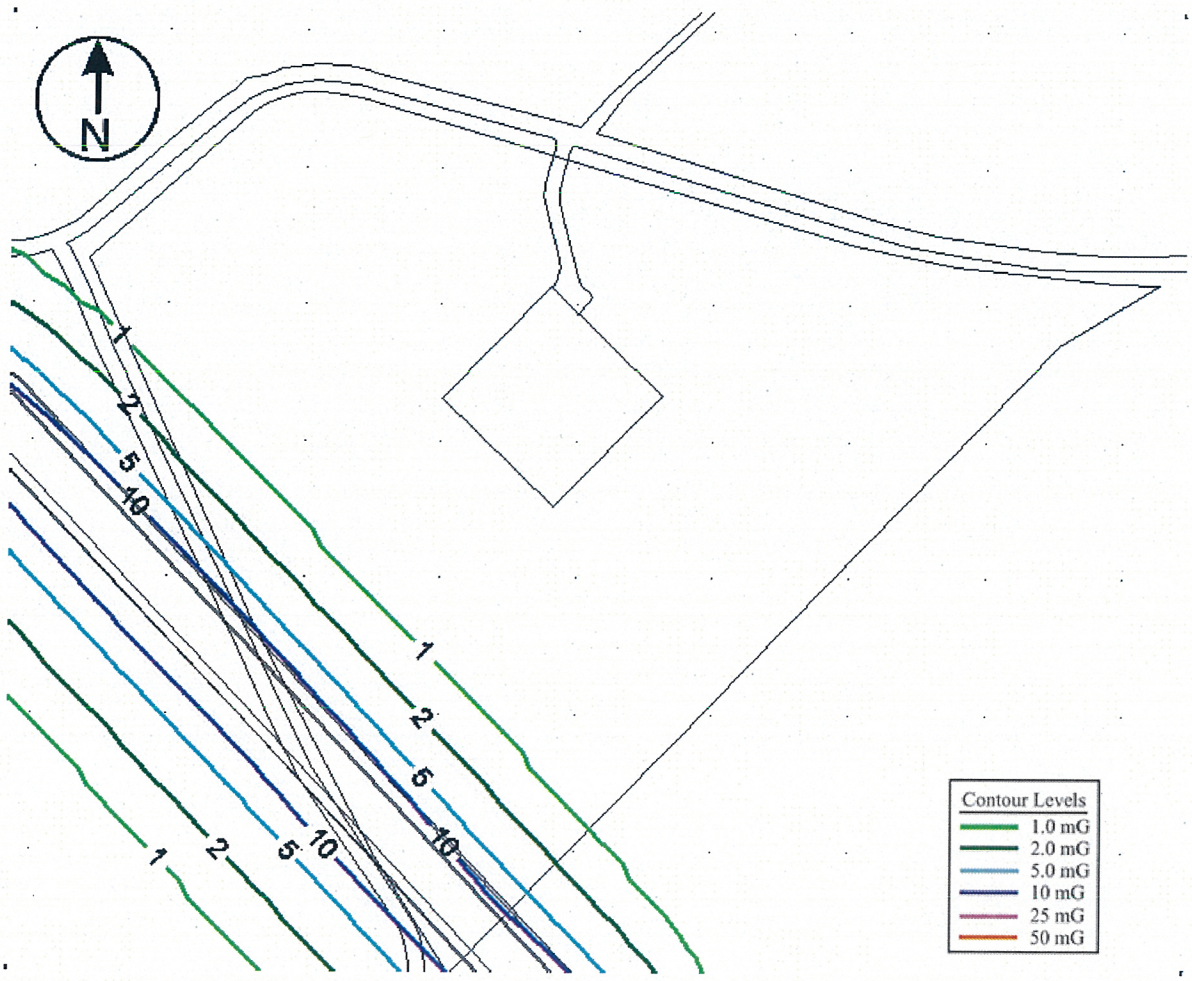

Figure 5. Calculated Magnetic Field Contour Map for the Existing Line Configuration Under Peak 2010 Loading Conditions (in mG)

Magnetic field calculations were also performed along the profile path around the substation location. Figure 6 presents a diagram of the profile path used for these field calculations. The profile begins near the southwest corner of the proposed substation property line and proceeds in a clockwise direction around the proposed substation location. The southernmost section of the Hartley Substation property was not included in these calculations due to the distance from the substation and corresponding transmission lines. The magnetic fields in this section would be negligible.

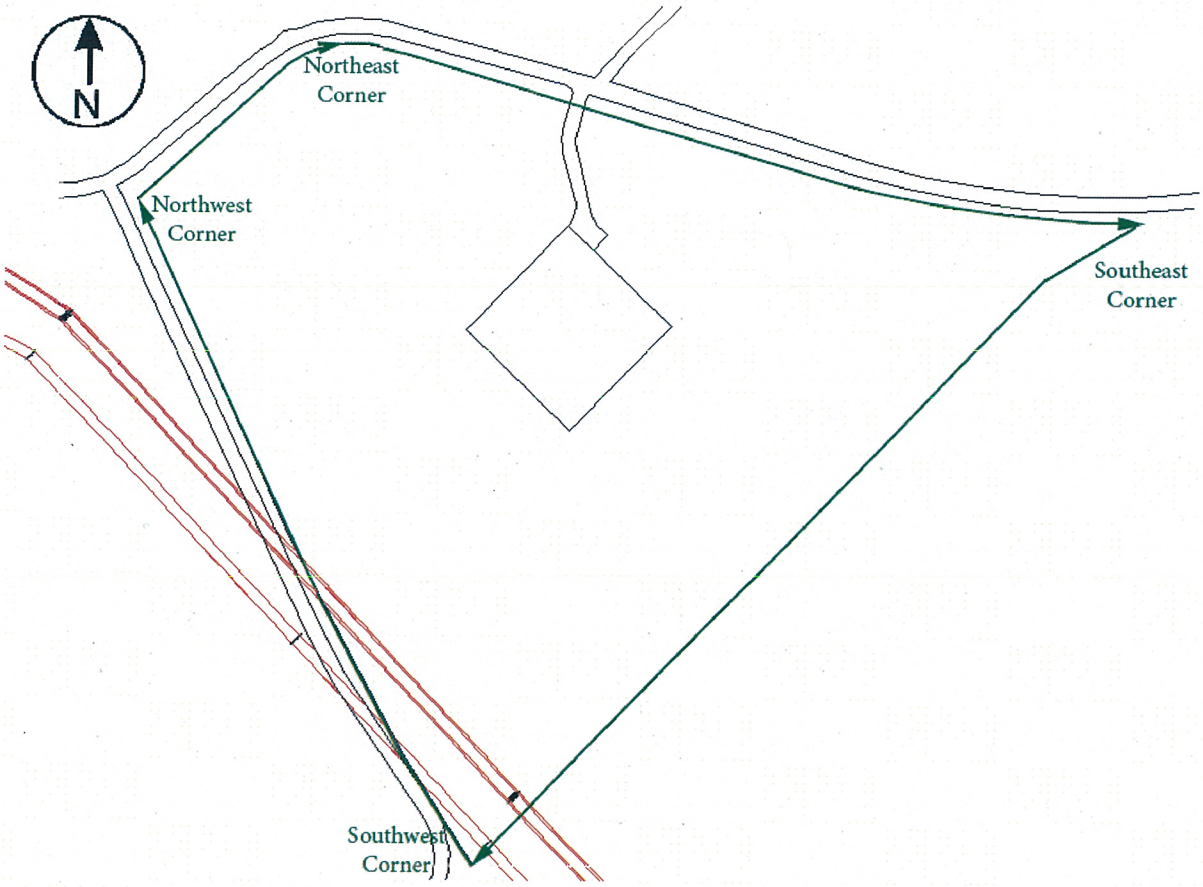

Figure 6. Profile Path for Magnetic Field Calculations Around the Proposed Hartley Substation Location For the Existing Site Configuration

The calculated magnetic field levels around the proposed substation location are presented in Figure 7 as a magnetic field versus distance graph. Calculated magnetic field levels along this profile range from about 0.0 mG to 15.6 mG, depending upon location. Calculated magnetic field levels increase at locations where the overhead transmission line circuits cross into the southwest corner of the proposed substation property.

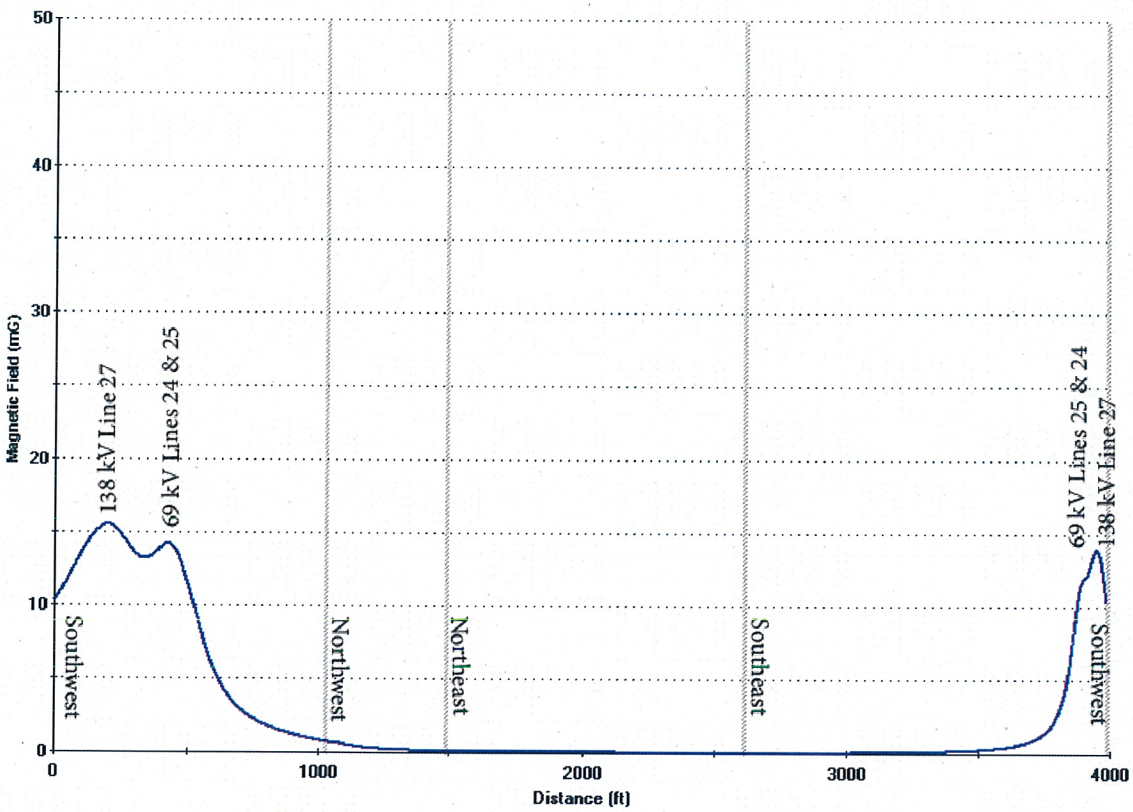

Figure 7. Profile Path for Magnetic Field Calculations Along the Proposed Hartley Substation Property Line

4.5 MODELING RESULTS FOR THE PROPOSED HARTLEY SUBSTATION

Based on the proposed substation design and modeling assumptions, the computer model calculated magnetic field levels projected around the proposed substation at a height of 1 meter above ground in accordance with IEEE Standards [10,11]. Figure 8 presents the calculated magnetic field contour maps for the proposed substation with the new 69 kV transmission line and distribution line configurations for the 2012 projected loading scenario. The presence of the proposed substation and associated new overhead 69 kV transmission lines and new underground distribution lines contribute to the overall magnetic field levels in the immediate area near the proposed substation. Contour levels are shown in units of mG.

As shown in Figure 8 the calculated magnetic field extends into the proposed substation site due to the addition of the new 69 kV overhead circuits and the proposed substation equipment. Some magnetic field contours are also present due to the new 13.2 kV underground distribution circuits which exit the substation property from the access road and travel along Owens Road, Cheechunk Road, Echo Lake Road, and Hartley Road.

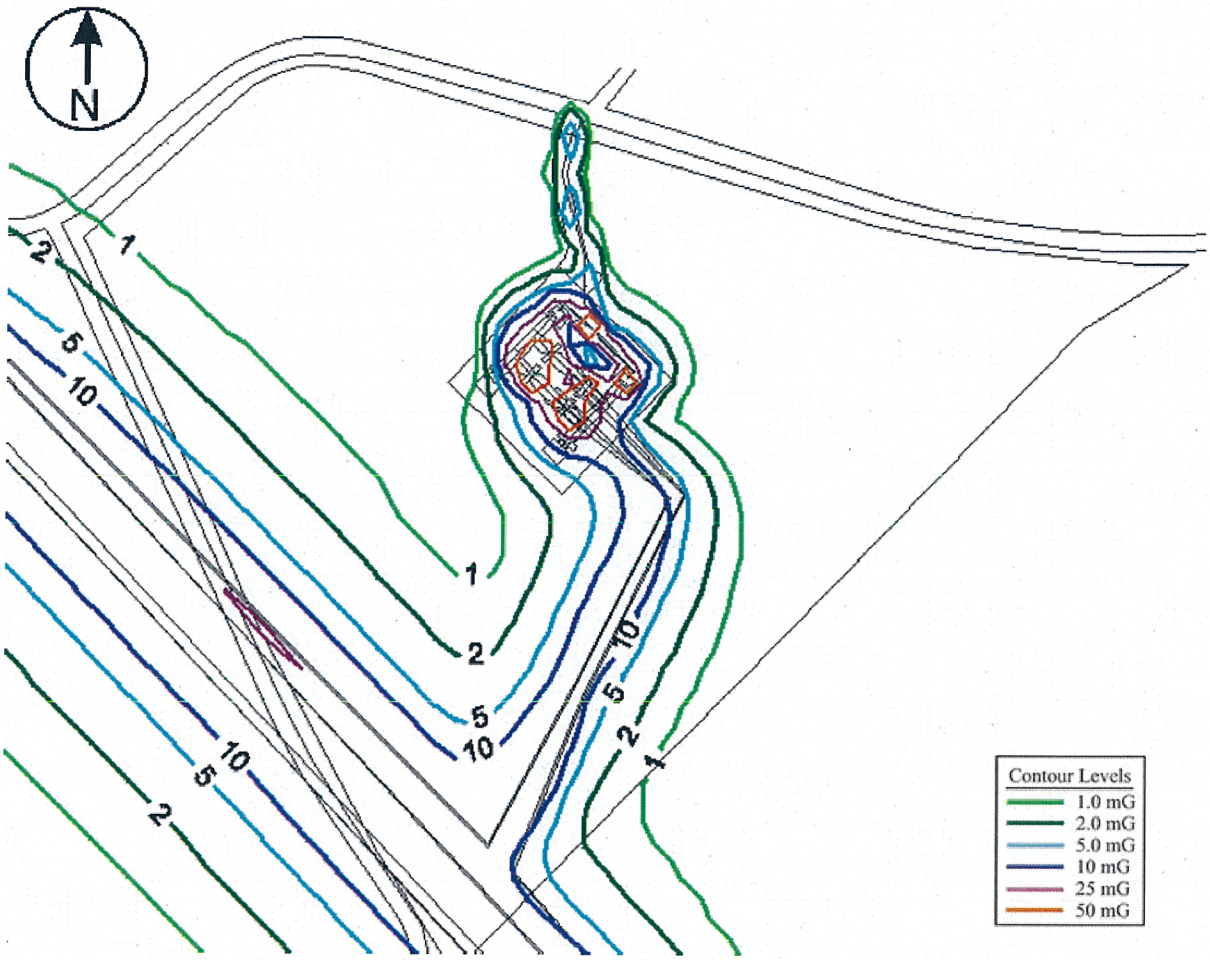

Figure 8. Calculated Magnetic Field Contour Map for the Proposed Substation Configuration Under Projected 2012 Loading Conditions (in mG)

Magnetic field calculations were also performed around the proposed substation. Figure 9 presents a diagram of the profile path used for these field calculations. Similar to the profile path for the existing site configuration, the profile begins near the southwest corner of the proposed substation property and proceeds in a clockwise direction along the perimeter around the proposed substation.

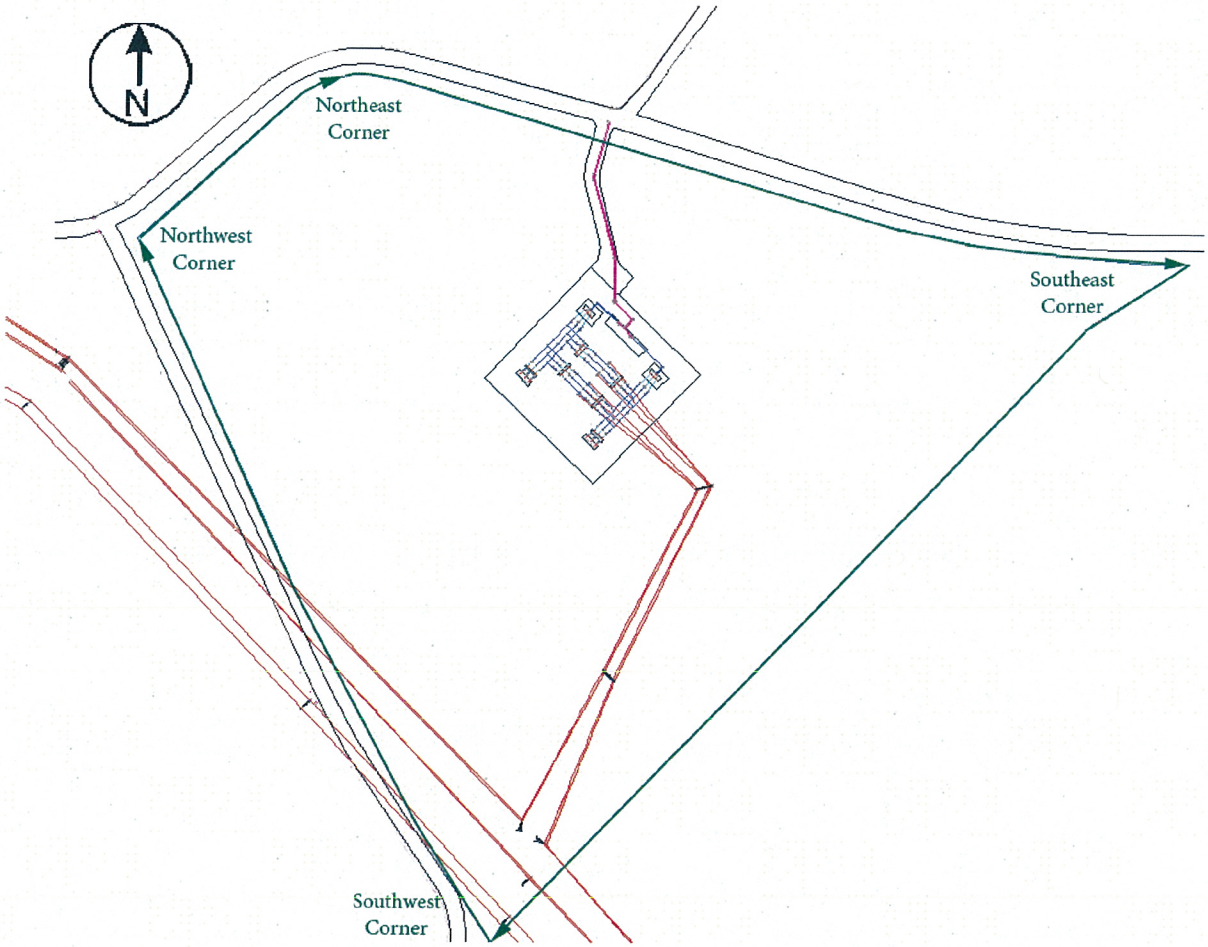

Figure 9. Profile Path for Magnetic Field Calculations Around the
Proposed Hartley Substation Location
For the Proposed Site Configuration

The calculated magnetic field levels around the proposed substation are presented in Figures 10 as magnetic field versus distance graphs for the projected 2012 loading scenario. Calculated magnetic field levels along the proposed substation profile range from about 0.0 mG to 25.6 mG (depending upon location along the profile path) for a projected 2012 loading scenario, as shown in Figure 10. Calculated magnetic field levels increase at locations where the overhead and underground circuits enter and exit the substation property. For example, where the six underground distribution circuits exit the substation at Cheechunk Road, calculated magnetic field levels reach 8.5 mG for the projected 2012 loading scenario. The location where the highest magnetic field levels are calculated along the profile path are where the existing overhead 69 kV transmission line circuits (Lines 24 and 25) cross the property line.

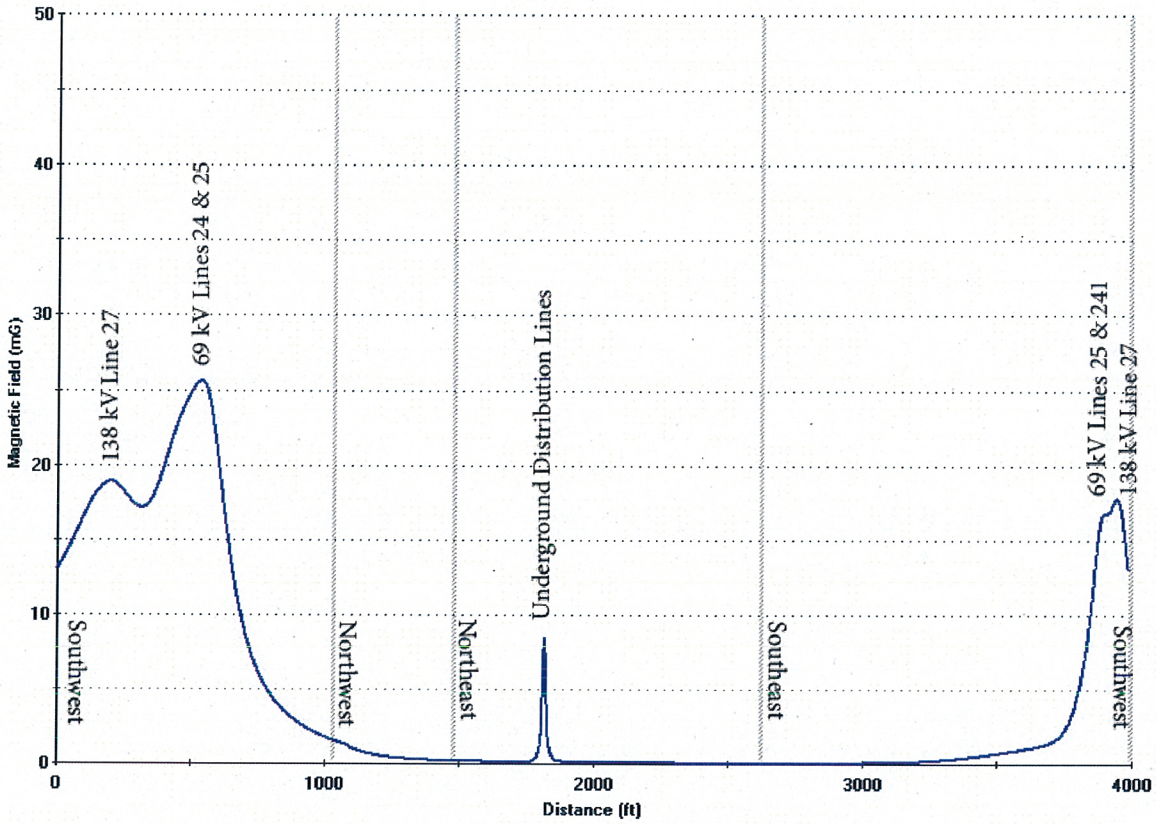

Figure 10. Calculated Magnetic Field Around the Proposed Substation Location for the Proposed Substation Configuration with a 2012 Projected Loading Scenario (in mG)

5.0 STANDARDS AND GUIDELINES

Presently, there are no federal health-based magnetic field standards. Although there are no federal health standards in the United States specifically for 60 Hertz magnetic fields, two organizations have developed guidelines: the International Commission on Non-Ionizing Radiation Protection (ICNIRP)[12] and the American Conference of Governmental Industrial Hygienists (ACGIH)[13]. Both of these guidelines are much higher than the calculated magnetic field levels around the proposed substation location (0.0 mG to 25.6 mG for 2012 projected loading). Tables 2 and 3 present a summary of the magnetic field levels of these guidelines respectively. Since it has not yet been determined whether magnetic field exposure constitutes a health hazard, it cannot be determined what levels of exposure are "safe" or "unsafe".

Table 2
Summary of ICNIRP 50/60 Hz Exposure Guidelines

International Commission on Non-Ionizing Radiation Protection Guidelines	
Exposure (50/60 Hz)	Magnetic Field
Occupational :	
Reference Levels for Time-Varying Fields	4,167 mG (4.167 Gauss)
Current Density for Head and Body	5,000 mG (5 Gauss)
General Public :	
Reference Levels for Time-Varying Fields	833 mG (0.833 Gauss)
Current Density for Head and Body	1,000 mG (1 Gauss)

Table 3
Summary of ACGIH 60 Hz Exposure Guidelines

American Conference of Governmental Industrial Hygienists Guidelines	
Exposure (60 Hz)	Magnetic Field
Occupational :	
Exposure should not exceed	10,000 mG (10 Gauss)
For workers with cardiac pacemakers, the field should not exceed	1,000 mG (1 Gauss)

In addition, IEEE has published a standard regarding exposure to electromagnetic fields[14]. Table 4 presents a summary of the 60 Hz electric and magnetic field levels for this standard. Again, calculated magnetic field levels at the proposed substation property line are much lower than the levels cited within the IEEE standard.

Table 4. Summary of IEEE 60 Hz Exposure Levels

IEEE Exposure Levels for 60 Hz Magnetic fields	
Exposure (60 Hz)	Magnetic Field
General public should not exceed	9,040 mG (9.04 Gauss)
Controlled environments should not exceed	27,100 mG (27.1 Gauss)

Finally, there are at least two states that have adopted engineering-based guidelines or standards for transmission line magnetic fields (New York and Florida). Table 5 [15] presents a summary of these state magnetic field standards. Calculated magnetic field levels along the proposed substation property line are also lower than both of these state guidelines.

Table 5. State Transmission Line Standards and Guidelines

State	Magnetic Field at ROW Edge
Florida	150 mG (max load)[a] 200 mG (max load)[b] 250 mG (max load)[c]
New York	200 mG (max load)

* ROW = right-of-way (or in Florida standard, certain additional areas adjoining the right-of-way).

a For lines of 69-230 kV.

b For 500 kV lines.

c For 500 kV lines on certain existing ROW.

Scientific research uses epidemiology studies, animal models, and laboratory studies of basic mechanisms to scientifically evaluate health issues. Based upon a comprehensive review of the scientific literature, the association between magnetic fields and adverse health effects is weak and some research is continuing. Many organizations (such as the National Institute of Environmental Health Sciences[15], World Health Organization[16], International Agency for Research on Cancer[17], National Cancer Institute[18], etc.) have reported that there is little or no scientific evidence supporting an association with EMF exposures and adverse health effects or disease risks. There is some evidence from epidemiology studies that exposure to power-frequency EMF is associated with an increased risk for childhood leukemia. However, this association is difficult to interpret in the absence of reproducible laboratory evidence or a causal scientific explanation.

For animals, many EMF studies have focused on various groups of animals, such as bees and cattle. Some studies have reported no effects resulting from EMF, while other studies found mixed results, with some studies indicating an effect from EMF while others did not. Researchers have also performed detailed short-term and long-term studies on laboratory animals with respect to EMF and diseases such as leukemia, breast cancer, skin cancer, brain cancer, reproductive defects, and others. Overall, animal studies do not support EMF health effects[15].

There is nothing new or unusual about a 69 kV substation. In fact, 69 kV facilities have been in service in the United States for over 100 years.

6.0 DISCUSSION AND CONCLUSIONS

The existing site presently has two overhead 69 kV transmission lines (Lines 24 and 25) and one 138 kV transmission line (Line 27) which cross a portion of the proposed substation site. The highest calculated magnetic field levels for the existing configuration are about 15.6 mG around the proposed substation location under 2010 peak loading conditions. This calculated field level occurs at the location where the existing 138 kV transmission line circuit crosses the proposed substation property line. Calculated magnetic field levels are as low as 0.0 mG around the substation location away from these existing transmission lines. Field levels attenuate with distance away from transmission lines.

For the proposed Hartley Substation configuration, calculated magnetic field levels range from about 0.0 mG to 25.6 mG around the proposed substation location for a 2012 projected loading scenario. The location where the highest magnetic field levels are calculated around the proposed substation location are where the existing overhead 69 kV transmission line circuits (Lines 24 and 25) cross the property line. Calculated magnetic field levels also increase at locations where the proposed underground circuits are routed. The calculated magnetic field levels above the six 13.2 kV underground distribution lines exiting the substation are 8.5 mG for the projected 2012 loading scenario.

Presently, there are no federal health-based magnetic field standards. Although there are no federal health standards in the United States specifically for 60 Hertz magnetic fields, some organizations have developed guidelines: the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the American Conference of Governmental Industrial Hygienists (ACGIH), and the Institute of Electrical and Electronics Engineers (IEEE). All of these guidelines are much higher than the calculated magnetic field levels along the proposed property line of the substation. In addition, there are at least two states that have adopted engineering-based guidelines or standards for transmission line magnetic fields (New York and Florida). The state of New York has a 200 mG limit at the edge of the right-of-way for overhead transmission lines under maximum loading conditions. Calculated magnetic field levels around the proposed substation site are again much lower than this state limit.

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APPENDIX P
Acoustical Impact Report

OSTERGAARD ACOUSTICAL ASSOCIATES

ANALYSIS OF ACOUSTICAL IMPACT

ORANGE AND ROCKLAND UTILITIES
PROPOSED HARTLEY ROAD SUBSTATION
Hartley Road and Cheechunk Road
Goshen, New York

Prepared For: **Orange and Rockland Utilities**
Prepared by: **Joseph A. Keefe**
Reviewed by: **John Erdreich, Ph.D.**
OAA File: **3621B**
Date: **7 October 2011**

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I. INTRODUCTION

Ostergaard Acoustical Associates has analyzed the proposed Orange and Rockland Utilities Substation (Hartley Road) in Goshen, New York to determine the acoustical impact, if any, on the surrounding community. The site will accommodate two new transformers. These transformers are cooled by natural convection at all times, supplemented with forced air cooling as necessary using integral fans.

To determine the acoustical impact of the proposed substation on surrounding areas it is necessary to compare the existing ambient sound with the projected sound contributed by the substation. Surveys of ambient sound were conducted including long-term, 48-hour A-weighted sound level monitoring at four locations, as well as short-term octave band sound pressure level measurements during the daytime. The site sound emissions were calculated using a computer model of the proposed installation. The emissions were compared with the ambient.

II. SITE DESCRIPTION

The proposed substation is located east of the intersection of Hartley Road and Cheechunk Road in Goshen, NY. The site is shown in Figure 1, based on aerial images provided by Google Earth®. The four ambient survey locations are also shown. Residences in the vicinity of the site are situated to the north, south, and west.

According to the Orange and Rockland site plans, the substation will include a switchgear house and two VonRoll 50 MVA transformers.

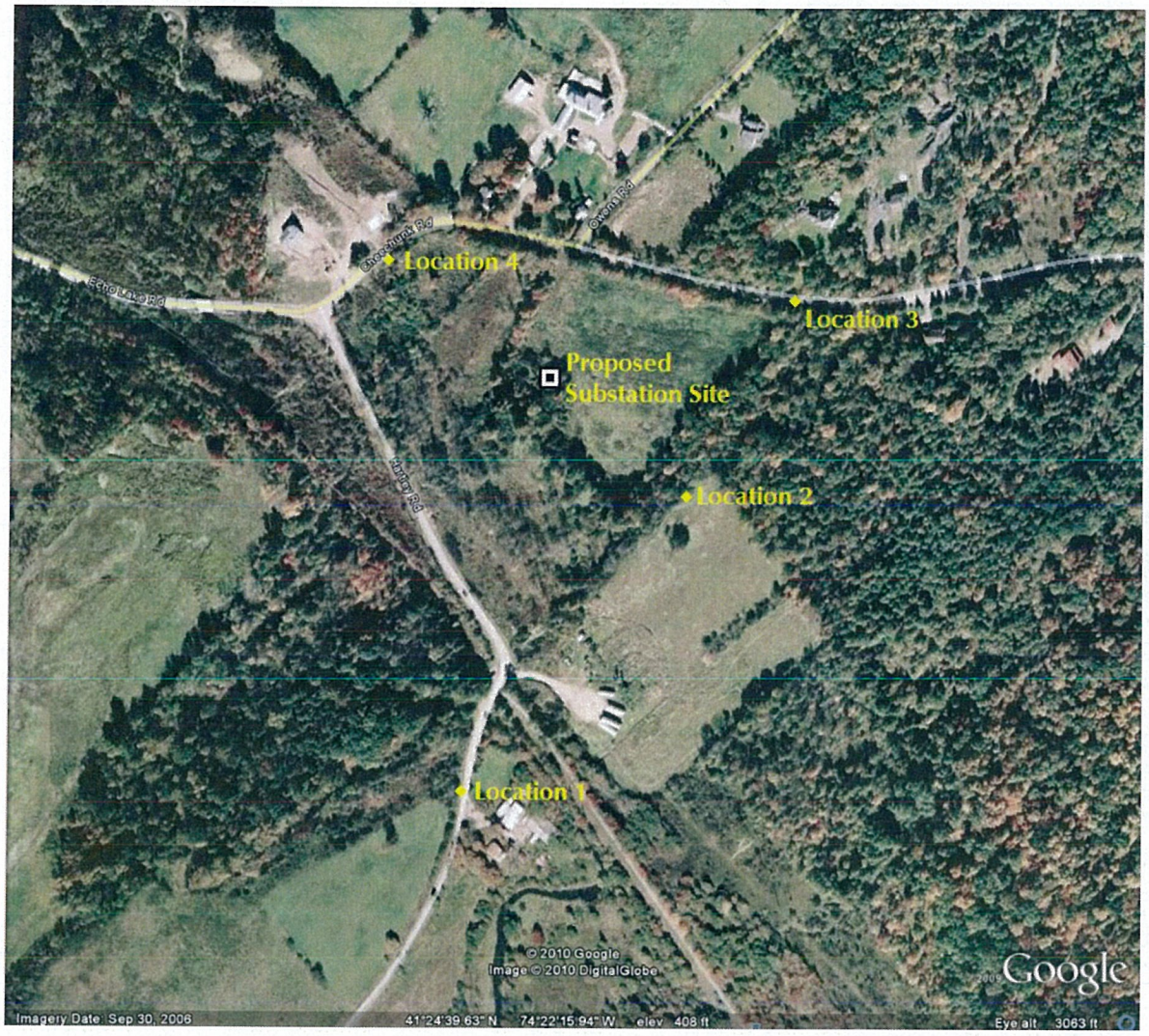


Figure 1 — Proposed site of Hartley Road Substation and vicinity. Survey Locations 1 through 4 are also shown.

III. CRITERIA

The noise code provisions of Goshen, New York, are found in Chapter 70 of the Town Code. Chapter 70 provides subjective and quantitative limits on noise in Goshen. Relevant portions of the code are given below:

- "The creation of any loud or raucous noise which causes public inconvenience or alarm or disturbs the public's peace, comfort and tranquility" is given as an example of "loud, raucous, disturbing and unnecessary [noise] and [is] prohibited". (§70-2 ¶M)

- "The creation of any noise which exceeds 75 dBa at the adjoining property line" is given as an example of "loud, raucous, disturbing and unnecessary [noise] and [is] prohibited". (§70-2 ¶O)

- Permitted noise includes "sounds created by public utilities in carrying out operations on their franchises." (§70-4 ¶C)

Definitive interpretation of the non-quantitative portions of the Code language is best left to legal professionals. However, it is advisable to ensure Orange and Rockland emissions for this project are well below 75 dB(A), since levels of 75 dB(A) would be likely to elicit complaints from residents surrounding the site.

The State of New York does not have a state-wide noise regulation.

IV. AMBIENT SOUND LEVEL METRICS

To analyze environmental acoustical data it is convenient to treat sound levels statistically. This is because sound levels can vary over a considerable range, since many sources contribute to outdoor sound measured at a location. Transient ambient sources often raise sound levels 20 decibels or more above background sound levels. The following descriptors are most often used to assess data of this type:

L_{90} - The sound level exceeded 90 percent of the time during a given measurement period. L_{90} is usually referred to as the background sound level.

L_{50} - This is the median level exceeded 50 percent of the time during a measurement period.

L_{10} - This is the sound level exceeded 10 percent of the time during a measurement period. L_{10} is a measure of the contribution of intrusive sound sources.

L_{eq} - The equivalent continuous noise level that would exist if all the noise in the measurement period were averaged over that time period.

L_{min} (L_{max}) - The minimum (maximum) (slow or fast averaged) noise level during the measuring period.

V. ACOUSTICAL MEASUREMENTS

On 24 June 2010, Mr. Joseph Keefe visited the site and deployed four automated sound level monitors. Data recorded included 24 hours on a weekday, Friday 25 June, and 24 hours on a weekend day, Sunday 27 June. In addition, 10-minute octave band sound levels were recorded at each location on 24 June. Daytime weather conditions in the area on 24 June began with clear skies, a temperature of 88°F, and light and variable winds. A severe thunderstorm moved rapidly through the area at about 1300 hours on 24 June, and upon the cessation of rainfall the temperature was 80°F. On 25 June and 27 June there was no rainfall. High temperatures were 83°F and 88°F, respectively.

Measurement locations are shown in Figure 1 and were selected to typify the following locations:

1: Across Hartley Road from a farm, typifying sound at residences south of site.

2: At the Orange and Rockland property line southeast of site, in the north corner of a cleared field.

3: At the Orange and Rockland property line east of site, on the south side of Cheechunk Road and east of Owens Road.

4: On the Orange and Rockland site property line, across from residential structures west of the site, on the south side of Cheechunk Road between Echo Lake Road and Owens Road.

VI. AUTOMATED MONITOR RESULTS

Larson Davis Type 720 and 820 sound level monitors were programmed to measure sound eight times per second and to store the average result each minute. The time histories in Figures 2 through 9 show the 1-minute average noise levels measured at each location. Note that 1200 hours corresponds to noon.

Location 1 exhibits typical results for sound monitored along a roadside; sound levels are low during sleeping hours and increase during the daytime and evening due to vehicular activity. Location 2's results are less typical, showing abrupt changes in sound level that do not correspond to typical human activity times. Since this meter was located in a field, it is suspected that fauna (insect) activity influenced the measured sound levels. This suspicion is supported by the octave band results discussed subsequently.

Locations 3 and 4 exhibit typical results for meters placed on high-traffic local roads. Numerous vehicle passbys cause sporadic and large changes in the time history, with the background level slowly rising during the day and falling during sleeping hours.

The monitors were also programmed to store statistical sound levels for each hour based on the sampling of eight times per second. Figures 10 through 17 provide data in a statistical format, and give the maximum and minimum sound levels for each hour in addition to the average sound levels. Locations 3 and 4 exhibit a much larger spread between minimum and maximum sound levels due to the traffic volume on Cheechunk Road.

Additional technical information about the survey monitors can be found in Appendix A.

Project: Harltey Road Substation
Project Number: 3621A

Measured Sound Levels at Location 1

Friday, 25 June 2010

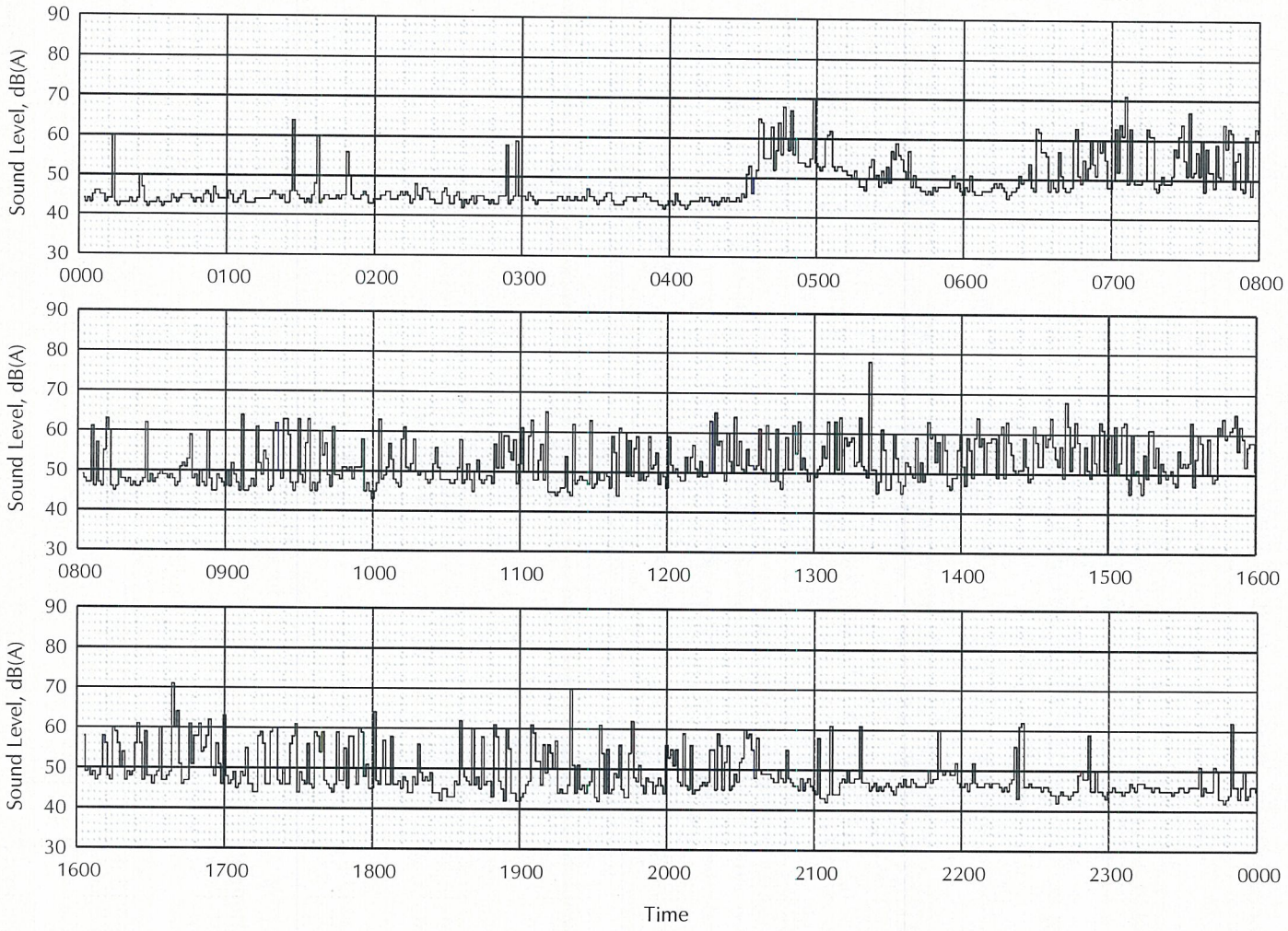


Figure 2

Project: Hartley Road Substation
Project Number: 3621B

Measured Sound Levels at Location 1

Sunday, 27 June 2010

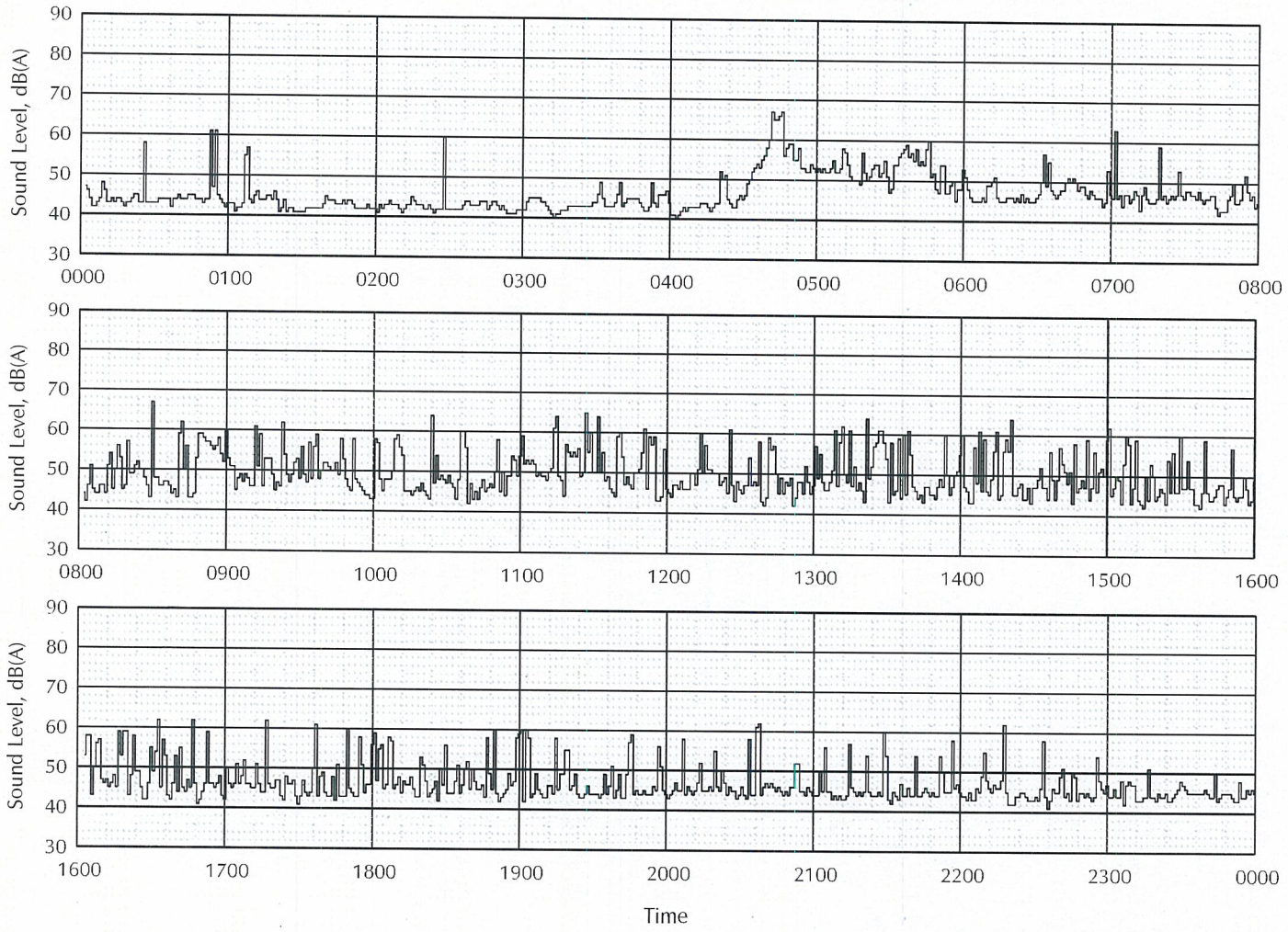


Figure 3

Project: Hartley Road Substation
Project Number: 3621B

Measured Sound Levels at Location 2
Friday, 25 June 2010

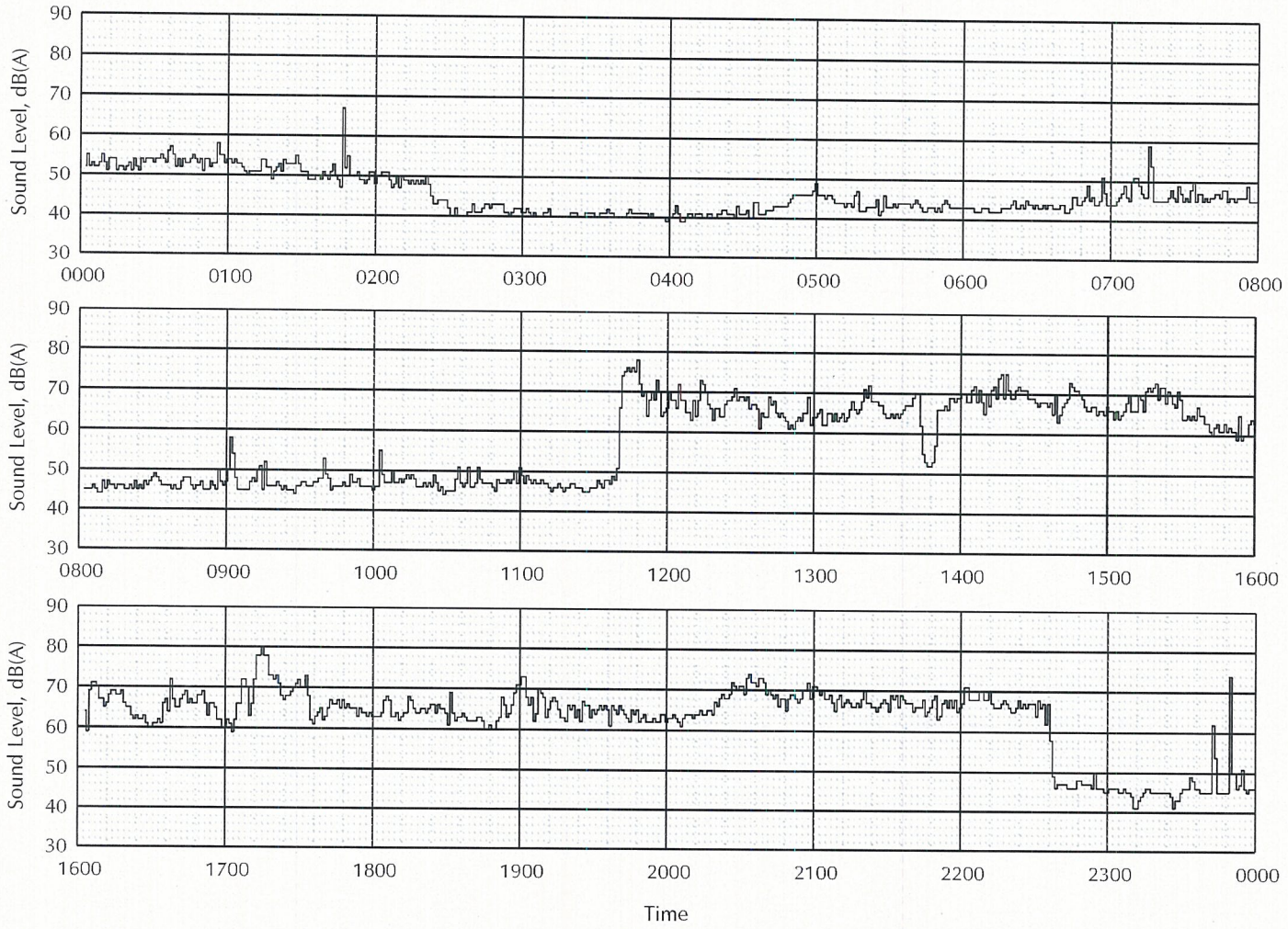


Figure 4

Project: Hartley Road Substation
Project Number: 3621B

Measured Sound Levels at Location 2
Sunday, 27 June 2010

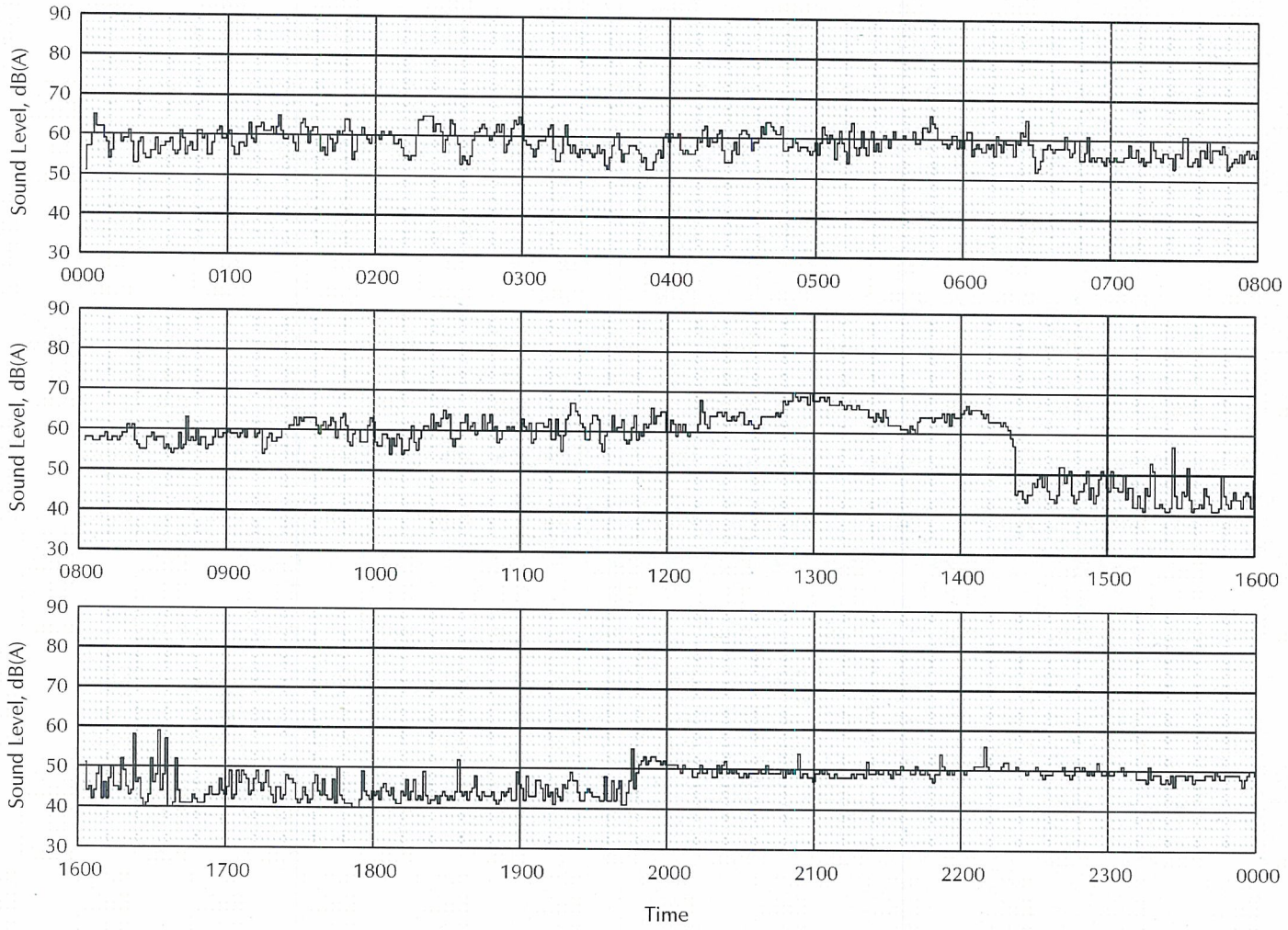


Figure 5

Project: Hartley Road Substation
Project Number: 3621B

Measured Sound Levels at Location 3
Friday, 25 June 2010

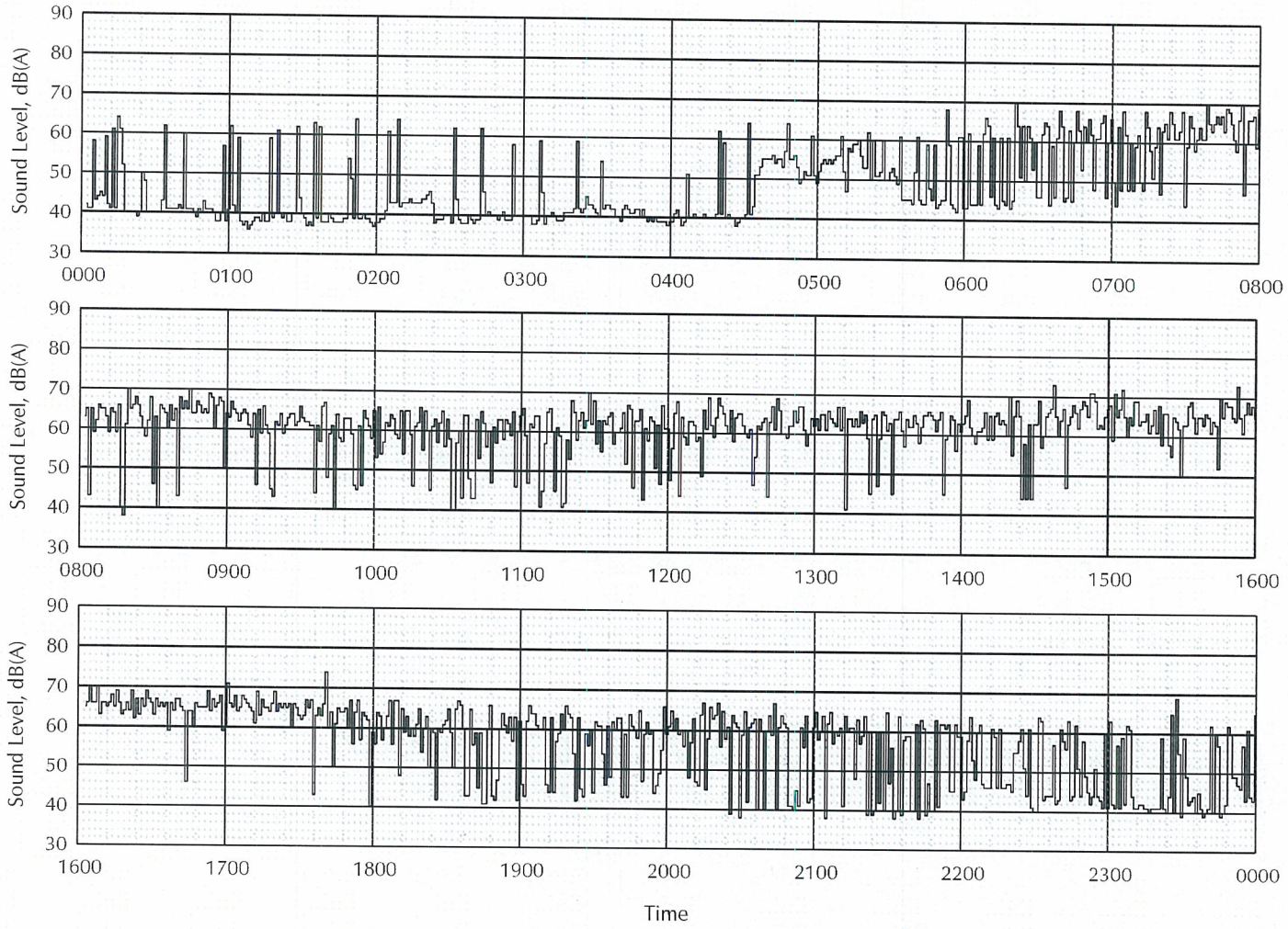


Figure 6

Project: Hartley Road Substation
Project Number: 3621B

Measured Sound Levels at Location 3
Sunday, 27 June 2010

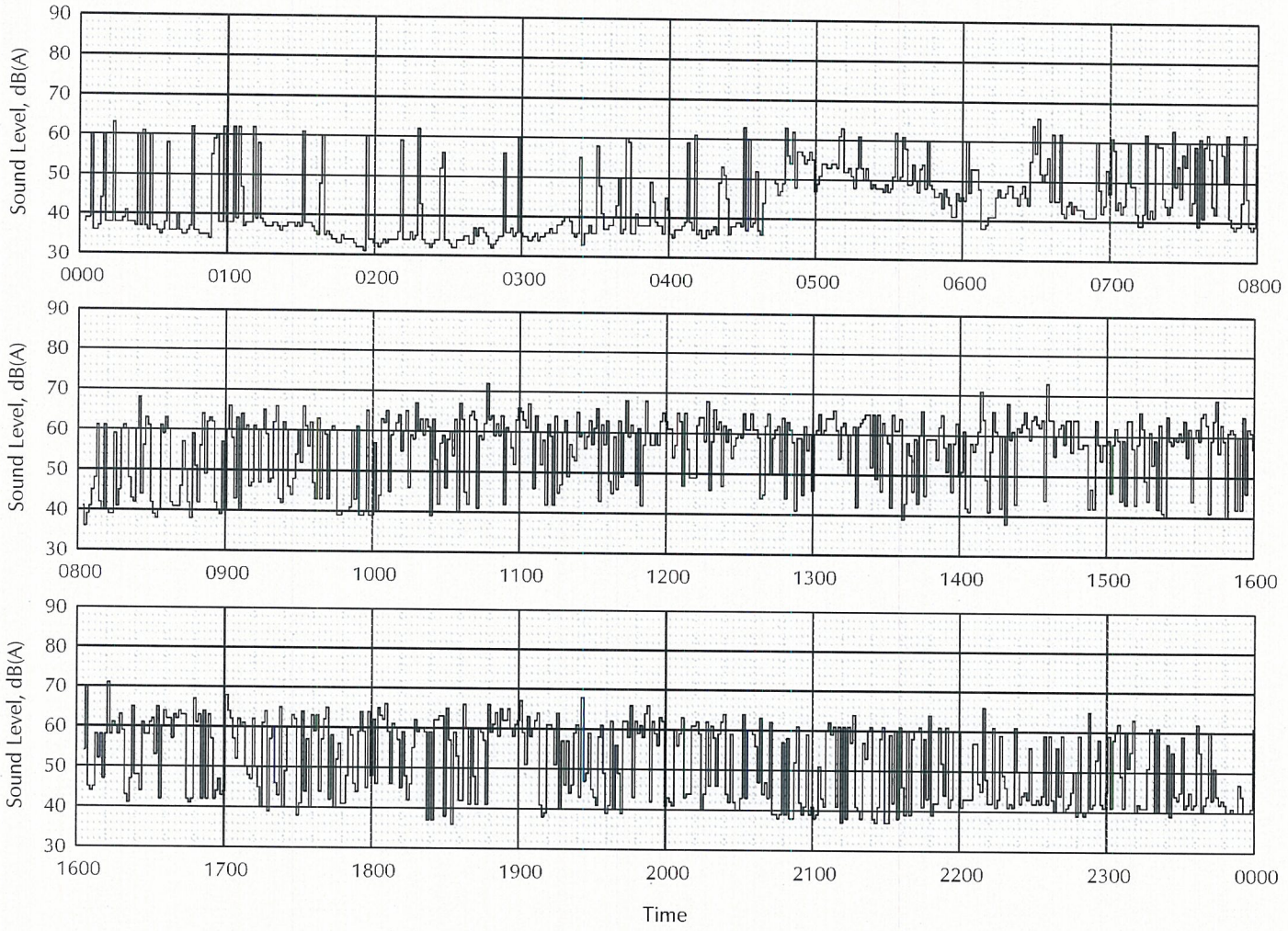


Figure 7

Project: Hartley Road Substation
Project Number: 3621B

Measured Sound Levels at Location 4

Friday, 25 June 2010

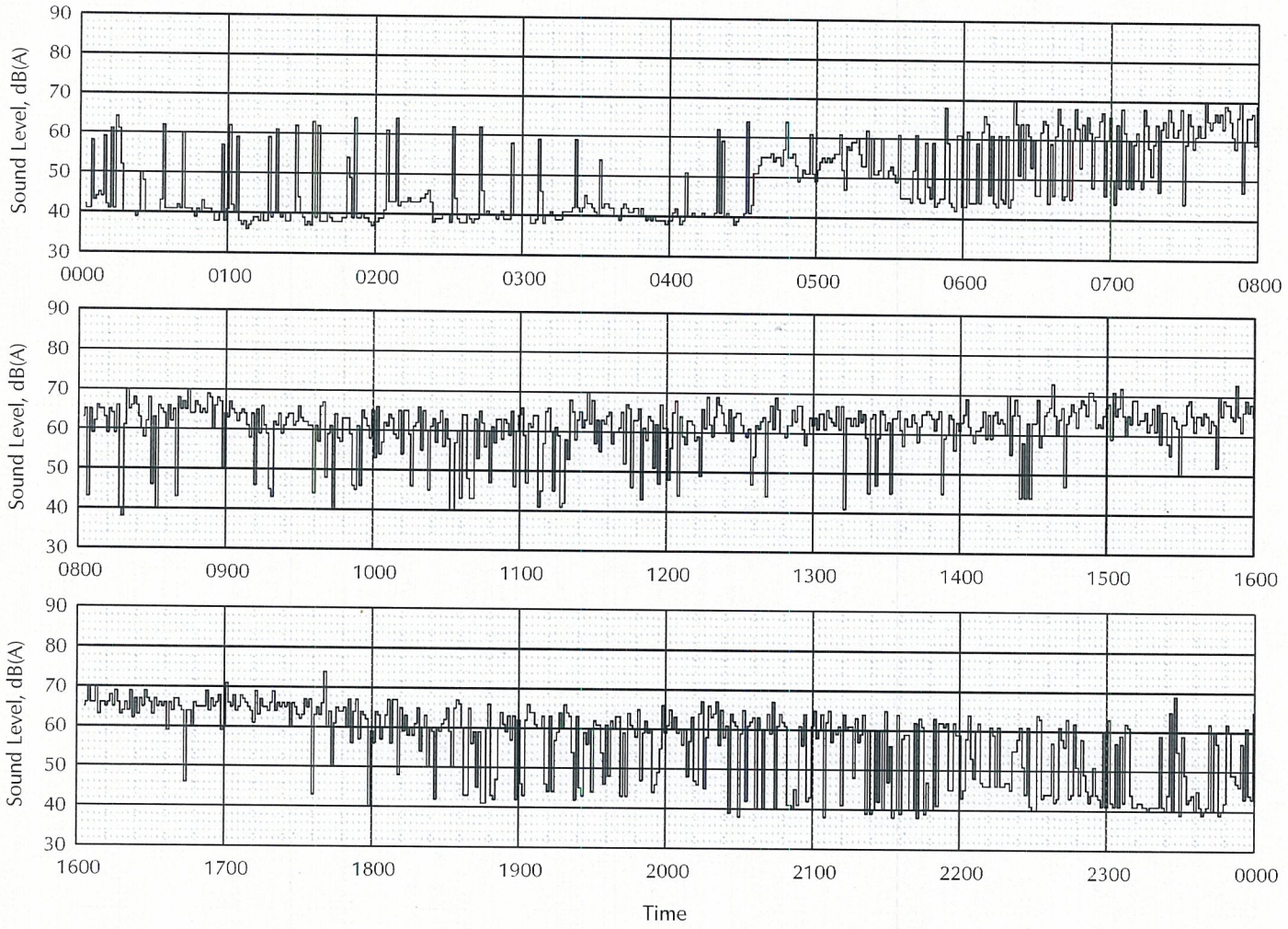


Figure 8

Project: Hartley Road Substation
Project Number: 3621B

Measured Sound Levels at Location 4
Sunday, 27 June 2010

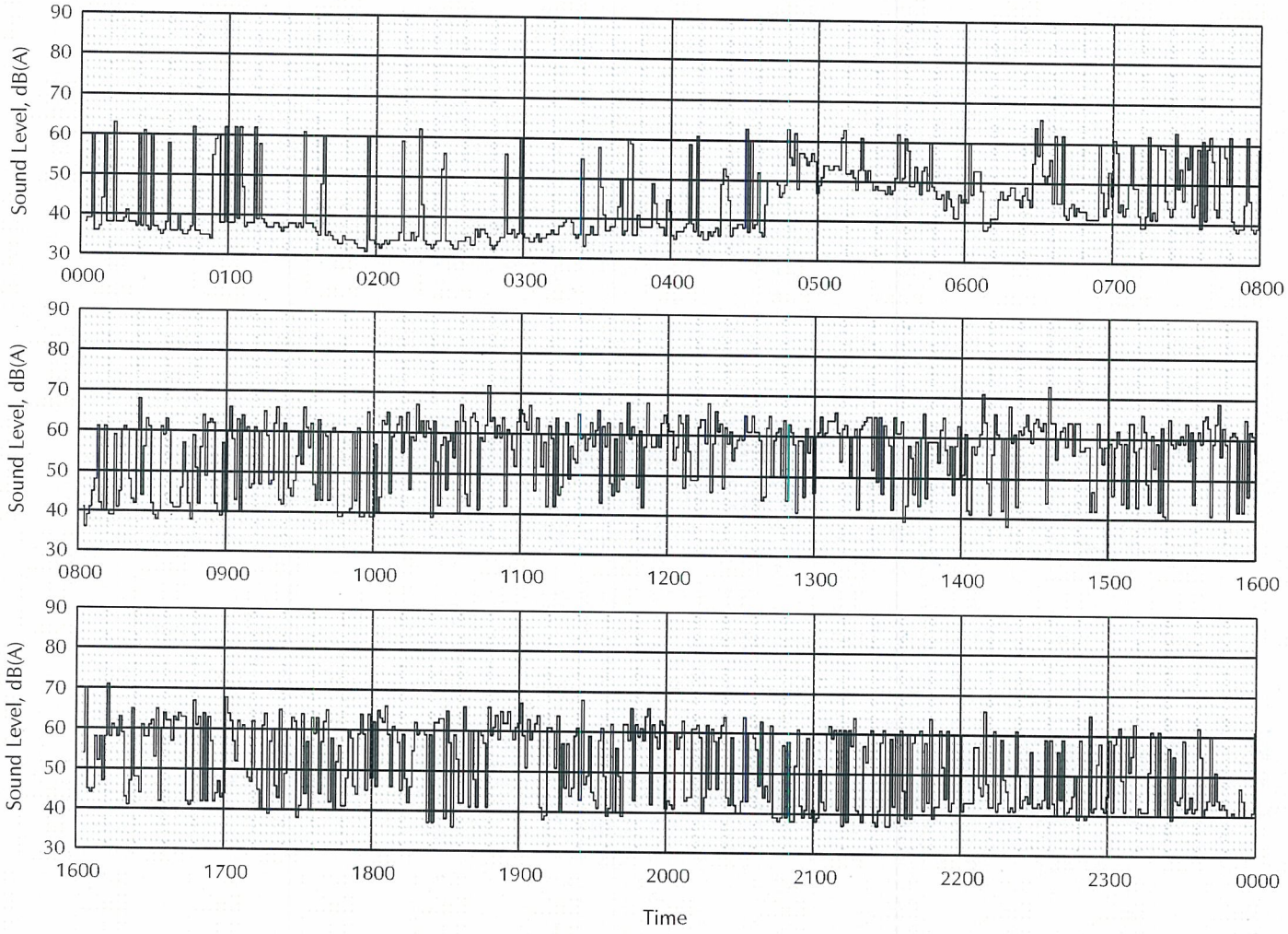


Figure 9

Project: Hartley Road Substation
Project Number: 3621B

Statistical Distribution of Sound Levels at Location 1
Friday, 25 June 2010

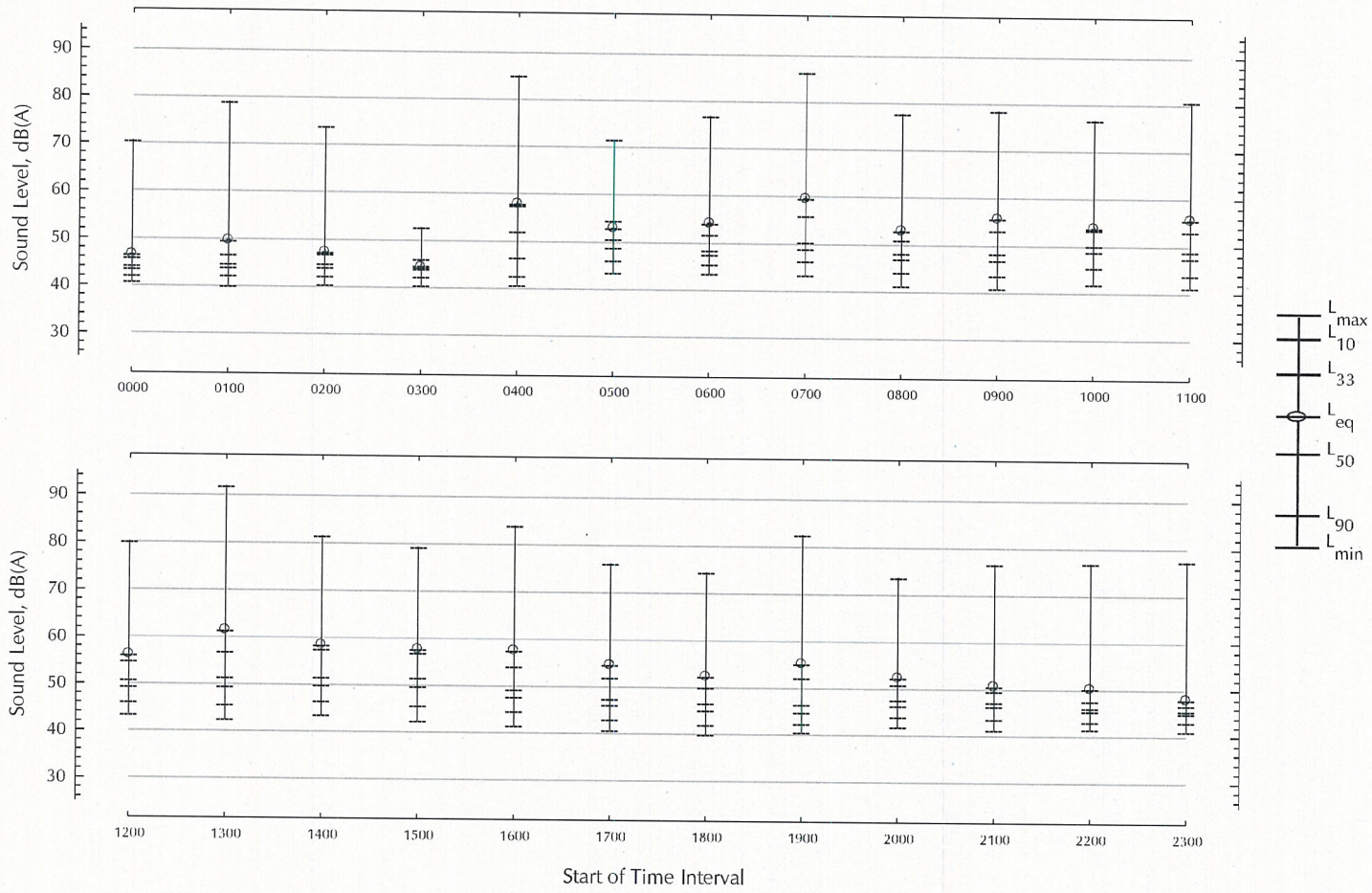


Figure 10

Project: Hartley Road Substation
Project Number: 3621B

Statistical Distribution of Sound Levels at Location 1
Sunday, 27 June 2010

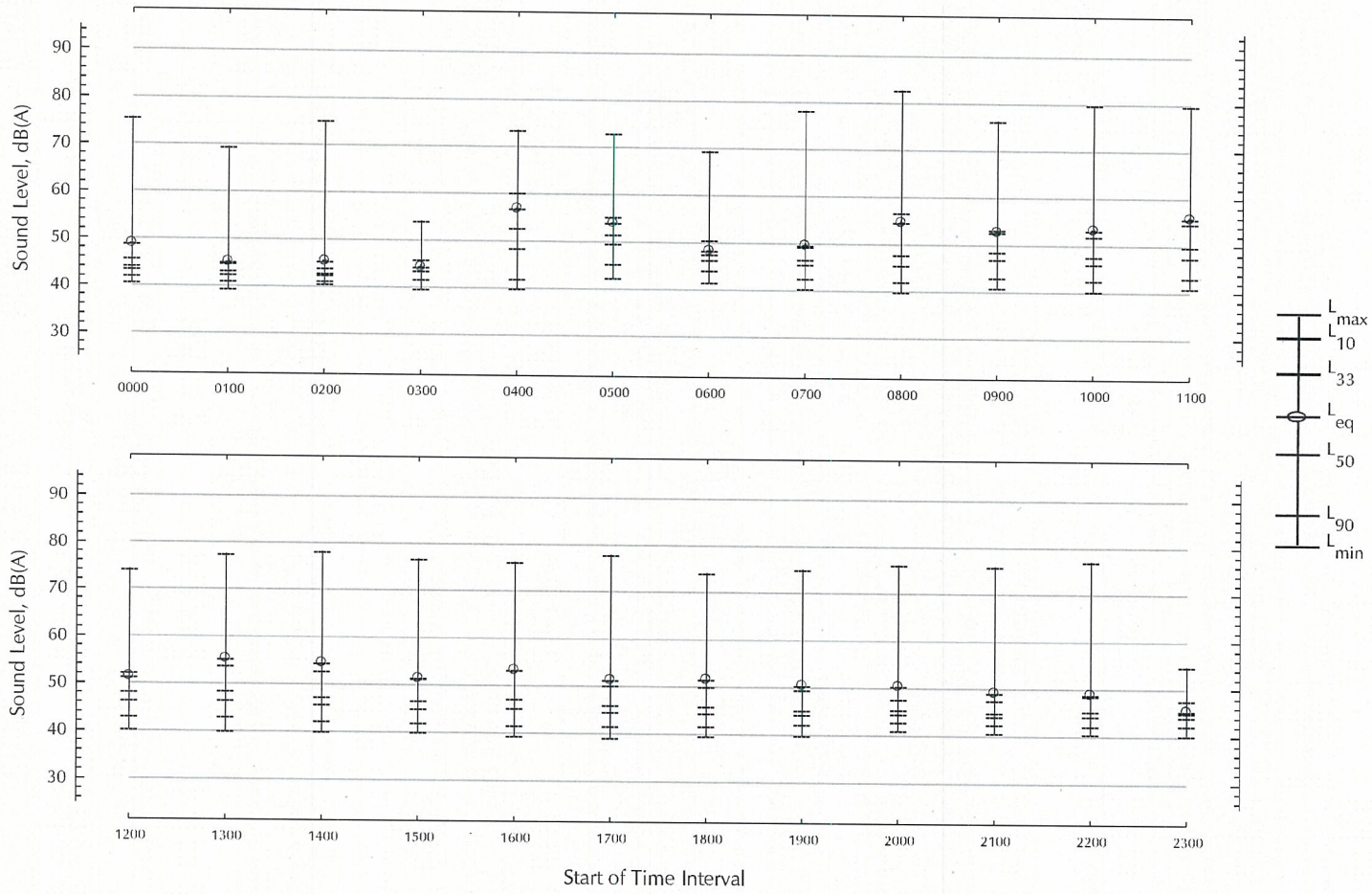


Figure 11

Project: Hartley Road Substation
Project Number: 3621B

Statistical Distribution of Sound Levels at Location 2
Friday, 25 June 2010

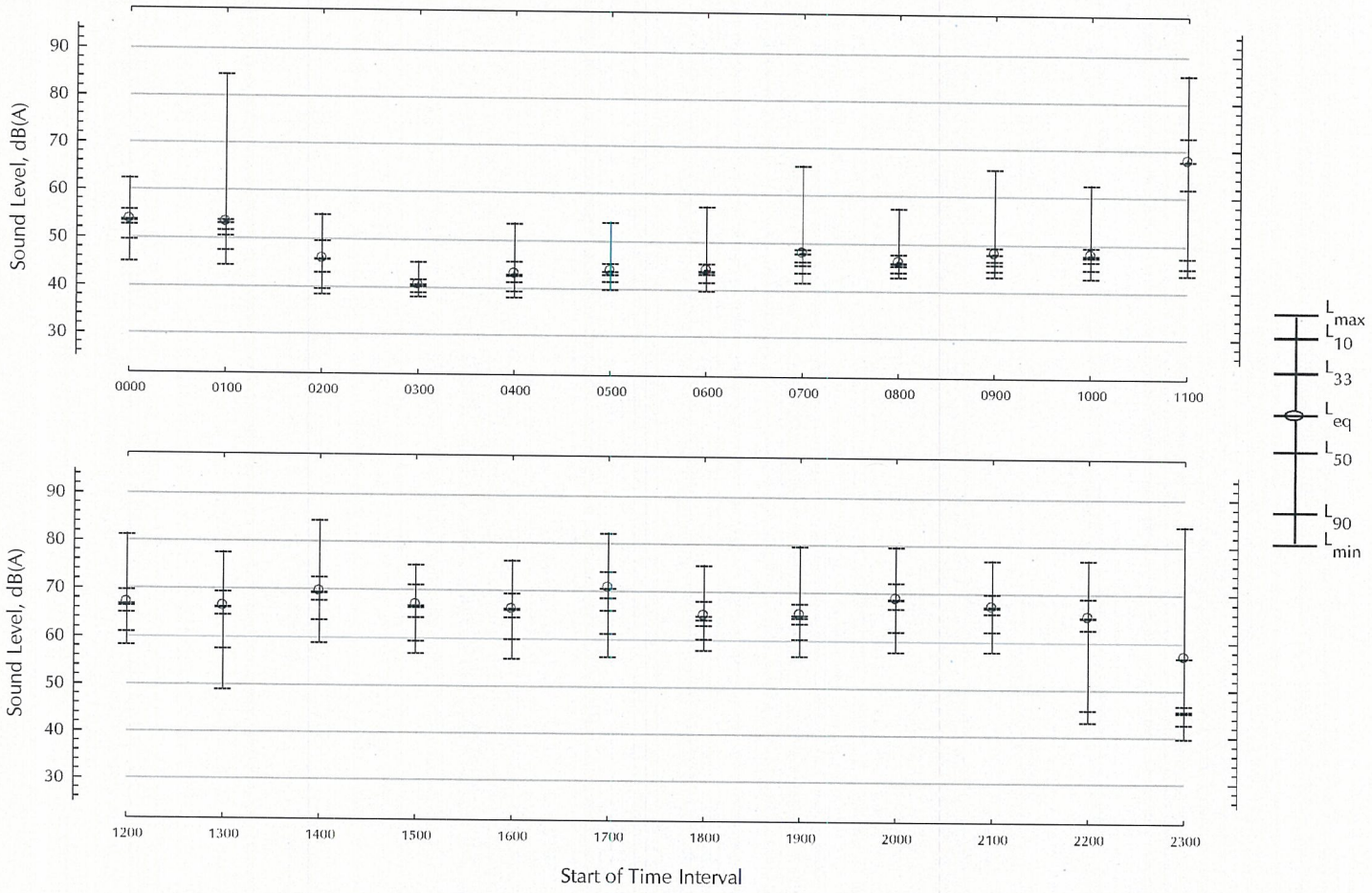


Figure 12

Project: Hartley Road Substation
Project Number: 3621B

Statistical Distribution of Sound Levels at Location 2
Sunday, 27 June 2010

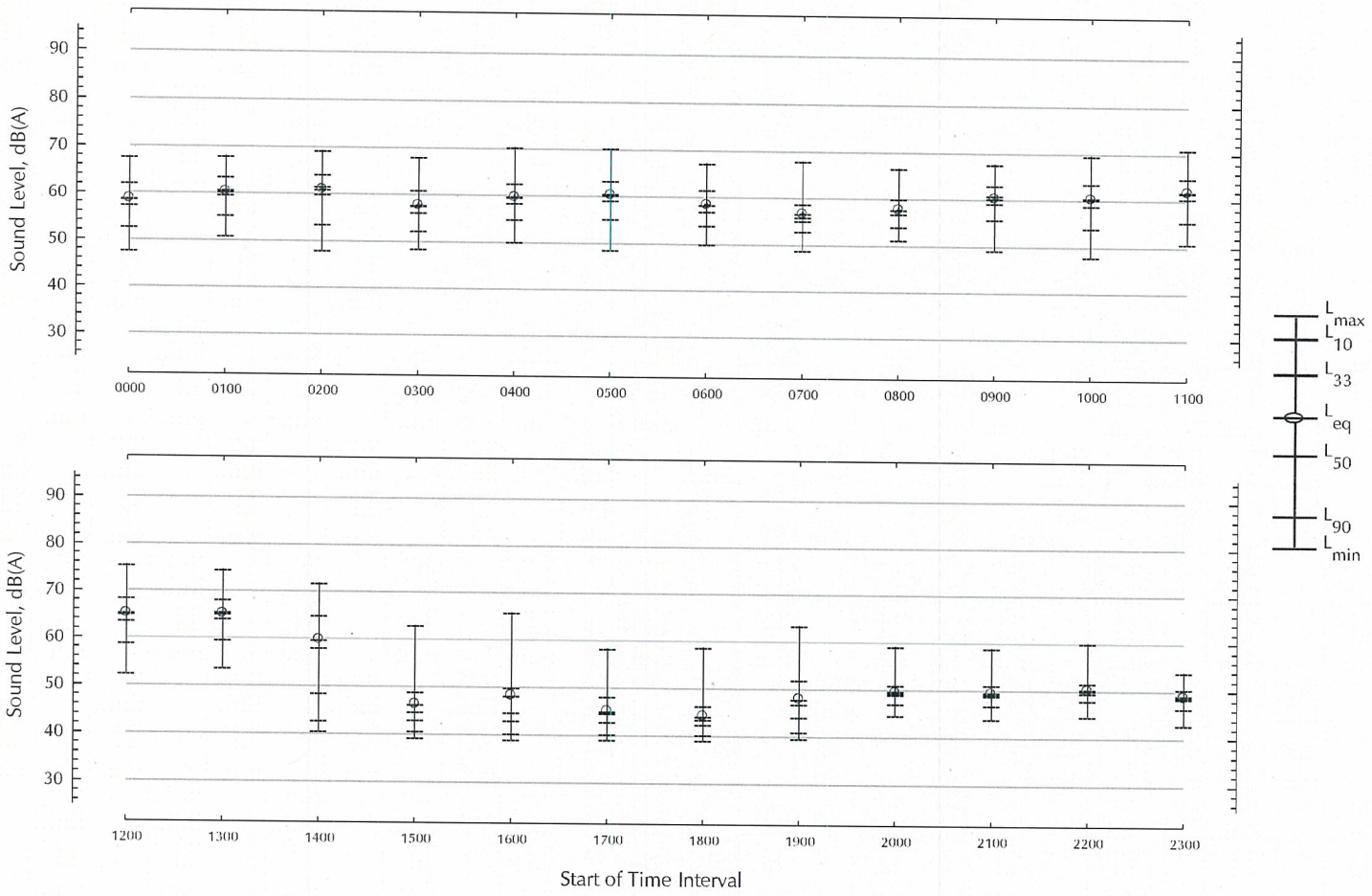


Figure 13

Project: Hartley Road Substation
Project Number: 3621B

Statistical Distribution of Sound Levels at Location 3
Friday, 25 June 2010

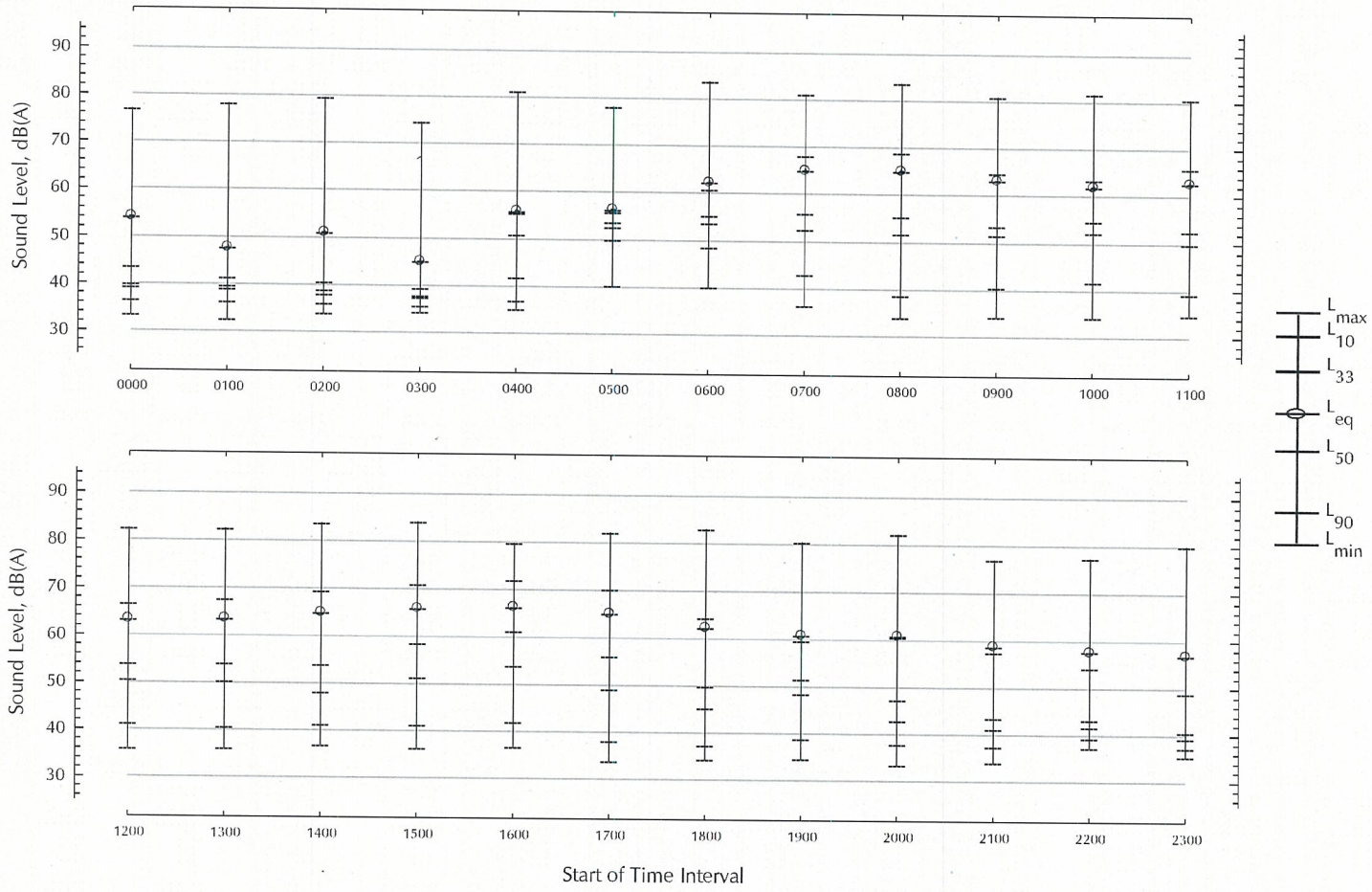


Figure 14

Project: Hartley Road Substation
Project Number: 3621B

Statistical Distribution of Sound Levels at Location 3
Sunday, 27 June 2010

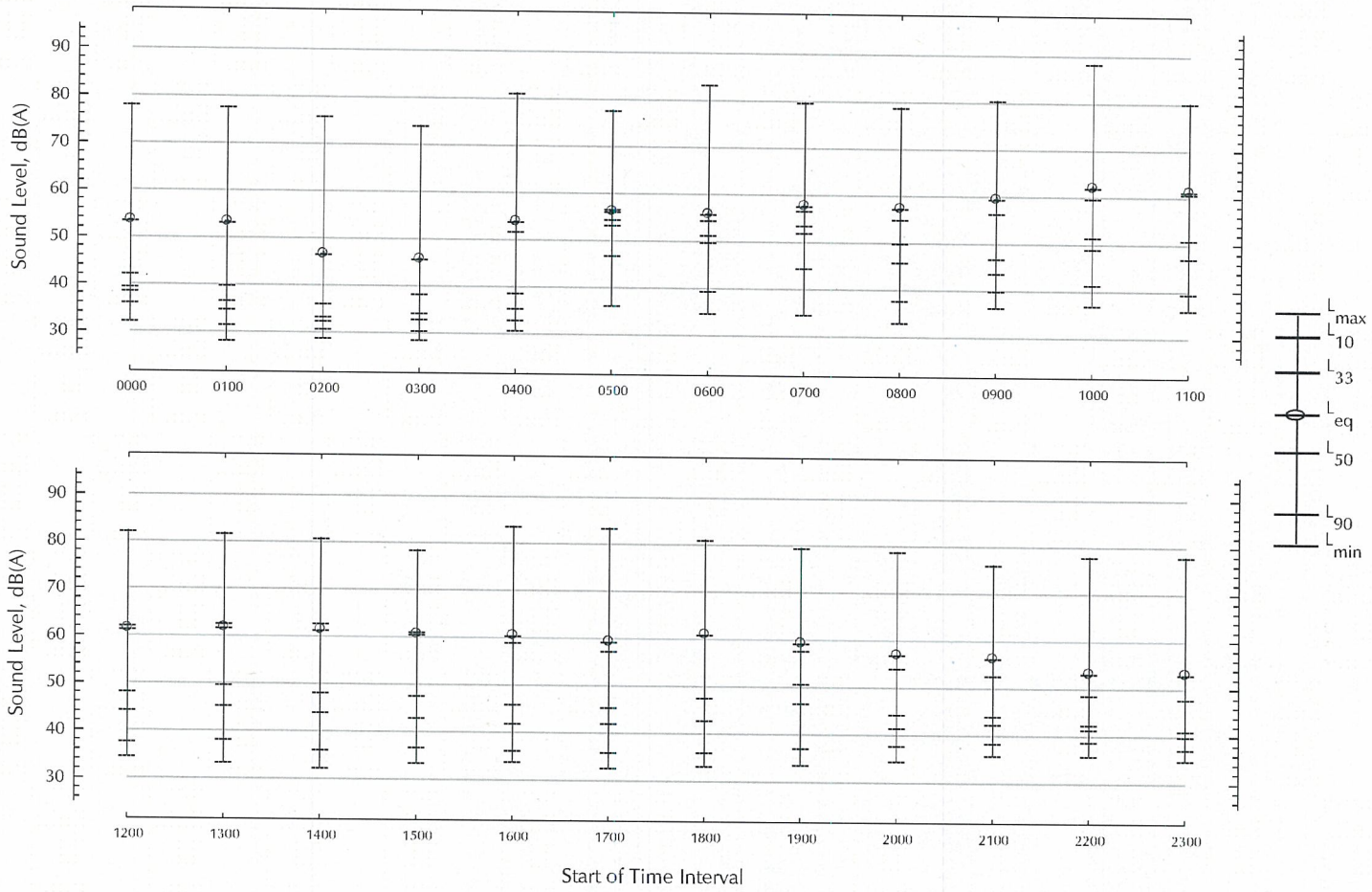


Figure 15

Project: Hartley Road Substation
Project Number: 3621B

Statistical Distribution of Sound Levels at Location 4
Friday, 25 June 2010

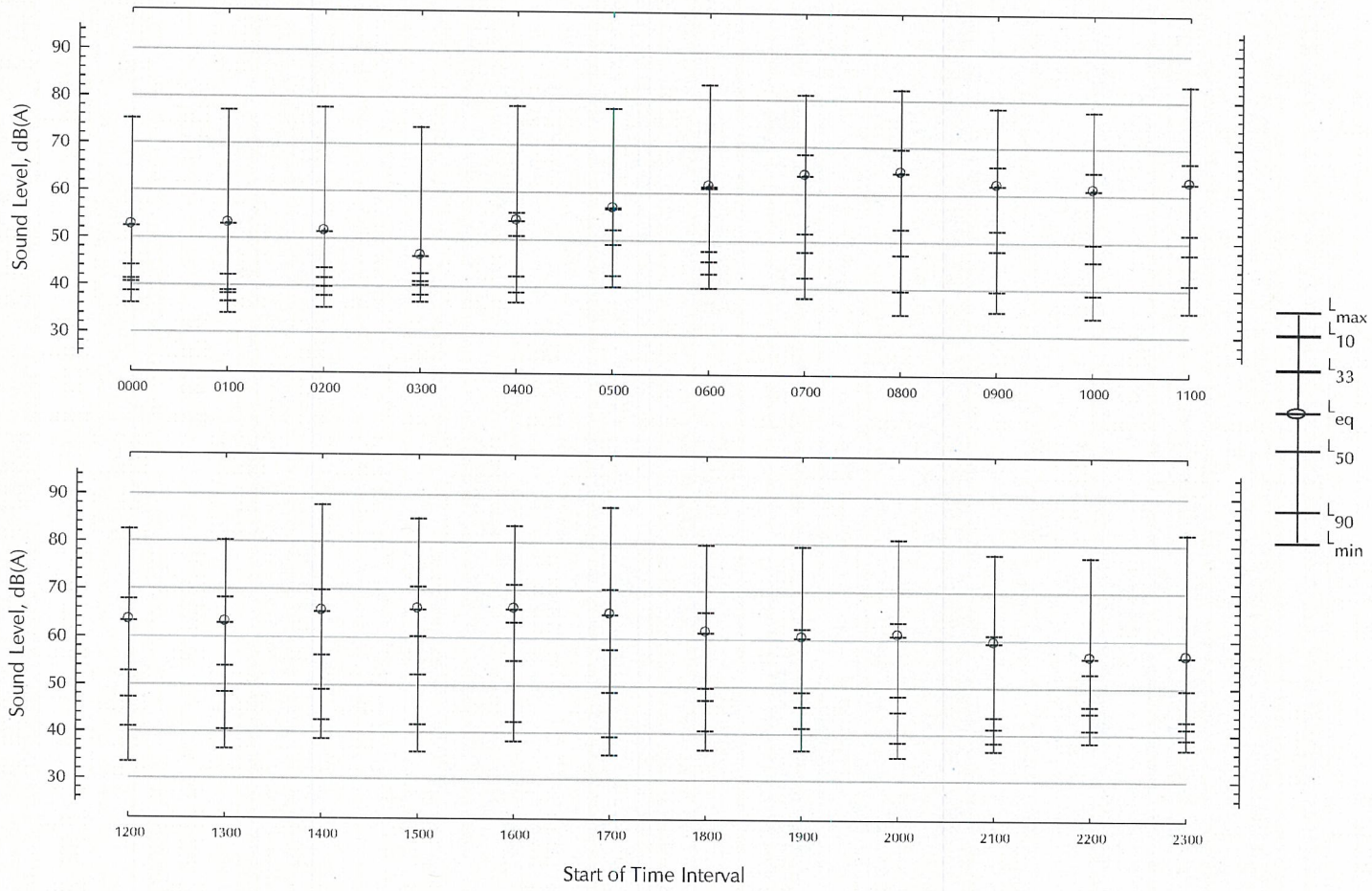


Figure 16

Project: Hartley Road Substation
Project Number: 3621B

Statistical Distribution of Sound Levels at Location 4
Friday, 25 June 2010

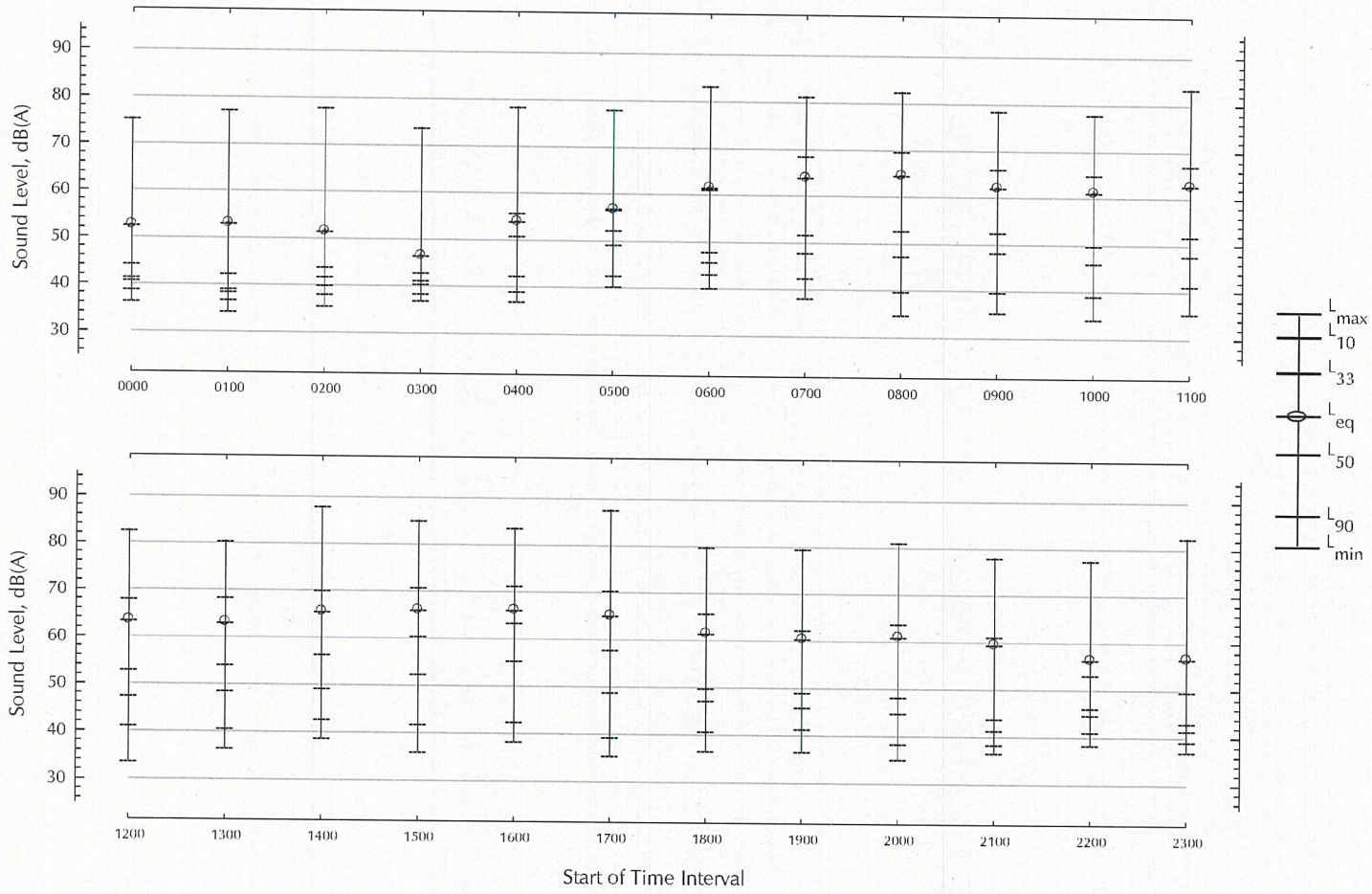


Figure 17

VII. OCTAVE BAND SOUND PRESSURE LEVEL RESULTS

Octave band sound pressure levels were measured during the daytime at the four survey locations. Data were obtained on 24 June 2010 between 1200 to 1600 hours using a Bruel & Kjaer Model 2250 real-time sound analyzer. Information on the measurement equipment can be found in Appendix A. Data were stored for later analysis in the laboratory. The results for 10-minute measurements obtained at each of the four locations are shown in Table I.

Table I — Measured daytime background (L_{90}) and intrusive (L_{10}) sound pressure levels at Locations 1 through 4, dB re 20 µPa.

	Octave Band Center Frequency (Hz)									
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**16000**	**A***
Location 1										
Daytime L_{10}	58	54	52	50	48	46	44	38	44	53
Daytime L_{90}	52	45	40	40	39	34	30	24	22	45
Location 2										
Daytime L_{10}	54	49	44	44	43	42	42	45	61	55
Daytime L_{90}	48	43	37	37	34	32	32	43	60	54
Location 3										
Daytime L_{10}	61	61	60	61	65	59	51	46	38	67
Daytime L_{90}	50	46	41	39	37	34	32	27	22	44
Location 4										
Daytime L_{10}	64	62	63	62	64	59	50	44	36	67
Daytime L_{90}	51	47	42	40	39	36	33	24	26	44

* A denotes the A-weighted sound level

Daytime L_{10} sound pressure levels ranged from 53-to-67 dB(A), while L_{90} sound levels ranged from 44-to-54 dB(A). The L_{10} levels are higher at Locations 3 and 4 due to the significant volume of vehicular traffic on Cheechunk Road. Levels at Location 2 are significantly influenced by insect noise, as evidenced by the high levels in the 16000 Hz octave band which also result in higher A-weighted sound levels. Without insect sound the background sound level at Location 2 would likely be similar to the levels documented at the other three locations, in the 44-to-45 dB(A) range.

VIII. MODELING OF SITE SOUND EMISSIONS

A computer model of the site and surrounding terrain was constructed based on a CAD site plan provided by Orange and Rockland Utilities, equipment dimensions, and acoustical data for an Enerco 50 MVA transformer similar to each of the two proposed units. Terrain contours were imported from the CAD files provided.

The acoustical model was used to compute A-weighted sound level contours for site-generated noise. The contours are 5 feet above grade. The model takes into account acoustical shielding and reflections provided by the transformers and the switchgear structure. Complete sound emissions were tabulated at receiver Locations L1 through L4, which correspond to the ambient monitoring locations.

Transformers

Transformer noise is typically characterized by a "hum" at two times and four times the 60 Hz line frequency, or 120 and 240 Hz, as well as broadband fan noise which typically affects the mid-frequency ranges typified by the 500 and 1000 Hz octave bands. Transformers produce noise steady in nature and operate 24-hours a day.

The transformers were modeled based on the acoustical ratings provided for an Enerco transformer, using sound power level data for the condition with all cooling fans operating to simulate worst-case sound emissions; Enerco and Von Roll transformers are manufactured by the same company. Manufacturer's sound data sheets show the transformer to have a

maximum NEMA* rating of 60 dB(A). Therefore, the model shows the emissions of two transformers, each with a NEMA rating of 60 dB(A). If, as past Orange and Rockland experience shows, the transformers' actual ratings are 58 dB(A), the predicted sound levels will be 2 dB lower than modeled.

Figure 18 shows the resulting modeled sound emissions for the two proposed transformers. A color legend is provided as well as the tabulated A-weighted sound level results at the ambient survey locations. The site property line is shown in red, off-site property lines are shown in teal, and the substation fence is shown in pink. The model shows that worst case site emissions will be in the range of 15-to-27 dB(A) at Locations 1 through 4 and as high as 31 dB(A) at the nearest residential property line to the equipment.

* NEMA = National Electrical Manufacturers Association

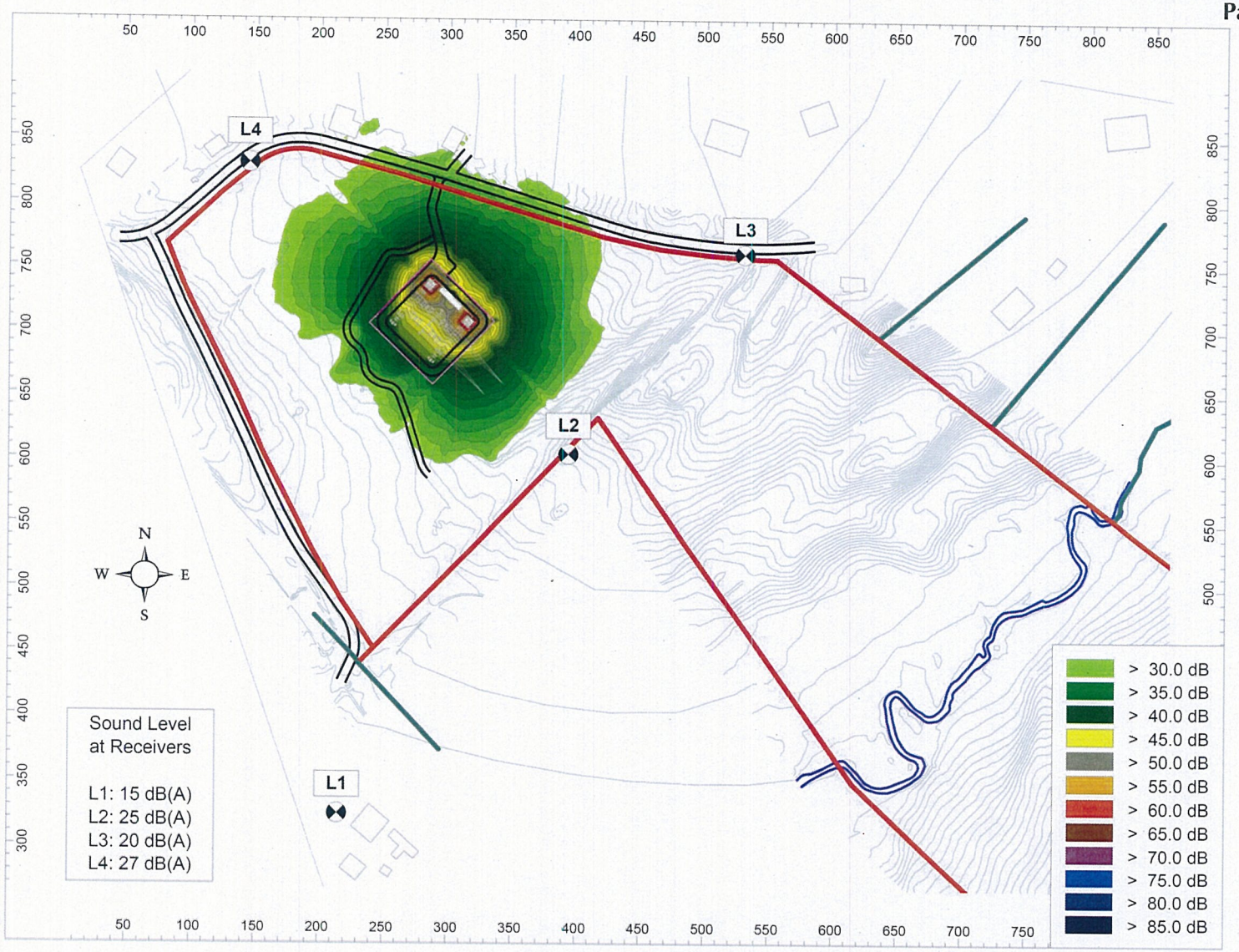


Figure 18 — A-weighted sound emission contours 5 feet above grade with all transformer cooling fans ON, Hartley Road Substation.

IX. ACOUSTICAL IMPACT

Table II below shows the minimum hourly L_{90} measured at each location during the 48-hour survey, compared with the future emissions predicted by the acoustical model. Since transformer noise is steady, it is appropriate to compare it with the existing background sound level. The Future L_{90} is calculated by adding transformer sound to the existing ambient using the special rules of decibel addition.

Table II — Expected change in background sound level (L_{90}) as a result of adding substation emissions. All entries are A-weighted sound levels in dB re 20 μPa.

Location	Minimum Measured Hourly L_{90}	Future Transformer Emissions	Future L_{90}	Difference Between Existing and Future L_{90}
1	41	15	41	0
2	39	25	39	0
3	31	20	31	0
4	32	27	33	1
Closest residence (between Locations 3 and 4)	32	31	35	3

A change in sound level of 0-to-2 dB is not noticeable to the human ear. A change of 3-to-4 dB is noticeable with direct back-to-back comparison between two different steady noise conditions. However, with other transient events superimposed over the steady background sound, the fact that once the sub-station is constructed there will be no reference with which to compare the new ambient to the old sound level, and the fact that the average (L_{eq}) sound level is between 45 dB(A) and 65 dB(A), a change of 3-to-4 dB will not be noticeable.

X. CONCLUSION

At locations south and east of the site the background sound level will be unaffected by substation emissions. All transformer sound emissions fall well below the Goshen Code's 75 dB(A) quantitative limit. Furthermore, because the modeled contribution of the transformers at the nearest residences is similar to the ambient (L_{90}) and far below the average, it is unlikely that a listener will hear the substation. It is unnecessary to consider noise mitigation for this project as it is designed. The acoustical impact of the Hartley Road substation on the surrounding community will be minimal.

APPENDIX A
INSTRUMENTATION

The measurements were carried out using Larson Davis Model 720 and 820 automated noise monitors. The monitors were programmed to sample the noise 8 times every second and record the average noise level derived from those measurements every minute. The monitors also store hourly statistics including the maximum, minimum, and average noise levels that occur during each hour.

The monitors were calibrated before and after the survey by means of a sound pressure level calibrator. The calibrator used was a Bruel & Kjaer Model 4230, Serial Number 909520, last calibrated by an outside calibration service in October 2009. This calibration is traceable to the National Institute of Standards and Technology, NIST.

Two forms of graphical displays are presented in this report. The time history graphs show the minute-by-minute average sound readings at each location for a period of 24 hours. From this type of display unusual noise occurrences can be identified. The statistical graphs show the hourly statistics obtained at each location over 24 hours. These are useful to identify how noise varies from hour to hour.

Octave band sound levels were measured with a Bruel & Kjaer 2250 real-time sound analyzer. The analyzer was programmed to measure and store sound levels every second for 10 minutes. The statistical distribution of sound was calculated from these 600 samples. The analyzer was calibrated before and after each survey using a Bruel & Kjaer Model 4231, Serial Number 2445631, last calibrated by an outside calibration service in August 2009.

Overall the data reported here can be considered accurate to the nearest decibel.

APPENDIX Q
Residential Property Valuation Report

IMPACT OF PROPOSED ELECTRICAL SUBSTATION ON NEARBY RESIDENTIAL VALUES ORANGE AND ROCKLAND UTILITY HARTELY ROAD/CHEECHUK ROAD GOSHEN, NEW YORK

VALUATION CONSULTANTS, INC.

6 Front Street

Newburgh, New York

12550

Tel. 845-568-0600

Fax. 845-568-0699

November 19, 2010

Allen Lipman, Esquire
Fabricant, Lipman & Frishberg, PLLC.
One Harriman Square - PO Box 60
Goshen, NY 10924

Re: Impact of Proposed Electrical Substation
on Nearby Residential Values
Orange and Rockland Utility
Hartely Road/Cheechuk Road
Orange County, Goshen, New York

Dear Mr. Lipman:

As requested, we have reviewed sales of residential properties close to electrical substations to measure any effect these facilities might have on residential values. This analysis compares sales close to electrical substations with sales of similar properties that are distant from the facilities.

The proposed site is a 48.7 acre parcel located southeast of the City of Middletown and northwest of the Village of Goshen, in the Town of Goshen, central Orange County, New York. The immediate neighborhood is southeast of Route 84, west of Route 17 and north of Route 6. The subject property is located at the intersection of Cheechunk Road and Bartley Road. The properties that surround the proposed site are generally single family residential and vacant land.

Our approach to measuring the impact of an electrical substation on residential values is to analyze the sales of units proximate to such facilities. These sales would then be compared to similar homes that are not proximate to these facilities, yet in the same market area. Four sales have been found, one is near the Harriman electrical substation, and three are near the Hunt electrical substation.

VALUATION CONSULTANTS, INC.

Example #1:

This sale is proximate to the Harriman substation in Harriman, NY. According to the Greater Hudson Valley Multiple Listing Service, this property sold for $449,900 on August 12, 2005. The three other sales in the grid are sales of comparable homes that are a distance from the substation. All three sales are of comparable appeal and indicate that the subject is not selling below market value due to its proximity to the electrical substation.

Example #2 and #3:

These two are examples of sales that are directly abutting the Hunt electrical transfer station, located on Old Dutch Hollow Road in Greenwood Lake. These are ranch style homes typical of that market area. Three sales each, of similar homes away from the substation, have been applied to the grid for comparison. These sales give no indication that the proximity to the electrical substation has any adverse effect on value.

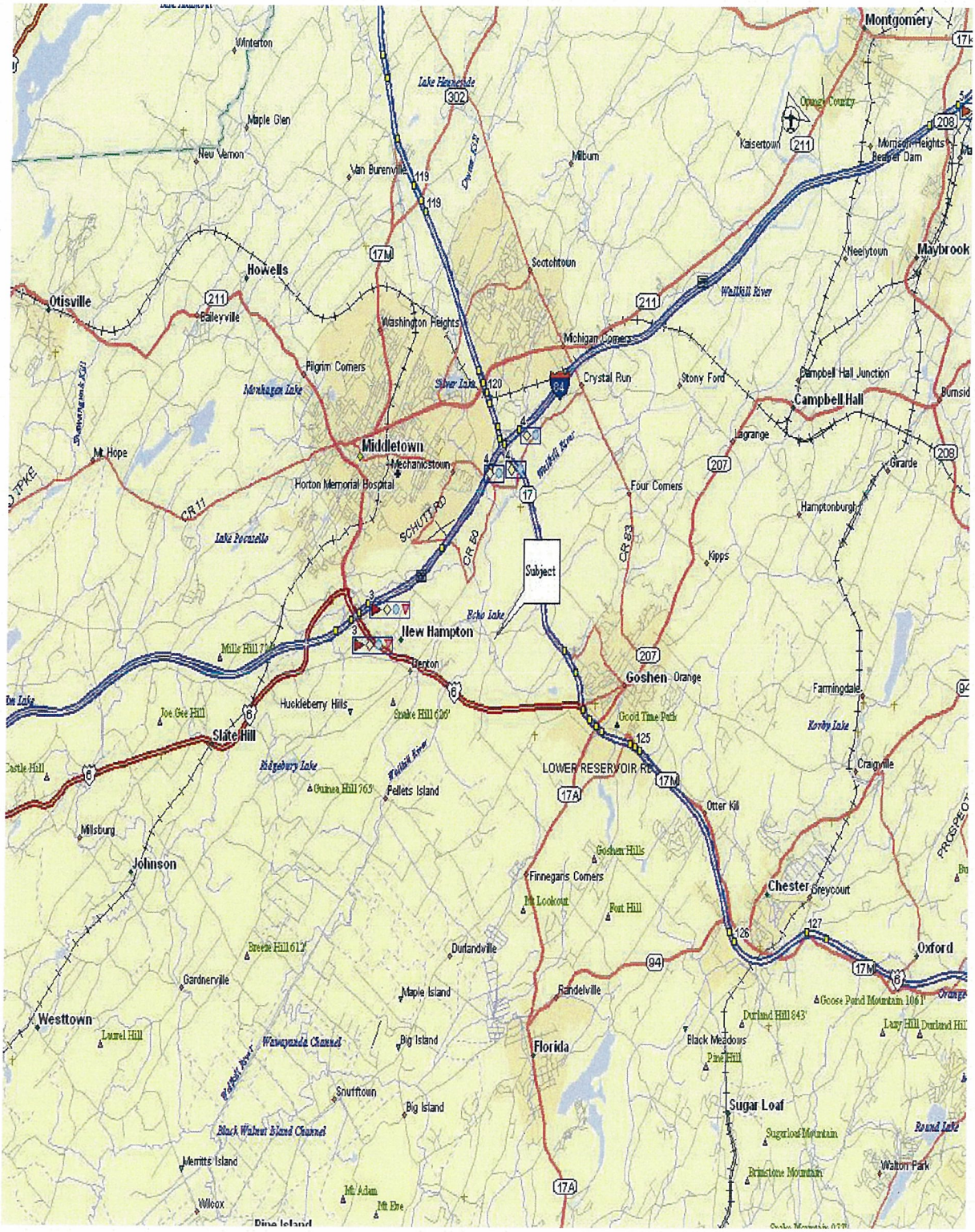
After review of sales of residences close to electrical substations to sales of similar homes that are a distance from these facilities, it is my conclusion that there is no affect on the value of these properties. The examples and sales provided in this analysis clearly indicate the sales close to electrical substations do not sell for any less than what a comparable residence would sell for farther away from the facility.

Please contact us if we may be of additional assistance in this matter.

Sincerely,

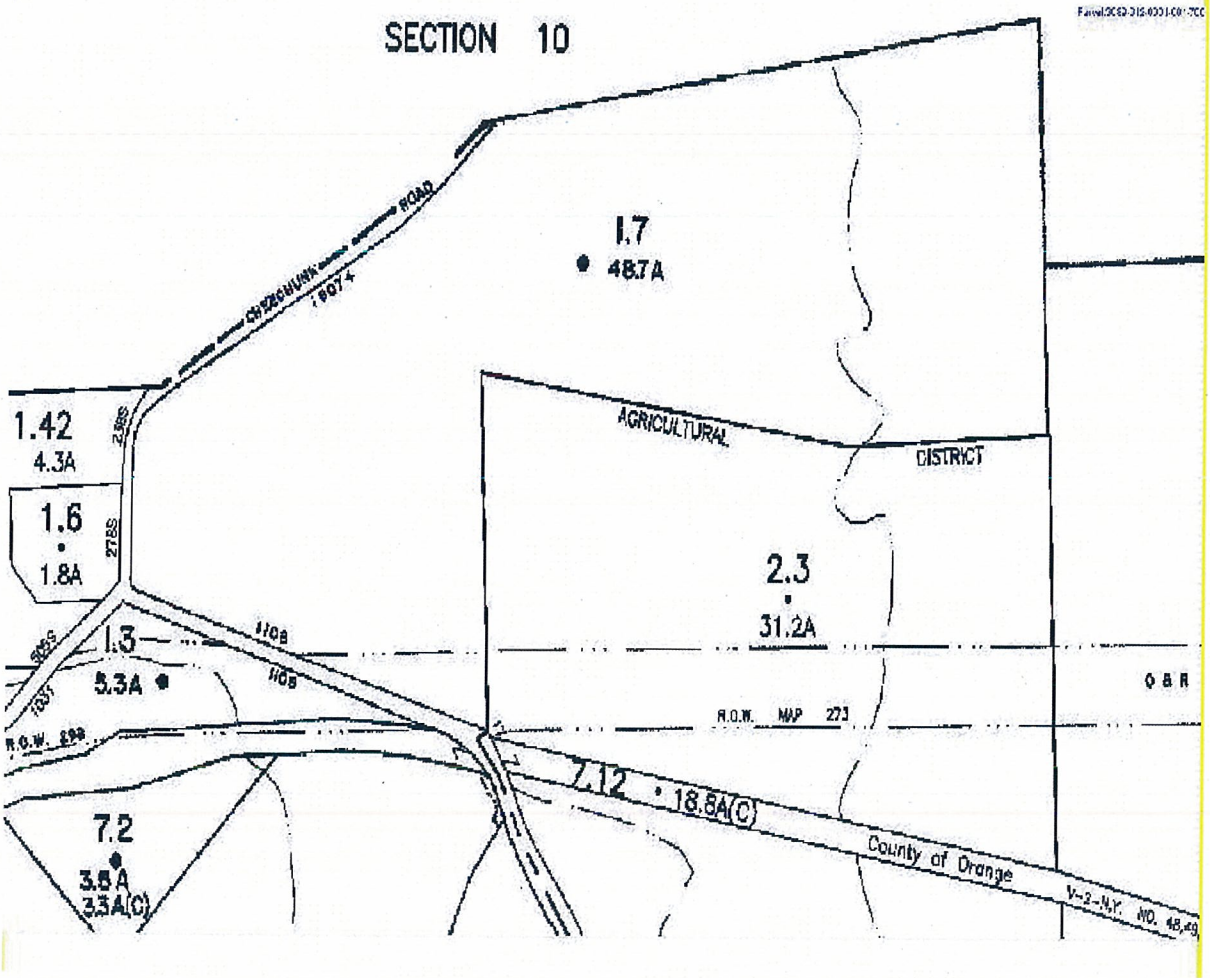
Thomas McChesney

Thomas McChesney



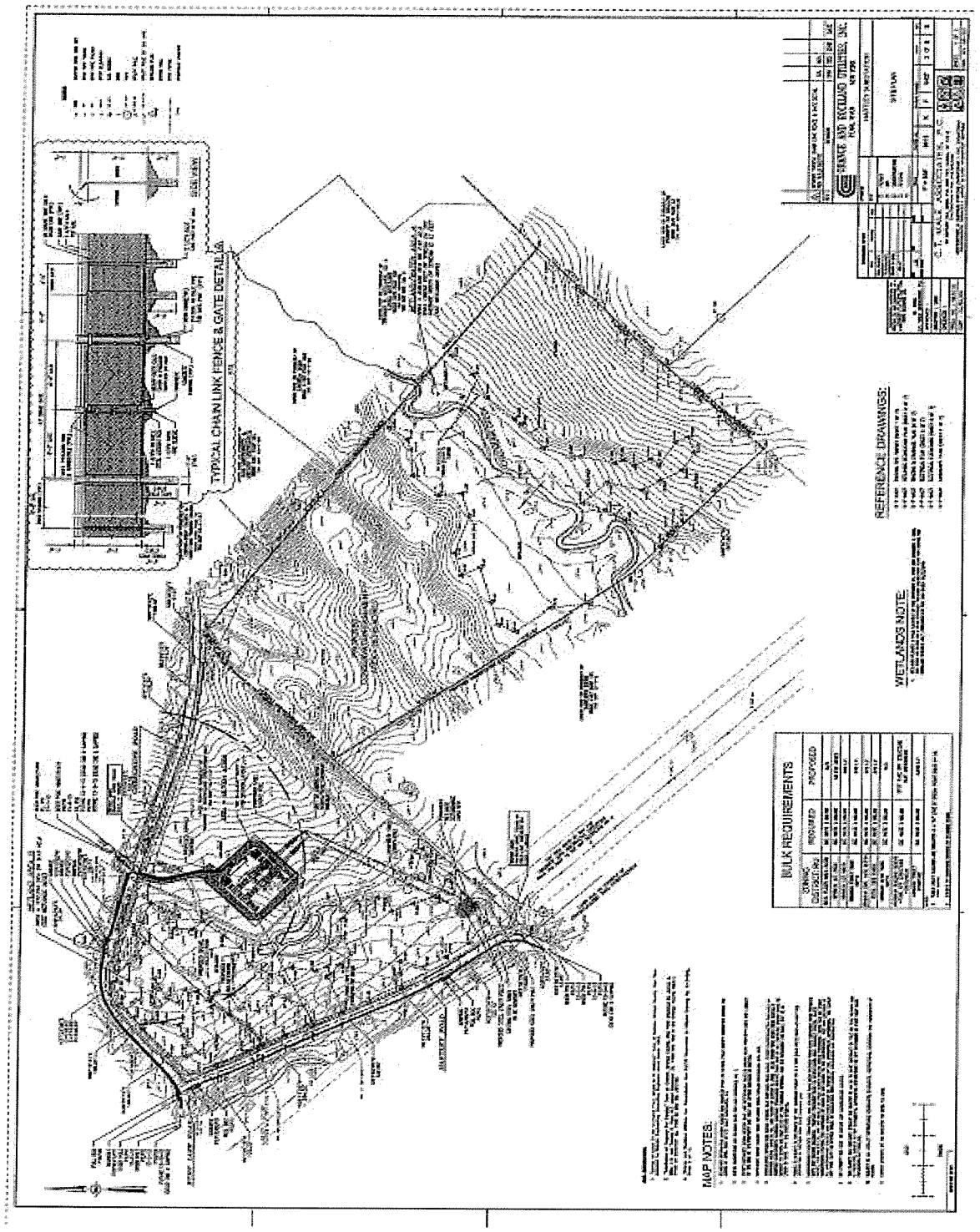
AREA MAP

VALUATION CONSULTANTS, INC.


SECTION 10
1.7
48.7A
1.42
4.3A
1.6
1.8A
1.3
5.3A
2.3
31.2A
AGRICULTURAL
DISTRICT
R.O.W. MAP 273
7.12 • 18.8A(C)
County of Orange
7.2
3.6A
3.3A(C)

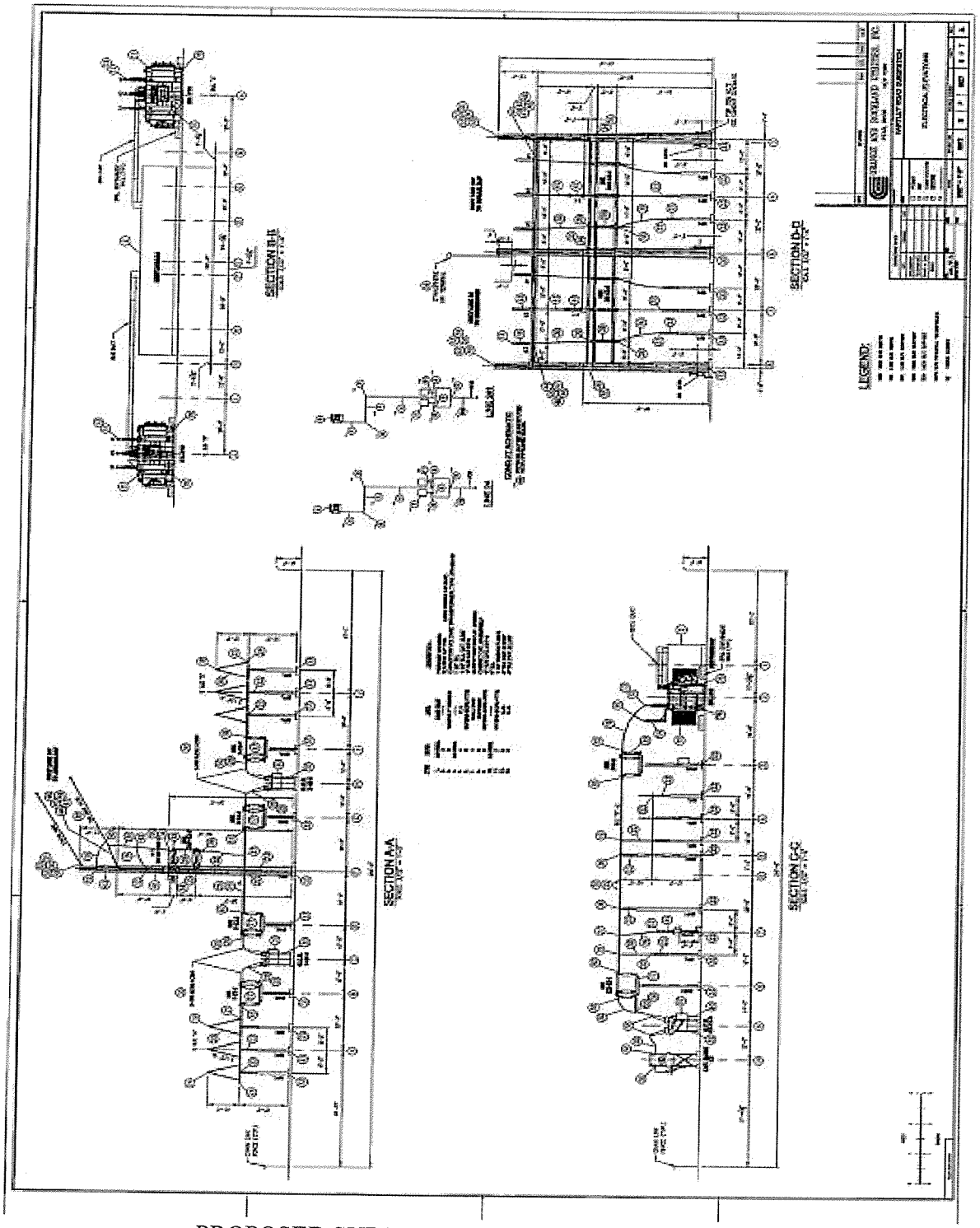
TAX MAP

VIEW OF PROPOSED SITE AND SURROUNDING PROPERTIES



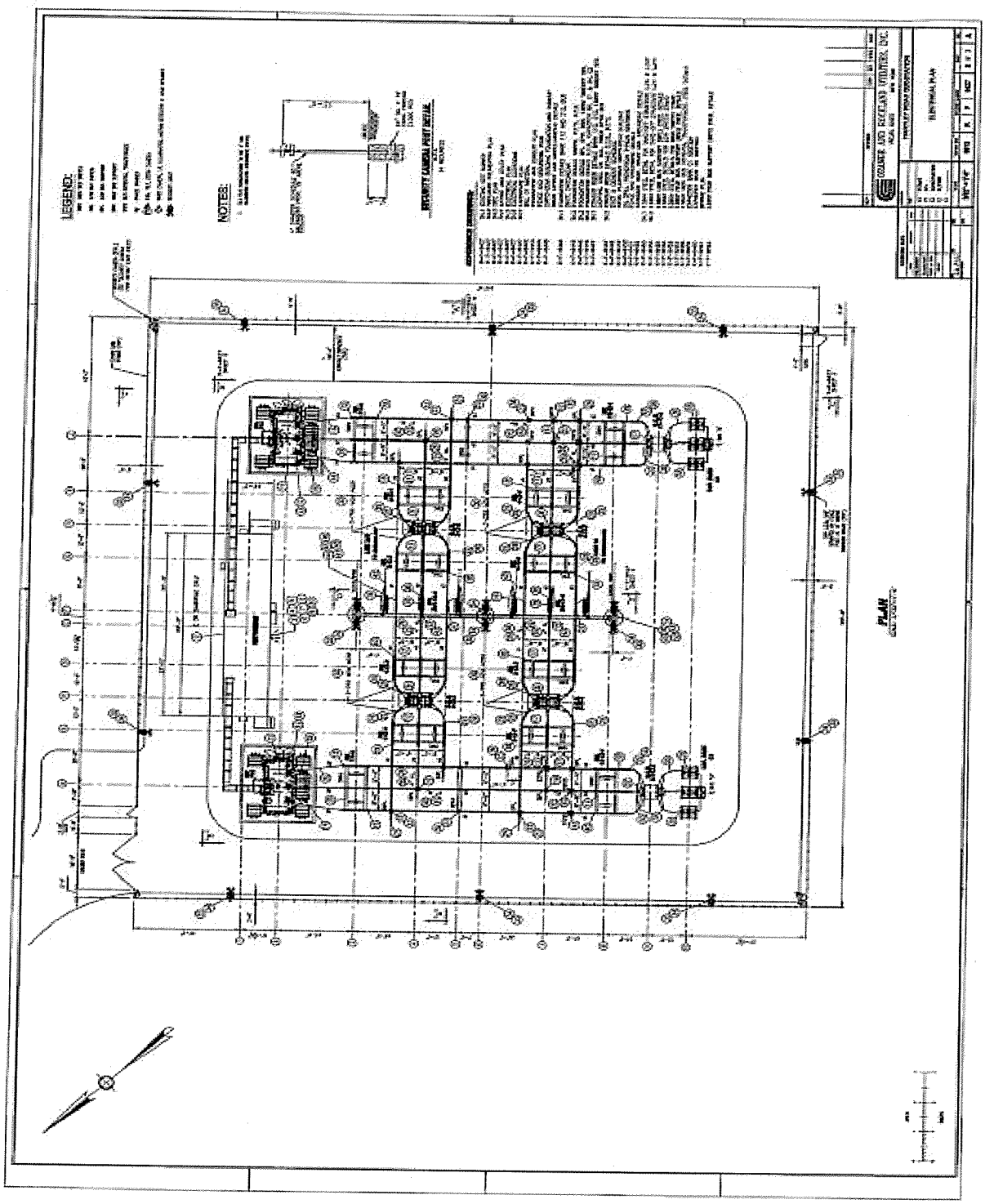
SURVEY MAP

VALUATION **C**ONSULTANTS, **I**NC.



PROPOSED SUBSTATION ELECTRICAL DRAWING

VALUATION CONSULTANTS, INC.



PROPOSED SUBSTATION ELECTRICAL DRAWING

Example #1

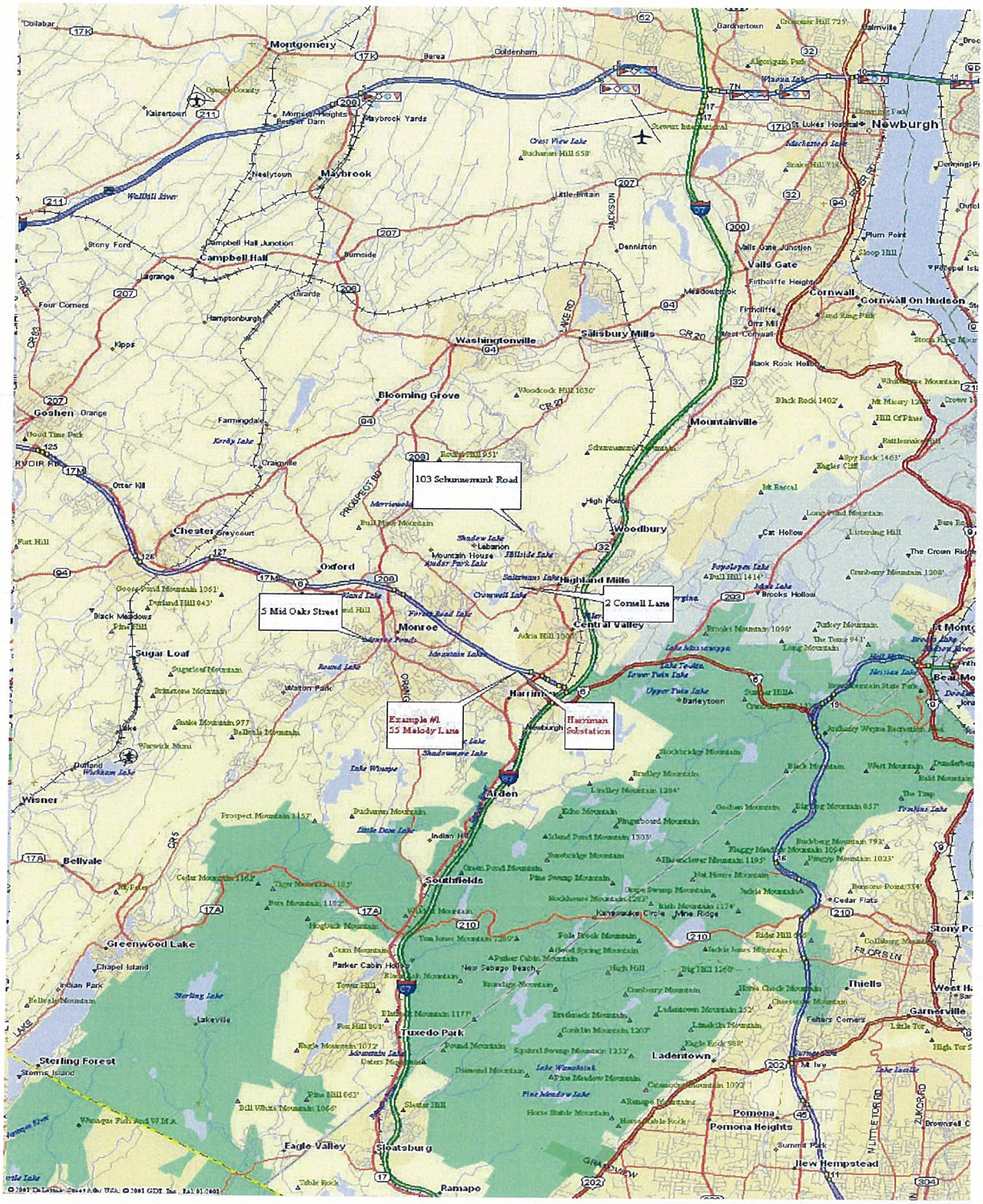
Supplemental Valuation Section

Single Family Supplemental Data

File No. T011017A

SALES COMPARISON ANALYSIS

ITEM	SUBJECT	COMPARABLE NO. 1		COMPARABLE NO. 2		COMPARABLE NO. 3	
Address	55 Melody Lane Harriman	103 Schunnemunk Road Woodbury		2 Cornell Lane Woodbury		5 Mid Oaks Street Monroe	
Proximity to Subject		4 Miles		2 Miles		3 Miles	
Sales Price	$ 449,900	$ 459,000		$ 440,000		$ 454,000	
Price/Gross Liv. Area	$ 234.69	$ 237.09		$ 183.95		$ 195.35	
Data and/or Verification Sources	Multiple Listing Assessors Rec.	Multiple Listing Assessors Rec.		Multiple Listing Assessors Rec.		Multiple Listing Assessors Rec.	
VALUE ADJUSTMENTS	DESCRIPTION	DESCRIPTION	+(-)$ Adjustment	DESCRIPTION	+(-)$ Adjustment	DESCRIPTION	+(-)$ Adjustment
Sales or Financing Concessions		Conventional None		Conventional None		Conventional None	
Date of Sale/Time	08/12/2005	02/24/2005		01/03/2005		05/05/2005	
Location	Near Substation	Residential		Residential		Residential	
Leasehold/Fee Simple	Fee Simple	Fee Simple		Fee Simple		Fee Simple	
Site	.23 Acres	2.5 Acres		.5 Acres		.31 Acres	
View	Average	Average		Average		Average	
Design and Appeal	Colonial / Avg.	Colonial / Avg.		Colonial / Avg.		Colonial / Avg.	
Quality of Construction	Average	Average		Average		Average	
Age	5 years +/-	7 years +/-		11 years +/-		40 years +/-	
Condition	Good	Good		Good		Good	
Above Grade Room Count (Total / Bdrms / Baths)	7 / 4 / 2.5	7 / 4 / 2.5		8 / 4 / 2		8 / 4 / 1.5	
Gross Living Area	1,917 Sq.Ft.	1,936 Sq.Ft.		2,392 Sq.Ft.		2,324 Sq.Ft.	
Basement & Finished Rooms Below Grade	Full Finished	Full Unfinished		Full Finished		Full Finished	
Functional Utility	Average	Average		Average		Average	
Heating/Cooling	HWBB / Cent.	HWBB / Cent.		HWBB / Cent.		HWBB / None	
Energy Efficient Items	Standard	Standard		Standard		Standard	
Garage/Carport	1 Car Garage	2 Car Garage		2 Car Garage		2 Car Garage	
Porch, Patio, Deck, Fireplace(s), etc.	Deck Patio, Porch	Deck Porch		Deck Porch		Deck None	
Fence, Pool, etc.	None	Fireplace		Fireplace		None	
Net Adj. (total)		[X] + [ ] - $ 0		[X] + [ ] - $ 0		[X] + [ ] - $ 0	
Adjusted Sales Price of Comparable		Gross: 0.0 Net: 0.0 $ 459,000		Gross: 0.0 Net: 0.0 $ 440,000		Gross: 0.0 Net: 0.0 $ 454,000	


103 Schunemunk Road
5 Mid Oaks Street
2 Cornell Lane
Example #1
55 Melody Lane
Harriman Substation
Montgomery
Newburgh
Maybrook
Campbell Hall
Washingtonville
Salisbury Mills
Cornwall
Cornwall On Hudson
Mountainville
Blooming Grove
Goshen
Chester
Oxford
Highland Mills
Central Valley
Monroe
Harriman
Woodbury
Sugar Loaf
Warwick
Wisner
Bellvale
Greenwood Lake
Southfields
Tuxedo Park
Sterling Forest
Eagle Valley
Sloatsburg
Ramapo
Ladentown
Pomona
Pomona Heights
New Hempstead
Thiells
Garnerville
Stony Point
Vails Gate
Newburgh
Beacon

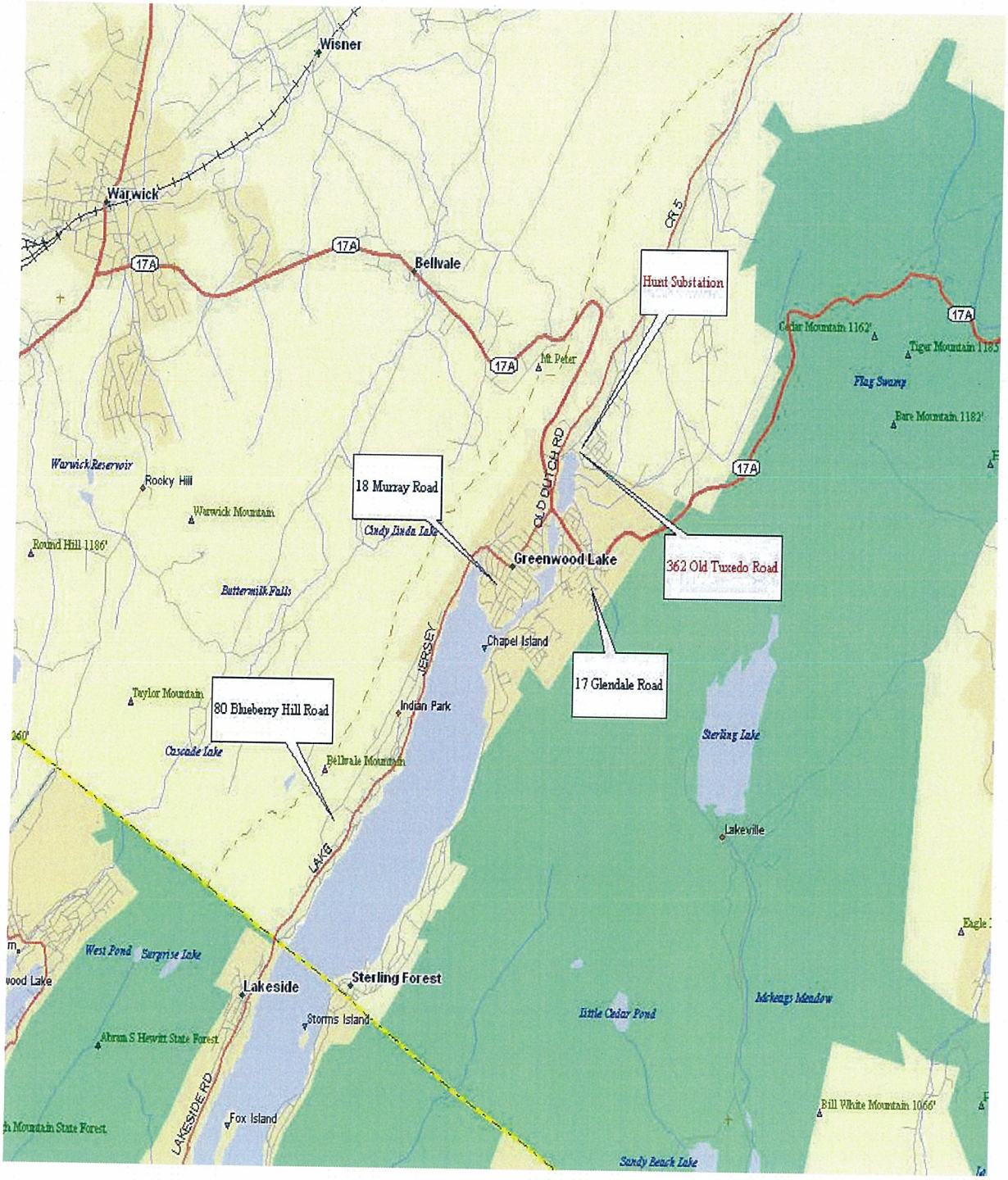
TJ Maxx
Larkin Dr
17
Walmart Supercenter
Tiger Schulmann's Kickboxing and Mixed Martial Arts
Larkin Dr
Harriman Substation
Melody
55 Melody Lane
Melody Ln
American Budget Inn
Brookside Dr W
Dunderberg Rd
Melody Ln
Oxford Ln
Oxford Ln
Oxford Ln
Kensington Way
Brookside Dr W
Uncle Bob's Self Storage
Brookside Dr E

Example #2

Supplemental Valuation Section — **Single Family Supplemental Data** — **File No.** T011017I

SALES COMPARISON ANALYSIS

ITEM	SUBJECT	COMPARABLE NO. 1	+(-) $ Adjustment	COMPARABLE NO. 2	+(-) $ Adjustment	COMPARABLE NO. 3	+(-) $ Adjustment
Address	362 Old Tuxedo Road Warwick	18 Murray Road Greenwood Lake		17 Glendale Road Greenwood Lake		80 Blueberry Hill Road Warwick	
Proximity to Subject		1.5 Miles		1 Mile		5 Miles	
Sales Price	$ 147,000	$ 140,000		$ 133,000		$ 134,000	
Price/Gross Liv. Area	$ 160.66	$ 117.65		$ 140.59		$ 213.04	
Data and/or Verification Sources	Multiple Listing Assessors Rec.	Multiple Listing Assessors Rec.		Multiple Listing Assessors Rec.		Multiple Listing Assessors Rec.	
VALUE ADJUSTMENTS	DESCRIPTION	DESCRIPTION		DESCRIPTION		DESCRIPTION	
Sales or Financing Concessions		Conventional None		Conventional None		Conventional None	
Date of Sale/Time	09/11/2002	01/29/2002		12/12/2001		08/27/2002	
Location	Near Substation	Residential		Residential		Residential	
Leasehold/Fee Simple	Fee Simple	Fee Simple		Fee Simple		Fee Simple	
Site	.29 Acres	.11 Acres		.19 Acres		.59 Acres	
View	Average	Average		Average		Average	
Design and Appeal	Ranch / Avg.	Ranch / Avg.		Ranch / Avg.		Ranch / Avg.	
Quality of Construction	Average	Average		Average		Average	
Age	52 years +/-	39 years +/-		57 years +/-		54 years +/-	
Condition	Average	Average		Average		Average	
Above Grade Room Count (Total / Bdrms / Baths)	5 / 2 / 1	6 / 2 / 1.5		6 / 3 / 1		4 / 2 / 1	
Gross Living Area	915 Sq.Ft.	1,190 Sq.Ft.		946 Sq.Ft.		629 Sq.Ft.	
Basement & Finished Rooms Below Grade	Partial Unfinished	Crawl		Partial Unfinished		Full Unfinished	
Functional Utility	Average	Average		Average		Average	
Heating/Cooling	FWA / None	HWBB / None		FWA / None		HWBB / None	
Energy Efficient Items	Standard	Standard		Standard		Standard	
Garage/Carport	None	None		None		None	
Porch, Patio, Deck, Fireplace(s), etc.	Deck None	Deck Cov. Porch		Deck None		Deck None	
Fence, Pool, etc.	None	Fence		None		None	
Net Adj. (total)		[X] + [ ] - $ 0		[X] + [ ] - $ 0		[X] + [ ] - $ 0	
Adjusted Sales Price of Comparable		Gross: 0.0% Net: 0.0% $ 140,000		Gross: 0.0% Net: 0.0% $ 133,000		Gross: 0.0% Net: 0.0% $ 134,000	


Wisner
Warwick
17A
Bellvale
Hunt Substation
CR 5
Mt Peter
Cedar Mountain 1162'
Tiger Mountain 1185'
Flag Swamp
Bare Mountain 1182'
Warwick Reservoir
Rocky Hill
18 Murray Road
Warwick Mountain
Cindy Linda Lake
OLD DUTCH RD
Round Hill 1186'
Greenwood Lake
362 Old Tuxedo Road
Buttermilk Falls
Chapel Island
JERSEY
17 Glendale Road
Taylor Mountain
80 Blueberry Hill Road
Indian Park
Sterling Lake
Cascade Lake
Bellvale Mountain
Lakeville
LAKE
West Pond
Surprise Lake
Lakeside
Sterling Forest
Storms Island
Little Cedar Pond
Ickeys Meadow
Abram S Hewitt State Forest
LAKESIDE RD
Fox Island
Bill White Mountain 1066'
Sandy Beach Lake

Grand Ave
Hunt Substation
362 Old Tuxedo Road
Old Tuxedo Rd

Example #3

Supplemental Valuation Section — **Single Family Supplemental Data** — **File No.** T011017J

SALES COMPARISON ANALYSIS

ITEM	SUBJECT	COMPARABLE NO. 1		COMPARABLE NO. 2		COMPARABLE NO. 3	
Address	368 Old Tuxedo Road Warwick	69 Deer Trail Warwick		30 Fourth Road Greenwood Lake		12 Heather Lane Greenwood Lake	
Proximity to Subject		2.5 Miles		1 Mile		1 Mile	
Sales Price	$ 225,000	$ 220,000		$ 190,000		$ 212,500	
Price/Gross Liv. Area	$ 241.94	$ 242.02		$ 192.31		$ 295.14	
Data and/or Verification Sources		Multiple Listing Assessors Records		Multiple Listing Assessors Records		Multiple Listing Assessors Records	
VALUE ADJUSTMENTS	DESCRIPTION	DESCRIPTION	+(-)$ Adjustment	DESCRIPTION	+(-)$ Adjustment	DESCRIPTION	+(-)$ Adjustment
Sales or Financing Concessions	Conventional None	Conventional $10,000 Conces.		Conventional None		Conventional None	
Date of Sale/Time	10/23/2006	03/31/2006		10/06/2006		08/14/2006	
Location	Near Substation	Residential		Residential		Residential	
Leasehold/Fee Simple	Fee Simple	Fee Simple		Fee Simple		Fee Simple	
Site	.2 Acres	.42 Acres		.18 Acres		.18 Acres	
View	Average	Average		Average		Average	
Design and Appeal	Ranch / Avg.	Ranch / Avg.		Ranch / Avg.		Ranch / Avg.	
Quality of Construction	Average	Average		Average		Average	
Age	48 years +/-	68 years +/-		71 years +/-		66 years +/-	
Condition	Average	Average		Average		Average	
Above Grade Room Count (Total / Bdrms / Baths)	5 / 2 / 1	5 / 2 / 1		6 / 3 / 1		5 / 2 / 1	
Gross Living Area	930 Sq.Ft.	909 Sq.Ft.		988 Sq.Ft.		720 Sq.Ft.	
Basement & Finished Rooms Below Grade	Partial Unfinished	Partial Unfinished		Full Unfinished		Crawl	
Functional Utility	Average	Average		Average		Average	
Heating/Cooling	FWA / None	FWA / Cent.		FWA / None		FWA / None	
Energy Efficient Items	Standard	Standard		Standard		Standard	
Garage/Carport	None	None		None		None	
Porch, Patio, Deck, Fireplace(s), etc.	Deck Fireplace	Deck Woodstove		Deck Fireplace		Deck Fireplace	
Fence, Pool, etc.	None	None		None		None	
Net Adj. (total)		[X] + [ ] - $	0	[X] + [ ] - $	0	[X] + [ ] - $	0
Adjusted Sales Price of Comparable		Gross: 0.0% Net: 0.0% $	220,000	Gross: 0.0% Net: 0.0% $	190,000	Gross: 0.0% Net: 0.0% $	212,500

Hunt Substation
368 Old Tuxedo Road
30 Fourth Road
12 Heather Lane
69 Deer Trail
Greenwood Lake
Bellvale
Mt Peter
Chapel Island
Indian Park
Bellvale Mountain
Cindy Linda Lake
Sterling Lake
Butternut Falls
MOUNTAIN LAKES LN
FOURTH BROOK LN
LAKEWOOD RD
STERLING RD
FIRST RD
DOLANS
CASCADE TRL
DEER TRL
MOUNTAIN TRL
BUTTERMILK FALLS RD
CASCADE RD
ASHLEE MEADOW RD
CALIFORNIA RD
CHERRY TREE HILL RD
INDIAN TRL
BROOK RD
EAST SHORE
W LAKE RD
OLD FORGE RD
Lakeville
CR 84
OLD TUXEDO RD
WILDWOOD
LAWRENCE RD
NELSON RD
PENN LUNA RD
ALEXANDER RD
PETERS
JARMAN RD
NE RUMSEY LN
KETCHUM RD
PUMPKIN
TURKEY MILL RD
OLD MT PETER RD
HILL SIDE RD
ABBEY RD
IRON FORGE
KAIN RD
APPALACHIAN TR
CONTINENTAL RD
ROUTE 17A
STAGE COACH LN
CASCADE RD
BRILLER RD
BLAKE RD
APPALACHIAN TRL
AGOWA RD
CR 84
CLOVE RD
OAK
FAIRVIEW
TEDDENWWN
VILLAGE
CANE RD
FOREST
WALNUT
CHESTNUT
LINDEN
TENEYCK
BIRCH
PINE HILL
CEDAR RD
HILLSIDE
AVONDALE RD
GROVE
MAPLE
HOLDEN
PEETER
MURRAY RD
PARK
JERSEY
KOULAFARIS
DEER TRL
SKYLOOP TRL
BROOK TRL
MOUNTAIN TRL
HOLBERT
KIMBERLY
HILL LN
WILLIAMS
17A

Hunt Substation
368 Old Tuxedo Road
Old Tuxedo Rd
Mountain Ave
Allen Rd

THOMAS M. MCCHESNEY, SRA - APPRAISER'S QUALIFICATIONS

MEMBERSHIPS AND AFFILIATIONS:

Member of Appraisal Institute - SRA Designation

New York State Certified Residential Real Estate Appraiser #45-2845

Appraisal Institute - Mid Hudson Chapter
1997 President
1996 Vice President
1995 Secretary
1993 - 1995 - Education Committee Chairman
1990 - 1993 - Education Committee
1998 - 2001 - Board of Directors
2005 - Present - Board of Directors

Appraisal Institute - Region IV
1995 - 1997 - Regional Ethics and Counseling Panel

EDUCATION:

Ramapo College of New Jersey, Mahwah, New Jersey
Bachelor of Science 1985
Major: Business Administration
Concentration: Economics / Finance

County College of Morris, Randolf, New Jersey
Associates of Arts 1982
Major: Business Administration

American Institute of Real Estate Appraisers
Real Estate Appraisal Principles 1987

American Institute of Real Estate Appraisers
Residential Valuation 1988

American Institute of Real Estate Appraisers
Standards of Professional Practice 1989

American Institute of Real Estate Appraisers
Basic Valuation Procedures 1989

Appraisal Institute
Capitalization Theory and
Techniques - Part A 1992

Appraisal Institute
Standards of Professional Practice - Part A 1997
Standards of Professional Practice - Part B 1997

Appraisal Institute
Standards of Professional Practice - Part C 2002

SEMINARS:

Society of Real Estate Appraisers
Standards of Professional Practice 1989

Appraisal Institute
Valuing Land When There Are No Comparables 1993

Appraisal Institute
Preparation of Tax Certiorari 1993

Appraisal Institute
New URAR 1993

Appraisal Institute
Valuation by Subdivision Analysis 1994

Appraisal Institute
Appraisal Reporting of Complex
Residential Properties 1994

Appraisal Institute
Appraisal Review - Residential Properties 1994

Appraisal Institute
Understanding Limited Appraisals 1994

Independent Fee Appraisers
Basic Residential HUD Requirements 1995

Appraisal Institute
Litigation Appraising - Part 1 - Current
Issues in Tax Certiorari 1995

Appraisal Institute	
How to complete New York State FHA Appraisals	1996
Appraisal Institute	
Appraising High Value and Historic Homes	1996
Appraisal Institute	
Special Purpose Properties: The Challenge Of R.E. Appraising in Limited Markets	1996
Appraisal Institute	
Current Issues in Tax Certiorari	1997
Appraisal Institute	
Planning Boards, Land Use Control and Zoning Board of Appeals	1997
Appraisal Institute	
Attacking and Defending an Appraisal in Litigation	1998
Appraisal Institute	
Unsyndicated partial Interest Appraisals	1998
Appraisal Institute	
Emerging Technologies Forum	1998
Appraisal Institute	
Property Value Studies in Relation to Community Residences	1998
Manfred Real Estate Learning Center	1999
New FHA/HUD Guidelines	
McKissock Data Systems	
Regression Foundations	2000
Regression Applications	2000
NYS Association of Realtors, Inc.	
Residential Construction, Home Inspection, ADA, Land, Environmental Inspection	2000
Appraisal Institute	
Appraising Vacant Land	2002

Appraisal Institute Scope of Work: Expanding your range of services	2003
Appraisal Institute Mathematically Modeling Real Estate Data	2004
Appraisal Institute Introduction to Income Capitalization	2005
Appraisal Institute Appraisal Consulting: A solutions approach for professionals	2005
Appraisal Institute Residential Market Analysis and Highest and Best Use	2005
Appraisal Institute Residential Market Analysis and Highest and Best Use	2005
Employee Relocation Council Relocation Training Program	2006
Appraisal Institute 2006 Changes to USPAP: The Demise of Departure	2006
McKissock Appraising Historic Properties	2006
Appraisal Institute Online Valuation Resources	2007
Appraisal Institute Uniform Standards of Appraisal Practice	2007
Appraisal Institute Evaluating Residential Construction	2007
Appraisal Institute Analyzing Distressed Real Estate	2008
Appraisal Institute	

Analyzing Real Estate in Distressed or Troubled Markets 2008

Appraisal Institute
Uniform Standards of Appraisal Practice 2008

Appraisal Institute
REO Appraisal 2009

Appraisal Institute: USPAP Update Course 1/2010

EXPERIENCE REAL ESTATE:

3/93 to Present
Valuation Consultants, Inc., Newburgh, New York
Owner and Senior Residential Appraiser/Manager

3/86 to 3/93
Appraisal Services, Newburgh, New York
Senior Appraiser

7/85 to 3/86
Anchor Mortgage Services, Inc., Wayne, New Jersey
Post Closing Mortgage Reviewer

8/82 to 9/84
Louis F. McChesney Appraisal, Sparta, New Jersey
Appraiser Assistant

APPRAISAL EXPERIENCE:

Has appraised all types of residential properties, condominiums and multi family residences.

Has performed property analysis and appraisal for private and corporate investors, financial institutions, attorneys, major corporations, home transfer companies and others. Here listed are a few selected employers:

A: GENERAL

Bank of America
Boston Safe Deposit and Trust
JPMorgan Chase
Citibank, N.A.

Coldwell Relocation Management Services, Inc.
Community Bank of Orange County
Community Bank of Sullivan County
Community Preservation Corporation
GMAC
TD BankNorth
Key Bank of New York
Lakeland State Bank
M & T Bank
Manhattan Savings Bank
Masbeth Federal Savings
Merrill Lynch Relocation
New York State Facilities Development Corp.
North Fork Bank
Orange County Trust
Provident Bank
Prudential Relocation
Putnam County Savings Bank
Remax International Relocation
Rhinebeck Savings Bank
Riverside Bank
Travelers Relocation
Ulster Savings Bank
Walden Federal Savings Bank
Walden Savings Bank
Webster Bank
Supreme Court of the State of NY - Suffolk
Hon. William J. Kent
Newman & Cahn, LLP
Robert J. Del Col, Esq.
Bloom & Bloom, P.C.

B. AREAS OF APPRAISAL EXPERIENCE - NEW YORK STATE

COUNTIES: Orange, Dutchess, Putnam, Ulster, Rockland, and Sullivan

FACTUAL STATISTICAL AND REFERENCE INFORMATION

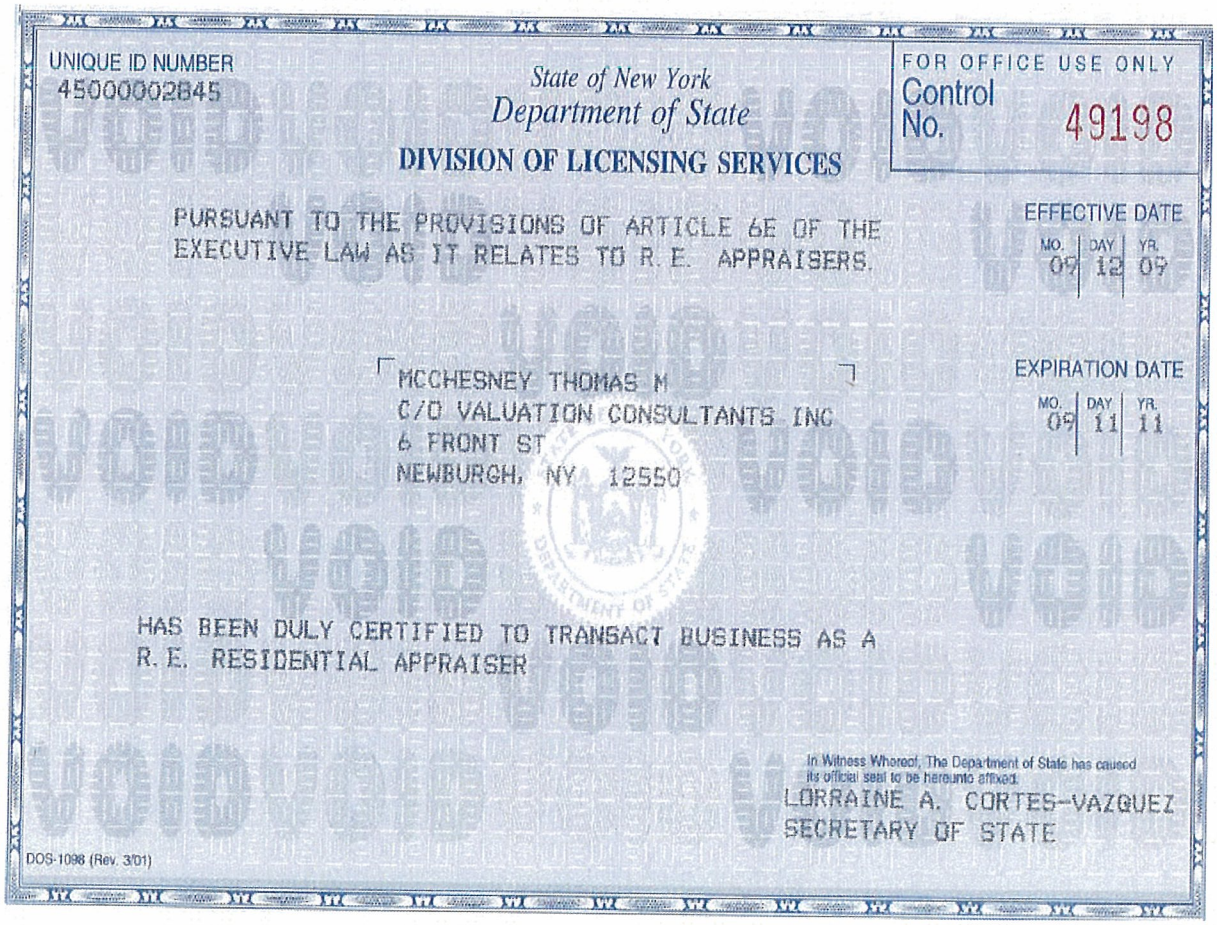
An up-to-date set of area Zoning Maps and Ordinances.

City maps showing existence of underground utilities.

Maintenance of sales transactions by subdivisions and street name, effective dates of sale and current listing.

Current community statistics referring to retail sales, bank clearance, employment, transportation routes, construction activity, and mortgage recordings.

Census Tract Maps. Flood Plain Maps. Wetland Maps.



UNIQUE ID NUMBER
45000002845

State of New York
Department of State
DIVISION OF LICENSING SERVICES

FOR OFFICE USE ONLY
Control No. 49198

PURSUANT TO THE PROVISIONS OF ARTICLE 6E OF THE EXECUTIVE LAW AS IT RELATES TO R.E. APPRAISERS.

EFFECTIVE DATE
MO. 09 DAY 12 YR. 09

MCCHESNEY THOMAS M
C/O VALUATION CONSULTANTS INC
6 FRONT ST
NEWBURGH, NY 12550

EXPIRATION DATE
MO. 09 DAY 11 YR. 11

HAS BEEN DULY CERTIFIED TO TRANSACT BUSINESS AS A R.E. RESIDENTIAL APPRAISER

In Witness Whereof, The Department of State has caused its official seal to be hereunto affixed.
LORRAINE A. CORTES-VAZQUEZ
SECRETARY OF STATE

DOS-1098 (Rev. 3/01)

APPENDIX R
Resumes

KLEINFELDER
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DAVID B. TOMPKINS, CWB, PWS
Regional Environmental Permitting & Practice Lead

Education
- BS Environmental Science and Geography, Univ. of New York : Plattsburgh, New York
- MS Wildlife Ecology, West Virginia University

Registrations
- Professional Wetland Scientist
- Certified Wildlife Biologist/Wildlife Society
- Certified Subsurface Evaluator DEP, NJ

Professional Affiliations
- Assoc. of State Wetland Managers
- SETAC-North Atlantic Chapter
- National Registry of Environmental Professionals

Certifications/Training
- OSHA 40-hour Hazardous Waste Operations
- OSHA 8-hour Supervisor, Endangered and Threatened Species
- Freshwater Wetlands Construction Techniques
- Hydric Soils
- Wetland Evaluation Technique (WET II), Wetland Training Institute

Summary of Experience

Mr. Tompkins has 25 years of experience conducting and managing biological and environmental investigations and providing wetland consulting services. His work has included environmental impact statements, hazardous waste remediation projects, wetland delineations, permitting and mitigation, hazardous waste sampling analyses, biological monitoring, endangered species studies and permitting for hazardous waste and commercial development projects. He is well versed in regulatory permitting, regulatory negotiations, and compensatory mitigation. Graduate research involved the natural re-vegetation of abandoned mines in West Virginia.

Select Project Experience

HABITAT/BIODIVERSITY EVALUATION

Indiana Bat Evaluations, Various Clients, Eastern Pennsylvania and Hudson Valley, NY
Supervised and performed over 50 habitat evaluations for Indiana Bats focused on identifying roost and maternity trees for nesting females. Activities have also included mist netting (6 locations) and radio tracking. Project work is routinely reviewed by USFWS and NYSDEC staff. Also performed exit counts and roost tree identification using radio telemetry as part of NYSDEC Hudson Valley monitoring program. Supervised project requiring the establishment of mitigative measures for a development project located near a known nesting population of Indian Bats.

LCP Chemical Superfund Site, Ecological Survey, Habitat Assessment, and Biota Sampling, Linden, NJ
Mr. Tompkins designed and conducted various ecological surveys at the subject site to assist Brown and Caldwell with the characterization of the ecological community as well as to provide food chain pathway analysis and raw data for the analysis of wildlife contaminant uptake and bioaccumulation. Species of concern included fish, benthics, birds and mammals. The habitat assessment was designed to identify species which may have been impacted from land uses changes and not former site activities. Project reports were included in the RIFS documents submitted to USEPA.

Karner Blue Butterfly And Blue Lupine Surveys, Habitat Conservation Plan, National Grid, Albany, Schenectady, Saratoga, And Warren Counties, NY
Directed surveys along all National Grid utility right-of-ways (ROWs) within sand plain areas of New York State. Surveys consisted of transecting ROWs and mapping populations of blue lupine (*Lupinus perennis*), and any associated Karner blue butterflies (*Lycaeides Melissa smauelis*) or frosted elfins (*Callophrys irus*) using Trimble GPS units. Currently directing the preparation of a habitat conservation plan and incidental take permit for National Grid, for management operations along these ROWs, in

consultation with the US Fish and Wildlife Service and the New York State Department of Environmental Conservation. This includes completing necessary documentation under NEPA and SEQRA.

Plant Surveys, Various Locations, New York State
As part of the site development review process and various stand alone projects, rare plant and general botanical surveys were conducted on over 250 sites for a variety of plants occurring in New Jersey and New York State (and to a lesser degree other states). Habitats included rocky summits, sand plains/pine barrens, forested wetlands and meadows, deep interior forests, and various other habitats.
Additional expertise has been acquired over my career mapping habitat feature for a variety of species, which include both host specific species (Wild Lupine- Karner Blue Butterfly) or habitat generalists. These studies focused on habitat structure as well as species composition.

Site Development and Permitting, Stone Industries, Ramapo, NY
As project manager and senior biologist, Mr. Tompkins provided environmental and engineering services in support of a mining permit application for an approximate 500-acre site in Ramapo, New York. Prepared various environmental impact analyses for traffic, noise, visual, ecology, archaeology, and hydrogeology.

Stream Assessments, Syracuse, Watertown, German Flats, Chazy, NY
Using either the Hilsenhoff Biotic Index or The Rapid Bioassessment Protocols established by USEPA and various state agencies, stream assessments were conducted at a variety of sites in support of ongoing remedial investigation being conducted under the NYSDEC Superfund program. These assessments included benthic sampling for macro invertebrates (including taxonomic enumeration), fish surveys seining and electro-shocking), and habitat assessments to determine the level of impairment on a given stream from both anthropogenic sources and site contamination. Several of these studies focused on the bioaccumulation of contaminants in the food chain. In some cases, stream remediation and subsequent restoration was required and implemented. Two specific studies included the impacts of site contaminants on the reproductive potential of mink and on piscivorous birds.

Bloody Brook Sediment Investigation, Lockheed Martin Corp., Syracuse, NY
Conducted sediment sampling and ecological surveys along a 3+ mile section of stream, which was a tributary to Onondaga Lake. Negotiated extensively with NYSDEC on clean-up goals, and selection of appropriate receptor species for bioaccumulation studies. Special consideration was given to mink due to potential reproductive failure, and piscivorous bird species and potential for bioaccumulation of toxic levels of various heavy metals.

Ecological and Sediment Investigation, New York Air Brake, Watertown, NY
Over a period of several years, (mid to late 1990's) personally conducted numerous ecological investigations regarding the deposition /remediation of contaminated sediments in tributaries of the Black Dirt River. Special emphasis was placed on the bioaccumulation of heavy metals in crawfish and the subsequent uptake by mink along the river corridor. Other species included earthworms, fish, benthic macro-invertebrates and avian species. Involved in various discussions over the presence of mink and the appropriateness of the species as a receptor species.

Eastern Timber Rattlesnakes Population Study Rockland County, NY
Conducted a 4 year study identifying population levels, den and basking area locations using live capture and radio telemetry techniques, performed den surveys, and overall evaluation of habitat suitability and impacts from development projects.

General Wildlife Survey, Various Clients, NY And NJ
Routinely evaluate sites for identification of natural resources (wildlife and plant species) and evaluate impacts from proposed development projects. This evaluation includes site visits, historical data source review, interpolation from existing habitat conditions and known reference site conditions and species

assemblages. Commonly, this work includes specific focus on migratory songbirds and reptiles and amphibians.

WETLAND DELINEATION AND PERMITS/WATERFRONT DEVELOPMENT

Buckeye Pipeline Company, Wetland Delineation and Permitting, Sewaren, NJ
To replace a damaged cathodic protection system associated with a pipeline crossing a tidal marsh wetland, Kleinfelder conducted a wetland delineation, and permitting exercise to allow Buckeye to successfully complete onsite activities required to maintain the integrity of the pipeline system. Permitting was necessary for Coastal Waterfront Development, Freshwater wetlands General Permit, and Water Quality Certification.

Buckeye Pipeline Company, Waterfront Redevelopment Permitting, JFK Airport, New York
Coastal erosion exposed a critical pipeline supplying aviation gas to the airport facility. As part of restoration project, Kleinfelder, provided engineering and design services for waterfront restoration project. Permits required included NYS Dept. of State Coastal Consistency Review, Army Corp of Engineers Nationwide Permit Approval, NYS Dept. of Environmental Conservation Protection of Waters Article 15, NYSDEC Tidal Wetlands Article 25, and 401 Water Quality Certificate.

Torches On The Hudson, Waterfront Permitting, Newburgh, NY
Conducted permitting for a 162 slip marina facility in Newburgh. Engineering design included the use of screw anchors in the river bottom to protect fish habitat. Components of the permitting included Essential Fish Habitat Study, Army Corp of Engineers, and NYSDEC Protection of Waters, NYSDOS Coastal Consistency Review.

Ames Rubber, Wetland Delineation and Permitting, Totowa, NJ
Kleinfelder staff delineated onsite wetlands and obtained necessary approvals to conduct a remedial investigation inside the transition zone and wetland area of a palustrine forested wetland. Necessary improvements will include monitoring well installation and construction of a work area. Site restoration recommendations were included.

NYSDOT Pin 9804.17.101 Contract D015617 Pin S082.00, Wetland Delineation For Bridge Rehab/Replacement, Interstate Bridge #7, Town Of Calicoon, Sullivan County, NY
Mr. Tompkins directing staff flagged the boundary of each onsite wetland in accordance with the Army Corps of Engineers Wetlands Delineation Manual. The work was preformed during the appropriate field season (i.e. growing season) and the limits of the delineation where 500 feet upstream of the proposed crossing "D" to 500 feet downstream of the proposed crossing "F". In addition to flagging the river bank, wetland areas surrounding proposed construction access roads were surveyed. Data points and representative photographs of the uplands and wetlands were taken for inclusion in the delineation report. The report consisted of the introduction of the area including discussion of site location, limits of study area, soils, hydrology, plant communities, and existing mapping resources. In addition, provided was the approximate total wetland area and approximate wetland area within the proposed road crossings, as well as an opinion on the regulatory status of the wetlands on site.

Moore Project, WCI/Spectrum, East Fishkill, NY
Assisted project team with the delineation and assessment of on-site wetlands, development of permit documents, and mitigation plans. Project activities included extensive negotiations with USCOE for permit issuance.

The Marketplace, Wilder Balter Partners, Newburgh, NY

Project included the delineation of wetlands on a 108-acre parcel and the subsequent obtainment of a jurisdictional determination (JD). As part of the JD negotiations, approximately 4 acres were determined to be isolated pursuant to the SWANC decision.

WETLAND MITIGATION AND MITIGATION MONITORING

Mitigation Monitoring, Beekman Country Club, Town Of Beekman, NY
Currently managing project which involves the bi-monthly monitoring of a 1.85 acre wetland mitigation site. Project involves monitoring the reestablishment of hydrophic species, hydrology and the re-colonization by wildlife species. An assessment is also performed on the impact of herbivores. A monitoring report was written and submitted for the USCOE.

Wetland Mitigation Monitoring, Woodbury Premium Outlets, Woodbury, NY
Successfully conducted and managed a 5 year program designed to document the successful establishment of a wetland community in an off-site mitigation site. The project included vegetation monitoring, hydrologic monitoring, and documentation of wildlife utilization. Annual reports were submitted to the USCOE and after 5 years the bond for the monitoring was released.

Dutchess County Airport Landfill, Landfill Board Of Trustees, Town Of Wappingers Falls, NY
Remediation efforts at this site required the delineation of wetlands and ecological resources to minimize and compensate for impacts. Subsequently, wetland delineation was performed; permitting documents were prepared for submittal to the USCOE and Town, which included the preparation of approximately 2 acres of compensatory wetlands to be established after remediation was completed.

Timber Rattlesnake Assessment, Putnam Valley Planning Board, Putnam Valley, NY
As part of Town Consultant responsibilities, an assessment of historical records and existing habitat was conducted to determine if a proposed subdivision had potential for impacts to remnant timber rattlesnake populations.

GENERAL ENVIRONMENTAL SERVICES

Environmental Compliance, Us Postal Service, Six Districts
Mr. Tompkins developed an environmental compliance guidebook for postmasters in six districts of the US Postal Service, including: New York, New Jersey, Maryland, Puerto Rico, and Virgin Islands. Coordinated Hazardous Materials Inventories, US Postal Service, NY and managed the training for the implementation of the guidebook.

Town Of Wawayanda, Town Planning Board, Orange County, NY
As consultants to the Town Planning Board, all applications presented to the Planning Board were screen for wetland and ecological impacts. Either directly or by supervising staff, all wetland lines were field verified, and evaluated for permitting needs and possible mitigation. Where applicable, applicants were forwarded to NYSDEC or USCOE for permitting review. Impacts to resident wildlife was also assessed and discussed with project applicants.

Industrial Site Responsibility Act Investigation, Metal Processing Plant, NJ
Managed a New Jersey ISRA investigation involving a galvanized metal processing plant. Environmental concerns at the site included underground storage tanks, historical dumping, groundwater contamination, chemical storage, storm water management and off-site versus on-site contamination issues.

Developed and managed programs designed for conducting chemical inventories at over 360 U.S. Postal Service facilities in New York State. Assembled inventory data into a centralized database for USPS management.

Tank Management, Confidential Commercial Client, NY, NJ, MA, CT, MD, VA, TX
Instituted a tank management program for a 120-facility commercial client. Project included tank monitoring, upgrading, removal, remediation, and regulatory compliance.

Environmental Surveys, Turner Construction, Pittsburgh, PA
Managed Phase I and II environmental surveys of eight buildings scheduled for demolition in downtown Pittsburgh. Environmental concerns included asbestos, lead paint, fuel tanks biohazards, PCBs and other potentially hazardous materials.

PUBLICATIONS AND PRESENTATIONS

Tompkins, D.B. Impact of Endangered Species on Development Projects in the Northeast US. Kleinfelder Technical Conference, Denver, CO., Feb. 2009.

Tompkins, D.B. and H. Russell, Ph.D. Electronically enhanced bioremediation of chlorinated solvents using the Biolance system. New York Water Environment Association. West Point, NY, Sept. 2007.

Tompkins, D.B. Rattlesnake Populations in the Ramapo Mountains of SE New York State. New York State Chapter of the Wildlife Society. Owego, NY, Feb. 2007.

Tompkins, D.B. Rapid Bioassessment Protocols: What are they? Do they work? Should we use them? New York State Wetlands Forum Annual Conference, Liverpool, NY 2002.

Sorell, T.L. and D. B. Tompkins. A Tiered Approach to Selecting Remedial Strategies for an Urbanized Watershed with Multiple Stressors. Society of Environmental Toxicology and Chemistry, Newport, Rhode Island, April 2000.

Sorell,T.L. and D.B. Tompkins. Evaluation of Ecological Risk in an Estuarine Marsh Post Remediation: Comparison of Field-Collected and Laboratory-Based Sediment to Tissue Bioaccumulation. Society of Environmental Toxicology and Chemistry, North Atlantic Chapter, Newport, Rhode Island, April 1996.

Tompkins, D.B. Monitoring the Re-Establishment of Biotic Communities in a Disturbed Wetland. American Communities Working for Wetlands Conference, Washington D.C., May 1997.

Tompkins, D.B., J .A. Gilbert, and D. M. Lebek. Development of a Material Consolidation and Waste Elimination Plan (MCWEP) for the USPS. Mid-Atlantic Industrial and Hazardous Waste Conference. Buffalo, New York. July 1996.

Tompkins, D. B. and T.L.Sorell. Evaluation of Ecological Risk in an Estuarine Marsh Post Remediation: Evaluation of Multiple Environmental Endpoints. Society of Environmental Toxicology and Chemistry, North Atlantic Chapter, Newport, Rhode Island, April 1996.

Tompkins, D.B., and Sorell, T.L., Development of a Biota Monitoring Program to Assess Effectiveness of Sediment Remediation. Society of Environmental Toxicology and Chemistry, North Atlantic Chapter, Plymouth Massachusetts. July 1995.

Tompkins, D.B., Wetlands: Current status and trends. Sullivan County Community College, Fallsburgh, New York. October 1990.

Tompkins, D.B., Natural Revegetation of Abandoned Surface Mines in Northern West Virginia. M.S. Thesis, West Virginia University, Morgantown, West Virginia. pp. 99, 1981.

Tompkins, D.B., and Woehr, J.R. Influence of Habitat on the Movements and Densities of Snowshoe Hares. Transactions of the Northeast Wildlife Society, Providence, Rhode Island pp. 169-175, 1979.

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JULIA CRANER
Project Manager/Environmental Scientist

Education
- MS, Hydrogeology
- BA, Geology

Professional Registrations
- NJ DEP Surface Evaluator

Professional Affiliations
- National Groundwater Association

Training
- OSHA HAZWOPER and Refreshers
- Loss Prevention System

Summary of Experience

As a Hydrogeologist/Environmental Scientist, Ms. Craner coordinates, manages, and assists with numerous environmental services. Ms. Craner has over 18 years of experience in hydrogeologic, environmental, and underground and aboveground storage tank investigations and remediation projects, as well as environmental real estate site assessments, environmental assessments, environmental impact statements, and environmental management and compliance. She has been involved in numerous environmental investigations involving hydrogeological investigations, and contaminated soil/groundwater investigations. She has also done many NEPA environmental assessments and has broad experiences in environmental management and regulatory compliance in New York and New Jersey.

Select Project Experience

- *National Grid, Upstate NY:* Ms. Craner was responsible for developing the NEPA Environmental Assessment associated with the application for an Incidental Take Permit and Habitat Conservation Plan for a linear utility project in upstate NY. The current conditions, potential impacts, and mitigation measures for physical, biological, environmental, economical, and social environments were evaluated for several alternatives under the proposed project. The project involved interaction with NYSDEC and USFWS.
- *US Postal Service, NY, NJ, MD, Puerto Rico, Virgin Islands:* Ms. Craner conducted Phase I Due Diligence assessments and NEPA Environmental Assessments at several postal facilities. She also played a major role in the development and preparation of Environmental Compliance Master Plans for vehicle maintenance facilities and large mail handling facilities; Environmental Compliance Guidebooks for postmasters; Spill Prevention and Pollution Control Plan for small post offices; a Material Consolidation and Waste Elimination Plan to consolidate and eliminate old and/or unused hazardous materials; a Waste Management Plan for a large mail processing and vehicle maintenance facility; and an Evaluation of Alternative Markets for undeliverable mail. Ms. Craner also conducted follow-up compliance audits of the postmaster guidebooks and master plans.
- *SEQRA Applications, Private Solar Farm Client, Hudson Valley, New York:* She spearheaded the application effort for expanded Environmental Assessment Forms (EAFs) needed for SEQRA review by municipalities at two proposed solar farms in the Hudson Valley region of New York. Under the EAF, ecological, geological, visual, agricultural, cultural, and economic resources were evaluated with respect to the proposed project.
- *Confidential Commercial Client, NY:* Ms. Craner assisted in the development of a Draft Environmental Impact Statement for a proposed landfill expansion in upstate New York. As well as describing existing conditions of various environmental resources, she evaluated potential impacts and mitigation measures for the proposed project and several alternatives.

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- *Confidential Commercial Client, NY, NJ, PA, MA, CT, MD, VA, TX:* She developed and managed ongoing programs for tank management, transformer management, asbestos and mold management for a 120+ facility commercial client. The programs entail monitoring, replacement/upgrading, removal, remediation, and regulatory compliance. Additionally, for many of the properties, she maintains and manages a multi-media environmental data management program for easy searching and retrieving of specific environmental information.
- *Confidential Commercial Client, NY, NJ, PA, MA, CA, CT, MD, VA, TX:* She has performed and provided third party review of over 100 Phase I Environmental Site Assessments during the due diligence process. Third party review involved the confirming/rebutting recognized environmental conditions.
- *RCRA Facility Investigation, Central Hudson Gas & Electric, Town of Lloyd, New York:* Ms. Craner managed a complex remedial investigation of several areas of concern via sampling of several media including subsurface soil, groundwater, and stream sediment. She evaluated data and prepared a detailed report. All but one AOC received No Further Action determinations by the NYSDEC as a result of this work.
- *Wetland Remedial Investigation, Central Hudson Gas & Electric, Town of Lloyd, NY:* She is currently managing remedial investigation of PCB impacts in wetlands. She oversees sampling events and laboratory analysis using an involved decision matrix. She is responsible for evaluation of sediment data using total organic carbon concentrations and recommendations for additional sampling.
- *Private College, Newburgh, NY:* Ms. Craner managed an air emissions inventory project, which inventoried the many emission sources and determined whether registration and/or permitting were required with the NYSDEC. She was also involved in Phase I Environmental Site Assessments conducted at the college and the coordination of a UST removal project.
- *US Military Facility, MD:* Ms. Craner was involved in a fracture trace analysis to delineate preferential groundwater flow in the bedrock aquifer. She managed the potentiometric study on interaction between the shallow and bedrock aquifers at the site. Duties included electronic data recording equipment setup and installation, data collection, system maintenance, data analysis, and recommendations.
- *Fresh Kills Landfill, Staten Island, NY:* Ms. Craner managed the groundwater level database for the Fresh Kills multi-aquifer hydrogeologic investigation for the leachate mitigation system. She was responsible for management of manual water levels and continuous water level recorders, reduction analysis, determining saltwater intrusion affects, and interpretation of groundwater data.
- *USEPA ARCS Sites, NY:* Using the PREscore program, she conducted evaluations of several USEPA ARCS sites in New York to determine their eligibility for Superfund including file reviews, data analysis and interpretation, and evaluation of groundwater, surface water, soil, and air pathways.

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- *Confidential Commercial Client, NJ:* Ms. Craner managed remedial sampling activities and conducted data analysis and reporting at petroleum-contaminated and solvent-contaminated industrial sites undergoing bioaugmentation. Projects included monthly sampling, data analysis, trend analysis, plume delineation, groundwater flow determination, and reporting. She was responsible for the development and state approval for a Classification Exception Area where there were groundwater exceedances, and she successfully applied for Discharge to Groundwater Permit-By-Rules for the bioremediation system.

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KATHERINE LYNN WOLFF
Environmental Permitting and Planning Project Professional

Education

- MS Environmental Management, Duke University
- BS Geology with minors in Biology and English, Bryn Mawr College

Professional Affiliations

- Society for Ecological Restoration
- Ecological Society of America
- American Water Resource Association

Certifications/Training

- Wetland Delineation Training – Wetland Training Institute
- U.S. Army Corps of Engineers Wetland Delineation Regional Supplement Training – Wetland Training Institute
- Certificate in Geographical Information Systems and Geospatial Analysis, Duke University
- Loss Prevention System Training Certification

Summary of Experience

Ms. Wolff specializes in environmental and ecological science and policy, and geographic information systems (GIS)/geospatial analysis. She has more than 9 years of professional experience involving permit assistance, wetland delineation, reconnaissance and mitigation, watershed and water quality assessment, stream-channel and habitat characterization, plant, macroinvertebrate, and vertebrate surveying, groundwater sampling, piezometer monitoring, and sediment sampling, coring and remediation. In addition to skills acquired through more than ten years of fieldwork, her expertise includes a solid understanding of Federal, State, and local permitting, and a strong background in the uses and applications of GIS and geospatial analysis. She has experience in environmental permitting under the Clean Water Act, Endangered Species Act, NEPA, U.S. Army Corps of Engineers (Section 10 and 404), as well as the Federal Energy Regulatory Commission (FERC filing). She has collaborated extensively with federal, state, and local regulatory authorities to assist clients in securing the appropriate permits for their projects. She has worked across the U.S., from estuaries in North Carolina to Texan floodplains to the Puget Sound region. She also has extensive experience conducting fieldwork abroad in Southeast Asia, Madagascar, and Australia.

Select Project Experience

Energy Projects

- ***Brownlee to Beech Bottom Waterline Project, Brooke County, West Virginia.***

Managed a team of biologists to conduct natural resource assessments including wetland delineations, stream investigations, and an endangered Indiana bat habitat assessment for a 28-mile water supply line. The project extended between the Ohio River in Brook County, West Virginia to centralized impoundments located in Western Pennsylvania. Coordinated and managed development of wetland delineation and stream investigation reports and a bat habitat assessment report. Evaluated regulatory compliance with erosion and sediment control best management practices outlined by the West Virginia Department of Environmental Protection and oversaw environmental inspections of these practices as well as mitigation design and permitting. Facilitated client communications regarding rare, threatened, and endangered species with governing agencies including the

U.S. Fish and Wildlife Service and the West Virginia Department of Natural Resources. Managed preparation of a Pre-Construction Notification permit package including Section 10 permit and Nationwide 12 permit for the U.S. Army Corps of Engineers. The Nationwide 12 and Section 10 permits required for the construction, maintenance and repair of utility lines in waters of the U.S. (including the Ohio River) were approved and all clearances successfully obtained for the project.

- ***Gateway Engineers Natural Gas Projects, multiple counties in Pennsylvania.***

Managed a team of four biologists to conduct wetland delineations, stream investigations, and endangered Indiana bat habitat assessments for one compressor station, one meter site, and 18 linear natural gas pipeline projects ranging from one to ten miles in length. Coordinated and managed the production of wetland delineation, stream investigation, and bat habitat assessment reports, and facilitated client communications regarding rare, threatened, and endangered species with governing agencies including the U.S. Fish and Wildlife Service, the Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission.

- ***Erosion and Sediment Control Inspections, Laurel Mountain Midstream, LLC, Pennsylvania.***

Managed a team of erosion and sediment control inspectors to evaluate best management practices installed at 10 natural gas project sites in southwestern Pennsylvania. Served as lead technical reviewer of weekly erosion and sediment investigation reports.

- ***Laurel Mountain Midstream, LLC DOT Desktop Analysis and Agency Consultations, Pennsylvania***

Managed a team of environmental specialists and GIS technicians to evaluate more than 400 miles of legacy pipeline in western Pennsylvania. Conducted Pennsylvania Natural Diversity Index (PNDI) searches through the PADEP Natural Heritage Program to identify potential rare, threatened and endangered species along right of way proposed for clearing under Department of Transportation CFR 192 Title 49 regulations, and assisted with agency consultations to obtain clearance for the project. Additionally supervised development of mapping to identify potential streams and wetlands along the entire 400 miles of right of way.

- ***ORU Environmental Impact Statement, Goshen, New York***

Coordinated a team of engineers, permitting specialists, environmental scientists, and CADD/GIS technicians to produce and submit an environmental impact statement for a proposed electrical substation in Goshen, New York.

- ***Appalachia Midstream Gas Services, LLC, Environmental Field Surveys and Permitting, North Central Pennsylvania***

Assisted in management of a team of staff biologists and preparation of water encroachment permits, ESCGP-1 permits, joint, and general permits for more than 17 linear natural gas line projects located in north central Pennsylvania. Served as a lead technical reviewer responsible for quality management of permit documents.

- ***Appalachian Gateway Project in Greene, Washington, Allegheny, and Westmoreland Counties, Pennsylvania and Harrison, Kanawha, Marshall, Wetzel, Barbour, and Doddridge Counties, West Virginia.***

Conducted agency consultation, drafted an Environmental Assessment, and led a team effort to prepare an Environmental Report (Federal Energy Regulatory Commission (FERC) Exhibit F-1) for FERC filing. The project involved the construction, maintenance, and operation of approximately 110 miles of new 20"-, 24"-, and 30"-diameter natural gas pipeline along new and existing rights-of-way, as well as four new compressor stations and upgrades to two existing compressor stations.

- ***Mine Permit Assistance for a Confidential Wind Farm Siting Project in Central Pennsylvania.***

Collaborated with the Pennsylvania Department of Environmental Protection, County Conservation District, and local planning office to coordinate environmental permitting and identify the locations of active and historic mines for a wind farm siting project. Researched mine permit records and conducted consultation interviews to collect mine ownership information and facilitate collaboration during the early stages of the permitting process.

- ***Environmental Permit Assessment for a Confidential Wind Farm Siting Project in eastern North Carolina.***

Supervised personnel to prepare a GIS-based data package and produce more than 30 maps for a wind farm siting study. Conducted a field visit to document potential cultural sites and environmentally sensitive features. Completed a regulatory review, and coordinated with municipalities to identify local wind ordinance requirements. Drafted an environmental review and permitting risk assessment for three potential wind farm sites.

Wetland Delineation, Mitigation, and Permitting

- ***Aberdeen Mill Mitigation Monitoring for Sierra Pacific Industries in Aberdeen, Washington.***

Conducted first annual wetland mitigation monitoring to gauge restoration success at a site established to mitigate the loss of wetlands filled during expansion of a lumber manufacturing facility. Monitoring included plant identification and determination of plant cover and health. Analyzed results of monitoring and assisted with native revegetation and invasive species removal at the restoration site.

- ***Burlington Mill Mitigation Monitoring for Sierra Pacific Industries in Mount Vernon, Washington.***

Conducted first and second annual wetland mitigation monitoring including plant identification and determination of plant cover and health. Analyzed results to gauge the success of compensatory wetland restoration following mill expansion. Drafted a monitoring report with recommendations for mitigation site maintenance

- ***Calbag Stormwater Permitting Assistance for Calbag Metals Co. in Tacoma, Washington.***

Conducted a wetland delineation and evaluated wetland, marine, and stream buffer functions for a proposed stormwater treatment facility and storage tank system. Assisted with the critical areas report. Results were incorporated into an environmental checklist developed in accordance with the Washington State Environmental Policy Act.

- ***Conibear Shellhouse Wetland Monitoring for the University of Washington in Seattle, Washington***

Performed a plant survey to monitor the success of a 0.5-acre mitigation site designed to enhance the structure and function of a portion of the Lake Washington shoreline and its buffer.

- ***Lost Lake Road Critical Areas Study for Aleksey Petrov in Snohomish, Washington.***

Conducted a wetland delineation following the U.S. Army Corps of Engineers 1987 Manual, using a Global Positioning System to locate wetland boundaries. Helped write delineation report for a proposed housing development on the site.

- ***West Alderbrook Lagoon Habitat Restoration for the U.S. Coast Guard in Astoria, Oregon.***

Assisted in developing the conceptual design for a habitat mitigation project to compensate for filling 0.79 acre of nearshore subtidal shallow-water habitat resulting from the construction of a rock seawall. Helped

draft a restoration implementation plan for the client based on tidal elevation models and data collected during site visits. Conducted a site assessment and plant survey to evaluate the status and health of existing upland and wetland habitat. Incorporated tidal elevation and plant inventory data to develop a habitat restoration design. Design involves breaching a dike to allow hydrologic exchange between the outlying lagoon and an isolated wetland area. The project will create habitat for juvenile spawning salmonids as part of a compensatory mitigation effort for the Coast Guard.

- ***Wetland 14 Monitoring for The Boeing Company in Puyallup, Washington.***

Conducted wetland mitigation monitoring to assess success of mitigation goals. Conducted field survey including plant identification, plant survivorship, tree growth, plant cover, and plant health. Used line intercept method to determine plant cover.

- ***Wetland Delineation and Permitting for George & Katie Dougherty in Clinton, Washington.***

Conducted wetland delineation following U.S. Army Corps of Engineers 1987 Wetland Delineation Manual in response to a stop work order. Land clearing for a development project had encroached into wetland buffer. Used Global Positioning System to locate wetland boundaries.

- ***Wetland Delineation for a Confidential Client in Gibson County, Indiana.***

Performed aerial, soil, and geological map interpretation to predict possible wetland area locations across a 250-acre site. Conducted a wetland delineation, evaluated mitigation opportunities for a proposed industrial development, and delineated the wetland edge using a Global Position System. Assisted with the wetland delineation report and a Phase I archeological survey.

- ***Wetland Delineation for a Confidential Client in Warren County, Indiana.***

Performed aerial, soil, and geological map interpretation to predict possible wetland area locations across a 250-acre site. Conducted a wetland delineation and delineated the wetland edge using a Trimble GeoXT Global Position System.

- ***Boat Street Marina Redevelopment and Permitting Assistance for the University of Washington in Seattle, Washington.***

Assisted in overseeing planting at an environmental mitigation site that converted 122 feet of concrete bulkhead to a gently sloping beach with native Northwestern riparian vegetation. Completed several plant inventories to ensure compliance with the shoreline restoration plan.

- ***Industrial Property Development, Wetland Delineation and Mitigation Plan for a Confidential Client in Western Washington.***

Delineated wetlands on 68-acre parcel for development of industrial property in the northern Puget Sound Area. The client proposed an advanced mitigation scheme to create 4 acres of new wetland habitat, enhance 1.4 acres of existing wetland, and preserve more than 150 acres of high-quality riparian wetlands along a major salmon-bearing river to mitigate potential loss of degraded wetlands on the industrial property.Stream Assessment and Restoration

- ***Biological Stream Survey for the U.S. Federal Highways Administration in Coffman Cove, Alaska.***

Assisted in monitoring of aquatic biota (fish and benthic macroinvertebrates) in streams affected by acid rock drainage along a 4.9-mile stretch of road. Conducted fish and benthic macroinvertebrate surveys upstream and downstream of culverts crossing the road corridor to evaluate whether aquatic biota were affected in fish-bearing streams within the study site. Used baited minnow traps to collect, identify, and measure juvenile and adult fish. Deployed 25 traps along multiple 100-meter transects in 11 streams. Conducted benthic macroinvertebrate surveys using kick nets and preserved recovered specimens for

laboratory analysis. Recorded additional environmental and habitat characteristics including gradient, flow, dominant vegetation, substrate composition, and habitat unit. Assisted in drafting a report detailing the results of this study.

- ***Confluence of Mill Creek & Green River Restoration for the City of Kent in Kent, Washington.***

The objective of this project was to create side channels to increase access to floodplain habitat for Chinook and other salmonids and to restore floodplain functions. Responsibilities included conducting a fluvial geomorphological study and biological analysis. Conducted a geomorphological survey to identify opportunities for habitat enhancement and compiled and analyzed field data to develop a complete geomorphological description of the project reaches. Synthesized this information according to the standard EPA Watershed Assessment of River Stability & Sediment Supply protocol. Evaluated fish habitat following the methods outlined by the Washington Forest Practices Board. Applied the Habitat Equivalency Analysis model to evaluate increased values in habitat resulting from implementation of the restoration plan.

Miscellaneous Environmental Projects

- ***Tree, Shrub, and Endangered Habitat Survey, Sacramento River Bank Protection Project for the U.S. Army Corps of Engineers in Sacramento, California.***

Conducted annual reconnaissance and field review of the Sacramento River Flood Control System Surveyed trees and shrubs at 20 sites along the Sacramento River and its tributaries. Identified species, measured diameter breast height, and obtained GPS coordinates for each tree and shrub using a GeoXT GPS device and laser range finder mounted on a tripod. Mapped elderberry shrubs and beetle bore holes in accordance with California State guidelines regarding the preservation of the threatened Valley elderberry longhorn beetle.

- ***County-Wide Fluvial Geomorphological Survey for the Harris County Flood Control District in Houston, Texas.***

Inventoried fluvial geomorphological characteristics in 22 watersheds in Harris County. Collected data at each stream reach including longitudinal stream-channel profiles, stream-channel cross sections, grain-size analysis of bed and bank sediments, instream habitat evaluations, and riparian habitat evaluations.

- ***Groundwater Monitoring at Former Rhone-Poulenc Chemical Plant for Container Properties, Inc. in Tukwila, Washington.***

Conducted quarterly water level measurement and bi-annual groundwater sampling of performance monitoring wells to assess performance of RCRA interim corrective measures at site on the Duwamish Waterway affected by toluene, copper, and caustic releases. Interim measure consists of subsurface barrier wall, groundwater extraction wells to maintain inward hydraulic gradient toward areas of highest contaminant concentrations, and a groundwater treatment system to remediate affected groundwater.

- ***Corrective Measures Monitoring at Wood Treatment Facility for J.H. Baxter Wood Preserving in Arlington, Washington.***

Collected water level measurements as part of a corrective measures pilot study at a wood treatment facility affected by wood-treating chemicals, including pentachlorophenol, creosote, and areas of light nonaqueous-phase liquid (LNAPL). Prepared graphs of water level fluctuations to assess the effects of the bioremediation system, which consists of pumping wells combined with an engineered infiltration trench to provide aerobic biological treatment.

KLEINFELDER
Bright People. Right Solutions.

- ***Water Quality Assessment for the North Carolina Department of Water Quality in Beaufort, North Carolina.***

Conducted shoreline surveys and monitored water quality to assess impacts of runoff containing elevated levels of fecal coliform bacteria in developed and natural areas adjoining two tidal estuaries. Used GIS to produce land-use maps and evaluated best management practices (BMPs) for managing impacts of fecal coliform bacteria.

- ***Water Quality Assessment for the U.S. EPA in Washington, D.C.***

Assisted the U.S. EPA Office of Wetlands, Oceans and Watersheds in the Assessment and Watershed Protection Division by evaluating state assessment methodologies, and related documents pertaining to the Clean Water Act. Reviewed scientific, statistical, legal, and policy documents and integrated them into guidance for watershed managers throughout the U.S. Used GIS to analyze elements of the TMDL program within the context of the Clean Water Act.

Publications/Presentations

- 2009 "Restoring Urban Intertidal Salmonid Habitat, West Alderbrook Lagoon, Oregon." K. Wolff and K. McArthur. Society for Ecological Restoration International Northwest Chapter (SERNW) Regional Conference and Annual Member Meeting: Creating Thriving Rural and Urban Communities through Ecological Restoration, Lynnwood, Washington. May 19-22, 2009.
- 2006 "Salt Mineralogy of Las Vegas Wash, Nevada." B.J. Buck, K. Wolff, D. Merkler, and N. McMillan. Morphology and Subsurface Evaporation, Soil Science Society of America Journal. 70:1639-1651. 2006.
- 2004 "Relict Water Tables Indicated by Salt Mineralogy, Las Vegas Wash, Nevada USA." B.J. Buck, D. Merkler, K. Wolff, and N. McMillan. In Selim Kapur, Erhan Akca, Luca Montanarella, Arda Ozturk, A. Mermut, editors. 12th International Meeting on Soil Micromorphology, Adana Turkey; European Communities, EUR 21275 EN/2:5-7. 2004.

AMY S. GREENE
ENVIRONMENTAL
CONSULTANTS, INC.

SCOTT ANGUS
Project Manager

Years of Experience: 22

Education:
- Paul Smith's College, Paul Smith's NY; Major: Ecology and Environmental Technology
- Rutgers University/Cook College, New Brunswick, NJ; Continuing Professional Education Program

Special Qualifications:
- US Fish and Wildlife Service Recognized Qualified Bog Turtle Surveyor in NJ, NY, CT and MD.

Certifications and Training:
- Threatened and Endangered Species of NJ, Cook College, 1998, 1999, 2000, 2001, 2003, 2004
- Vegetation Identification for Wetland Delineation, Cook College, 1999; 2000
- Identifying Grasses, Sedges and Rushes, Cook College
- Winter Wetland Vegetation Identification, Cook College, 2004
- Managing Multiple Projects, Objectives and Deadlines; Skillpath Seminar, 2006.

KEY QUALIFICATIONS

Mr. Angus has over 22 years of professional experience in performing rare, threatened, endangered and non-game wildlife species surveys, wetland delineation and preparing environmental permit applications. Mr. Angus is recognized by the U.S. Fish and Wildlife Service as a Qualified Bog Turtle Surveyor in every state in the northern range, including New York and New Jersey. Mr. Angus has performed numerous Phase I Bog Turtle Habitat Surveys, Phase II Visual Bog Turtle Surveys and Phase III Bog Turtle Trapping Surveys.

Mr. Angus has been the project manager and field team leader for numerous threatened and endangered wildlife and plant species surveys throughout New York, New Jersey, Connecticut and Pennsylvania. Species investigated include reptiles and amphibians, including bog turtle and timber rattlesnake, freshwater mussels, terrestrial invertebrates, mammals including the Indiana bat and birds, including bald eagle, owls, hawks, grassland birds, redheaded woodpecker and piping plover. Mr. Angus has extensive experience in evaluation and assessment of avian species habitats, including neotropical and forest interior species. Mr. Angus has the skills to identify nearly all North American birds by call notes and songs. Mr. Angus is skilled at identification of all North American birds visually. Mr. Angus has assisted the NJ Non-game and Endangered Species Program (ENSP) with multiple endangered species projects including bog turtle projects. Mr. Angus has assisted in the preparation of habitat restoration plans for upland and wetland endangered and threatened species. He has been qualified as an expert witness in NJ Superior Court for wetland and threatened and endangered species issues.

Mr. Angus is proficient at wetland delineation. Mr. Angus has prepared applications for freshwater and tidal wetland permits for approval by the USACE and State agencies, as well as applications for projects under the jurisdiction of the NJDEP Coastal Program Permit rules. Mr. Angus has supervised and monitored construction projects for compliance with environmental permit requirements.

RELEVANT EXPERIENCE

Little Tor Substation, Town of Clarkstown, Rockland County, NY. *Client:* Orange and Rockland Utilities, Inc./CMX Inc. USFWS Recognized Qualified Bog Turtle Surveyor responsible for performing Phase I Bog Turtle Habitat Survey for the proposed new Little Tor Substation. Performed a Phase I bog turtle survey for all onsite wetlands and wetlands upstream and downstream of the site to determine if there were any wetlands that could be classified as potential bog turtle habitat. It was concluded that the proposed activities would have no direct or indirect impacts on bog turtles or bog turtle habitat. Herptile species observed during the survey included green frog (*Rana clamatens*), pickerel frog (*Rana palustris*), Northern gray treefrog (*Hyla versicolor*), and garter snake (*Thamnophis sirtalis*). The USFWS NY Field Office in Cortland, NY concurred with the findings.

Deerpark Substation Timber Rattlesnake Monitoring, Deerpark, Orange County, NY. *Client:* Orange and Rockland Utilities Company/CMX Engineering. Project Manager responsible for performing timber rattlesnake (*Crotalus horridus*) pre-construction surveys. After clearing the site of snakes Mr. Angus was responsible for observing remediation activities to prevent injury or death of timber rattlesnakes by machinery being utilized in a forested wetland to remove buried debris. Mr. Angus obtained a NY State Endangered Species License from the NYSDEC verifying his qualifications to work with the species. No timber rattlesnakes were captured or observed in the work area or during the pre-construction surveys.

Riverhead Resorts Project, Calverton, Suffolk County, NY. *Client:* Riverhead Resorts, LLC/Cameron Engineering & Associates, LLP. Project Manager and Avian Biologist responsible for extensive surveys for NY State rare, threatened and endangered grassland and pineland bird species on the approximate 800 acre closed Air Force Proving Grounds which has converted to predominantly grasslands. The remaining undeveloped portions of the site are dominated by pinelands. Mr. Angus was responsible for performance of a winter raptor utilization assessment and preparation of a Findings Report; performance of a nesting season survey for short-eared owl and northern harrier; and performance of State listed grassland and pineland bird species surveys. Both passive visual and auditory avian species surveys were conducted and a findings report was prepared. NY State listed bird species found during the surveys included: upland sandpipers, short-eared owls, long-eared owl, northern harriers, American kestrels, whip-poor-wills, horned larks, eastern meadowlarks, savannah sparrows, grasshopper sparrows and vesper sparrows. In addition, assisted another firm on the team with biological surveys which included herptiles, Lepidoptera and plants. During these surveys Mr. Angus found: Barrens buck moth (*Hemileuca maia* sp.), tiger salamander (NY Endangered, *Ambystoma tigrinum*), sickle-leaved golden aster (*Chrysopsis falcata*) and other rare Pinelands plants.

East Fishkill Site, East Fishkill Township, Dutchess County, NY. *Client:* Metropolitan Transportation Authority/NY State Troopers Day Engineering, Inc. Project Manager responsible for conducting a preliminary wetland investigation and a Phase I bog turtle survey for the MTA on a 70 acre site. Utilizing US Fish and Wildlife Service's National Wetland Inventory (NWI) mapping, NYSDEC wetland mapping and a field investigation performed a preliminary wetland investigation on the site. Identified and characterized wetland communities found on the site. Conducted a Phase I Bog Turtle Survey on emergent and scrub/shrub wetlands identified on the site. Potential bog turtle habitat was identified.

Readers Digest Property Improvements Phase II Visual Bog Turtle Surveys, Chappaqua, Westchester County, NY. *Client:* SG Chappaqua B, LLC/William Kenny Associates, LLC. Potential habitat was identified at the site and a Phase II Visual Survey for Bog Turtle was conducted. Conducted the surveys using USFWS protocols for bog turtles. Although no bog turtles found, numerous other reptile and amphibian species were located during the survey.

Sarles Street Proposed Subdivision, Mount Kisco, Westchester County, NY. *Client:* William Kenny Associates, LLC. Conducted a Phase I Bog Turtle Habitat Survey. Potential habitat was identified and after consultation with the USFWS, a Phase II Visual Survey for Bog Turtle was conducted. Conducted the surveys in accordance with USFWS protocols. Numerous reptile and amphibian species were found during the survey, although no bog turtles found.

Existing Wal-Mart Threatened and Endangered Species Habitat Survey, Brookhaven Township, Suffolk County, NY. *Client:* Whitestone Associates. Project Manager responsible for a Preliminary Wetland Investigation and a Threatened and Endangered Species Habitat Survey on a 23.6 acre site of which 14 acres were already developed with a Wal-Mart. This property is located in the Long Island Central Pine Barrens. No habitats for endangered species were located on the site. The site was clear of wetlands.

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STATEMENT OF PROFESSIONAL PRACTICE

February 2011

Graduated from the New York State College of Forestry at Syracuse University with a B.S. in Forestry and with a B.S. in Forestry from Syracuse University in 1960. Major in Forestry and Landscape Architecture.

Licensed to practice Landscape Architecture in the State of New York (1966), Licensed Landscape Architect in New Jersey (1985), and CPESC (Certified Professional in Erosion and Sediment Control) 1994. Member of the American Society of Landscape Architects, Soil and Water Conservation Society, International Erosion Control Association, and the Society of Wetland Scientists.

Site investigation and analysis for the delineation of Jurisdictional Wetlands for the U.S.Army Corps of Engineers, N.J.D.E.P., and N.Y.S.D.E.C. Robert G. Torgersen, Certificate in "Methodology of Delineating Wetlands", Cook College, 1990, and further continuing education courses in freshwater wetlands at Cook College since 1987. Delineation and evaluation of freshwater wetlands since 1986. A total of over 300 wetland boundary determinations and approvals by the ACOE and the NYSDEC to date. Preparation of freshwater wetlands mitigation and creation design services and field supervision of wetlands construction since 1986. Evaluation of site for presence/absence of Federal and State listed threatened and endangered species since 1986.

Conduct site biological investigations for existing ecological habitats including presence of threatened or endangered plant and animal species. Preparation of Environmental Impact Statement sections on environmental issues – freshwater wetlands, wildlife habitat and woodland habitat issues.

Certified Professional in Erosion and Sediment Control. Site design and consultation for large land development projects in erosion and sediment control and other environmental design concerns. Consultant to golf courses; New York State D.O.T.; New York City DEP; land development projects; residential subdivisions, etc. in these fields.

Established an independent practice on January 1971 at present address. The office staff consists of Robert G. Torgersen, Landscape Architect; Peter D. Torgersen, principal wetland specialist, Certificate in "Methodology of Delineating Wetlands", Cook College, 1991; one draftsman and one office assistant. A team approach is utilized in order to provide the best available professional service to a project. I team with appropriate specialists in related fields – engineering, landscape architecture, biological, archaeological, etc. for the best range of professional expertise for a particular project. This approach results in a well thought out design approach for a particular project.

Some representative projects and services follow:

MUNICIPAL PLANNING - Peekskill, N.Y., Jan Peek Square Urban Renewal; East Orange, N.J., East Orange Mall and Sanford / Evergreen Reconstruction and Park Project. Municipal Marina dredging, site renovation and parking reconstruction and Main Street Parking Lot re-design and reconstruction, Nyack Parking Authority, Nyack, NY. Nyack Park Commission, master plan for Memorial Park.

ENVIRONMENTAL PLANNING - preparation of environmental analysis, environmental assessments and environmental impact statements for projects including those under the jurisdiction of New York State S.E.Q.R. regulations. U.S. Army Corps of Engineers, N.Y.S.D.E.C., and N.J.D.E.P. jurisdictional wetland analysis, identification and delineation since 1986. Freshwater wetlands jurisdictional determination submittals and applications processed with these agencies in NY, NJ, & CT. Services include wetlands creation, restoration and mitigation planning and design. Investigations for presence/absence of threatened and endangered species as listed by the USFWS and the NYSDEC.

Design and preparation of soil erosion and sediment control plans and details, and storm water management planning and design. Preparation and design of water quality site analysis and erosion and sediment control plans for all land development projects. Conduct and prepare biological assessments and evaluations for sites under development for submittal to meet various governmental requirements and for environmental impact statements. Environmental consultant for golf course design and construction. Consultant for NYCDEP for sediment and erosion control for construction projects at Kensico Reservoir, Muscoot Dam and other projects in the NYC watershed. Consultant for NYSDOT for sediment and erosion control for construction projects associated with highway construction – Taconic State Parkway, # SH 9480 Contracts NYSDOT–D258434 and D258924.

PRIVATE RESIDENTIAL DESIGN - complete site and planting design for a wide range of private residences in the New York and New Jersey areas.

WATER QUALITY AND WETLAND DESIGN AND MITIGATION PROJECTS
(Work under the jurisdiction of agencies having jurisdiction, which could include the U.S.Army Corps of Engineers, NYS Dept. of Environmental Conservation, State of Connecticut and State of New Jersey DEP regulated wetlands)

Town of Cornwall, NY - Idlewild Creek Housing- 5.5 acre freshwater wetlands design and development at the Museum of the Hudson Highlands site; Town of Florida, NY - Viewpoint Realty Subdivision - 6 acre freshwater wetland mitigation design; Town of Chester, NY, Black Meadow Road By-Pass Freshwater wetland mitigation design. Town of Clarkstown, NY - Pelham West Subdivision and Stream Improvement - Stream environmental design and planting restoration. Many other water quality design projects to conform to EPA SPDES permits for stormwater discharges from construction activities - Rockland and Orange Counties, NY.; Hasty Hills Stables, Suffern, NY., manure and surface water treatment design and application.

Aquinas College – artificial turf soccer field (in progress); Nyack High School – reconstruction of athletic fields;

PUBLIC PARK GRANT APPLICATIONS - Village of Highland Falls, Roe Park; and Village of Kiryas Joel, N.Y., Orange County; 1994 Application for Municipal Park Project Grants under the Environmental Quality Bond Act of 1986, State of New York.

These projects have encompassed the entire scope of professional practice, which includes preliminary site investigation, site analysis and site design; preparation of environmental assessments and impact statements; development of preliminary site studies, design details and cost estimates; preparation of working drawings; site plans, grading and drainage plans, planting plans, soil erosion and sediment control plans, construction details and specifications; and field inspection of work under contract.

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BENJAMIN C. MUELLER, P.E.
NOISE CONTROL ENGINEER

Mr. Mueller is a principal of Ostergaard Acoustical Associates. Ben obtained his professional engineer licenses based on his expertise in acoustics. He oversees acoustical testing, analysis, and the development of solutions for architectural, environmental, and industrial projects. Ben also provides scientific counsel.

ARCHITECTURAL ACOUSTICS EXPERTISE

Adept at noise control for building systems, including HVAC, emergency generators, and rooftop equipment. Experienced at predicting noise levels in buildings and identifying appropriate noise control measures, including needed sound-isolating constructions. Many architects and mechanical engineering firms have benefited from Ben's expertise.

ENVIRONMENTAL ACOUSTICS EXPERTISE

Skilled at developing and analyzing 3D computer-based acoustical models. These models are designed to evaluate both existing and future site emissions. Ben supervises and carries out on-site acoustical testing, development of noise control solutions, and planning board testimony. Representative clients include PSE&G, PECO Energy, Orange & Rockland Utilities, and Nextel.

INDUSTRIAL NOISE CONTROL

Expert at evaluating noise in manufacturing environments and identifying noise control measures to conserve hearing and create workable acoustical environments. Develops noise solutions for equipment and whole facilities as appropriate. Clients served include Boehringer Ingelheim Pharmaceuticals, Inc., Johnson & Johnson, Philadelphia Gas Works, Gerdau AmeriSteel, OraSure Technologies, and Synthes.

SCIENTIFIC COUNSEL

Provides expert testimony before planning boards, zoning boards, and courts concerning acoustical impact and noise code compliance. Testimony concerns both existing and future conditions. Clients typically include utilities, pharmaceutical corporations, and commercial organizations.

EDUCATION

Bachelor of Science in Mechanical Engineering
Villanova University
1999

Master of Mechanical Engineering
Stevens Institute of Technology
2010

REGISTRATION

Professional Engineer, New Jersey and Oregon

PROFESSIONAL MEMBERSHIPS

Acoustical Society of America

American Society of Heating, Refrigerating, and Air-conditioning Engineers

American Society of Mechanical Engineers

Institute of Noise Control Engineering

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JOHN ERDREICH, PH.D., FASA

SCIENTIFIC COUNSEL IN ACOUSTICS

Dr. Erdreich is Of Counsel to Ostergaard Acoustical Associates. He has specialized in perceptual aspects of noise and construction deflects that degrade acoustical privacy, produce unintelligible communication, and distracting sound that compromises the quality of residential or commercial spaces. In addition to 40 years of experience addressing these issues, he is also experienced with related issues of vibration effects on people and animals.

He has held positions as a professor in the University of Oklahoma College of Medicine and the University of Cincinnati, as a research scientist at the National Institute for Occupational Safety and Health, and has taught architectural acoustics a the New Jersey Institute of Technology. He has published numerous articles in technical books and journals.

REPRESENTATIVE PROJECT EXPERIENCE

- **Construction Defects**
  Reviewed drawings to evaluate noise and vibration complaints in residential and commercial buildings. Measured noise intrusion through structures to provide a basis for testimony.

- **Accident Reconstruction /Evaluation**
  Simulated accident situations to measure sound levels of warning signals and competing sounds. Evaluated audibility of the warnings and, in the case of moving vehicles, the time for which the warning was audible. Developed and presented examples of the auditory environment of the accident during trials.

- **Regulatory Experience**
  Developed national standards for use in lieu of federal regulations. Prepared guidelines for venues in which speech intelligibility is critical including the Federal Courts Design Guide (acoustic guidelines) and American National Standard for Classroom Acoustics.

- **Occupational Hearing Loss**
  Carried out independent evaluation of claims for compensation for occupational hearing loss by comparing the degree of impairment, age, gender, and exposure of the claimant with the hearing levels of similar national and international populations. Also, for cohorts of claimants, evaluated their exposure and impairments against the available national and international databases. For many industrial situations I have been able to reconstruct the employees exposure retrospectively. Presented testimony in state, federal, and worker compensation courts.

- **Land Use Development**
  Supported private and municipal developers to qualify projects for approval for Federal funding through the Department of Housing and Urban Development.

- **Biological Effects of Vibration**
  Assisted defense team to evaluate OSHA investigation of hand-arm vibration in a turbine repair facility. Investigated vibration effects on heavy machinery operators. Evaluated potential effects of construction and blasting vibration on laboratory animals.

Complete Curriculum Vitae available on request.

EDUCATION

Doctor of Philosophy, University of Michigan, 1977
Physiological Acoustics

Bachelor of Science, Newark College of Engineering, 1965
Electrical Engineering

PROFESSIONAL

Fellow, Acoustical Society of America

Member, Institute for Noise Control Engineering

Senior Member, Institute of Electrical and Electronic Engineers

Member, Association for Research in Otolaryngology

Consultant to working groups in ANSI Acoustics Secretariat

Past President National Council of Acoustical Consultants

Former Director, Council for Accreditation in Occupational Hearing Conservation (CAOHC)

Past Chair, Acoustical Society of America Technical Committee on Biological Response to Vibration

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JOSEPH A. KEEFE
SENIOR ENGINEER

Mr. Keefe is a musician and physicist with seven years of acoustical consulting experience. Joe's fine analytic skills include Room Acoustics Design, Sound Isolating Construction, Sound System Design, HVAC Noise Control, and, Community Noise Evaluation and Control.

Building Acoustics Experience

- Grounds for Sculpture, Hamilton, NJ — New gallery performance space room acoustics design and HVAC noise control.
- Sussex County Community College Theater — Acoustical designs for room acoustics, sound system, and HVAC noise control.
- Rutgers Livingston Campus Theaters — Developed sound isolation between theaters and overhead dorm rooms.
- Technical support for numerous school acoustical designs.
- Auralization Demonstration for PS-175, Bronx, NY.
- Sound system designs for many auditoriums.
- Ellis Island Registry room — Sound system modeling for this challenging space.
- Bedens Brook Club — Developed methods for controlling the build-up of noise in dining rooms.
- 34th Street Station, No. 7 Subway Extension, Manhattan —room acoustics, public address system design, and HVAC noise control.

Environmental Noise Evaluation and Control Experience

- Noise evaluations for pharmaceutical and other manufacturing plants.
- New York Jets Training Facility, Hempstead, NY and Florham Park, NJ.
- Site noise evaluations for many schools where traffic, subway, aircraft, and railroad noise are a concern.
- NYC Noise Code Compliance for New 34th Street Station on No. 7 Subway Line.
- Metro-North Railroad Horn Test Protocol to develop new American National Standard.

EDUCATION

Bachelor of Arts in Physics and Music
Duke University, 2004

AutoCAD Authorized Training, 2004

EASE Modeling Software Level II Training, 2006

PROFESSIONAL MEMBERSHIPS

Acoustical Society of America

Institute of Noise Control Engineering

Ryan W. Fandray, EPI, PG

Environmental Geologist

Registrations

Professional Geologist,
Pennsylvania (PG004896)

Certifications/Training

Environmental Professional Intern (EPI) #00061106
OSHA 29 CFR 1910.120-40 Hour Hazardous Waste Worker Certified
Commonwealth of Pennsylvania - PennDOT Level II Inspector
Environmental Professional Intern (EPI) #00061106
PLS-Cadd Overview Training (April 2005 & 2008/2009)
Fli-Map Overview Training (August 2005)

Educational Background

B.A. Environmental Studies/ Geology 2000
University of Pittsburgh
M.S. Earth Science
California University of Pennsylvania

Employment History

2007-present
DiGioia, Gray & Associates, LLC
Environmental Geologist
2000-2007
GAI Consultants, Inc.
Sr. Project Designer II
1999-2000
PA Dept. of Transportation
Geotechnical Intern
1996-1999
LTV Steel Company
Environmental Technician

Professional Affiliations

Pittsburgh Geological Society
Association of Environmental Engineering Geologists
Geological Society of America
American Institute of Professional Geologists
Institute of Professional Environmental Practice
Pike Run Watershed Association

Areas of Specialization

Mr. Fandray joined DGA in 2007 with a background specializing in geological, environmental, and geotechnical investigations for transportation, commercial, industrial and utility projects. The major projects in various areas of engineering and environmental geology include foundation investigations, site development, landfill siting and design investigations, siting of transmission lines, and design and analysis of various utility and transportation sector structures and/or foundations.

Professional Experience

Provide geotechnical services for the construction of a new Corporate Drive Substation and Transition Yard tap located Orangeburg, New York. Preliminary duties included site geology preparation, develop a subsurface program and coordinate with a drilling contractor. Field and design duties included monitoring oversight of the drilling and sampling to adjust the exploration program as it proceeded, analyze the sampling for geotechnical design parameters to be included into MFAD and provide a geotechnical report summarizing the findings and providing foundation recommendations. (November 2009 – January 2010) Orange & Rockland Utilities, Inc

Provide geotechnical services for the rearrangement of 138 kV steel pole structures surrounding the Sugarloaf Substation located at Chester, New York. Preliminary duties included site geology preparation, develop a subsurface program and coordinate with a drilling contractor. Field and design duties included monitoring oversight of the drilling and sampling to adjust the exploration program as it proceeded, analyze the sampling for geotechnical design parameters to be included into MFAD and provide a geotechnical report summarizing the findings and providing foundation recommendations. (September – October 2009) Orange & Rockland Utilities, Inc

Provide geotechnical recommendation services for distressed lattice towers 39-28 and 39-29 above a mine fire located near Powellton, West Virginia. Duties included site geology preparation, mining history and abandoned mine mapping retrieval and site reconnaissance. (August - September 2009) AEP – Roanoke Office

Provide geotechnical services for the relocation of the Dean Substation located at West Point, New York. Preliminary duties included site geology preparation, develop a subsurface program and coordinate with a drilling contractor. Field and design duties included management of the monitoring of the drilling and sampling to adjust the exploration program as it proceeded and provide a geotechnical report summarizing the findings and providing foundation recommendations. (August - September 2009) Orange & Rockland Utilities, Inc

Provide geotechnical engineering services for landslide distressed lattice tower structure 118 located in Guernsey County, Ohio. Duties included site geologic preparation, aid in developing a subsurface program and coordinate with the drilling contractor. Field and design duties included management of the drilling and sampling to adjust the exploration program as it proceeded, perform slope stability and provide a geotechnical design for the remediation. (June - August 2009) AEP – Gahanna Office

Provide geotechnical services for the addition of a 138 kV Take-off Structure in the Lovett Substation located at Stony Point, New York. Preliminary and field duties included site geology preparation, develop a subsurface program, coordinate with a drilling contractor and provide monitoring of the drilling and sampling to classify the samples, prepare the logs of the borings, measure ground water levels, and adjust the exploration program as it proceeded. Design duties included modeling foundations with the MFAD software program for potential foundations to optimize foundation sizing and provide design specifications on the installation of the drilled shaft foundations. (March – August 2009) Orange & Rockland Utilities, Inc

Assist in the design and analysis of drilled shaft foundations at an AEP substation location near Cressap, West Virginia. Duties included modeling foundations with the MFAD and CUFAD software programs for potential foundations to optimize foundation sizing and provide design specifications on the installation of the drilled shaft foundations. AEP Kammer Substation

Provide geotechnical and geological engineering services for a proposed 300-mile long, 765-kV and 500-kV line transmission line in West Virginia, Virginia and Maryland. Duties included identifying geologic impact areas and the development of conceptual foundation alternatives for transmission line structures for differing geological formations. PATH West Virginia Transmission Company, LLC

Provide geotechnical and transmission engineering services for multiple upgrades, up-ratings and reroutes for multiple transmission lines. Duties include issuing multiple Letters of Notification and Construction Documents for multiple 138 kV lines and provide evaluations on voltage upgrades from 69 kV to 138 kV on multiple transmission lines. Additional work included structure relocations and re-conductoring along several routes along with subsurface exploration work. Duquesne Light

Provide preliminary geotechnical engineering services for site development of a major urban hospital facility in Monroeville, Pennsylvania. Preliminary information regarding subsurface conditions for multiple building structures and determining treatments on a large fill embankment was completed. Duties including monitoring and description of the subsurface investigation sampling to identify potential implications on foundation and site development. UPMC

Provide geotechnical site grading options and stabilization schemes for the substation expansion at the Logan's Ferry Substation. Duties included site geology investigation and review of previous work by others to develop preliminary site grading and potential structural elements for a substation expansion into a potentially landslide susceptible slope area. Duquesne Light

Performed cursory bridge inspections on three structures for the approach road to the Black Oak Substation near Dawson, MD. Duties included a visual inspection of the structures and determine the impacts from accumulated road gravel on the structures. Allegheny Energy

Perform preliminary engineering and develop a construction cost estimate for the relocation of a tower structure to accommodate Pennsylvania Turnpike roadway widening in Allegheny County, Pennsylvania. Preliminary engineering duties included PLS-CADD modeling of existing and proposed conditions to determine structure dimensions and relocation advantages. The cost estimate included engineering costs of structure fabrication, foundation, line relocation and erection data along with potential subsurface investigation and surveying costs. Duquesne Light

Perform preliminary engineering and develop a construction cost estimate for the relocation of a tower and h-frame structure to accommodate Pennsylvania Turnpike roadway widening in Allegheny County, Pennsylvania. Preliminary engineering duties included PLS-CADD modeling of existing and proposed conditions to determine structure dimensions and relocation advantages. The cost estimate included engineering costs of structure fabrication, foundation, line relocation and erection data along with potential subsurface investigation and surveying costs. Duquesne Light

Design and analysis of four light pole drilled shaft foundations at a Ligonier Ball Field location in Ligonier, Pennsylvania. Duties included modeling foundations with the MFAD software program potential foundations to

optimize foundation sizing and provide specifications on the installation of the drilled shaft foundations. Cenkner Engineering

Provide design, analysis and investigation activities for multiple 138 kV transmission line rearrangements between the Cheswick and Logans Ferry Substations. Duquesne Light

Provide preliminary geotechnical engineering services for a submarine conduit crossing of the Ohio River backchannel between Brunot Island and Esplen Substation. Duties included site reconnaissance, site geology preparation, development of a subsurface program and contract documentation. Duquesne Light

Provide geotechnical engineering services for an underground 345kV conduit relocation associated with the new arena located on the east side of the City of Louisville, Kentucky. Duties included site geology preparation, develop a subsurface program, coordinate with a drilling contractor and provide monitoring of the drilling and sampling to classify the samples, prepare the logs of the borings, measure ground water levels, obtain bulk thermal samples where appropriate and adjust the exploration program as it proceeded. USi Corp. – Louisville Gas and Electric

Provide geotechnical engineering services for both heavy and light loading conditions associated with a new substation in the northern Virginia area on a former ash fill site. Duties included site geology preparation, coordinate with a drilling contractor and provide monitoring of the drilling and sampling to classify the samples, prepare the logs of the borings, measure ground water levels, obtain relatively undisturbed samples and bulk samples where appropriate and adjust the exploration program as it proceeded. Additional office duties included laboratory testing evaluation, site history investigation and report preparation that identified foundation options for structures and equipment associated with a new substation. Dominion Technical Solutions – Virginia Electric Power (Possum Point PS Ash Disposal Site)

Provide final geotechnical services for a transmission line crossing over the Ohio River. The Sewickley Loop Project consisted of six borings for structural information on sizing for deep foundations. Duties included site geology preparation, retain a drilling contractor and provide monitoring of the drilling and sampling to classify the samples, prepare the logs of the borings, measure ground water levels, obtain relatively undisturbed samples where appropriate and adjust the exploration program as it proceeded. The span included both Moon Township and Sewickley Borough. Duquesne Light

Provide preliminary geotechnical engineering services for a proposed 50-mile long, 500-kV and 230-kV line transmission line in southeastern Virginia to serve the electricity demand of the Hampton Roads and Outer Banks of North Carolina. Duties included development of conceptual foundation alternatives for the transmission line structures for differing geological formations and provide a scope of work for the final geotechnical investigation. Dominion Technical Solutions

Solid waste landfill application study that included a subsurface boring and sampling investigation for geologic, hydrogeologic and geotechnical information. As part of the development of a new landfill, the geology and hydrogeology of the site was investigated by developing a subsurface investigation plan. Implementation of the subsurface investigation plan included; subsurface soil and rock sampling, open-hole hydraulic testing, piezometer and well installation, single well aquifer testing, and geologic and hydrogeologic mapping. Information gathered from the subsurface investigation was incorporated into a permit application for approval by the VADEQ. Additional geologic reconnaissance and mapping of the landfill and overall property boundaries was completed. Coal combustion byproduct landfill in Virginia City, Virginia. Southwest Virginia Power Plant, Dominion

Provide slope stability modeling and analyses for a proposed Ammonia Plant at the W.H. Sammis Plant in Stratton, Ohio. Slope stability analysis using the program PCStable, was conducted to determine limiting equilibrium conditions and post construction global stability. First Energy Corporation

Construction monitoring of underground 138kV and 345kV conduit installation in the east side of the City of Pittsburgh for Duquesne Light Company. USI Corporation

Performed mine stabilization planning and stability analyses which included geotechnical details for a proposed development consisting of multiple retaining walls and large fill volumes over mine spoil backfill in Allegheny County, PA. Faisson Development

Performed subsurface boring/sampling monitoring for proposed FGD installation, ancillary equipment and building installations for the Allegheny Energy - Hatfield's Ferry Power Station. Washington Group International

Ryan W. Fandray, EPI, PG
Environmental Geologist

Performed subsurface boring/sampling monitoring for the proposed IGCC project at the AEP - Mountaineer Power Station in New Haven, West Virginia. American Electric Power / Bechtel

Performed subsurface boring/sampling monitoring for the proposed SRC foundation installation at the Allegheny Energy – Ft. Martin Power Station. Washington Group International

Retail development investigation for the development of a report containing information regarding subsurface conditions, material design parameters, and bearing capacity to enable the client to design shallow foundations for multiple buildings. Duties including monitoring and description of the subsurface investigation sampling, geological background information and report preparation. Hawk Development, Cranberry, Pennsylvania / Haine Freedom Retail Associates

Power Station near Masontown, Pennsylvania. Allegheny Energy, Inc.

Provide verification and support of drilling and grouting of an abandoned deep mine for the proposed shallow foundations for a parking lot addition at the U.S. Department of Veterans Affairs (VA Hospital), Pittsburgh Pennsylvania. RTKL Associates, Inc

Perform clearance study for Duquesne Light Company transmission lines for potential voltage upgrade in Allegheny and Beaver Counties with the use of Flip7 lidar survey data and PLS-CADD models. Line assessments for Tap 388 Legionville to Koppel Steel, Hopewell to Koppel Steel, Dravosburg to Wilmerding and Phillips to Hopewell. Duquesne Light Company

Performed geologic services for the Pennsylvania Department of Transportation District 11-0 under Geotechnical Open-End Contracts 116735 & E00104. Includes site reconnaissance and investigative documentation of mined areas, slope movements, and various PENNDOT transportation facilities. Perform literature search of geological/geotechnical features on projects and review of project submittal for all phases of design and construction.

Performed subsurface boring/sampling monitoring along with site remediation work in southern Maryland for the Cove Point Expansion project. The investigation included both land and water borings in Calvert / Prince Georges / Charles and St. Marys' Counties. Dominion

Subsurface boring/sampling and piezometer installation for an ash site extension permit for the Hatfield Ferry Power Station, CCB Disposal Landfill, Greene County, PA. Allegheny Energy, Inc.

Foundation and potential karst investigation for the Centre County Compressor Station. Duties including monitoring and description of the subsurface investigation sampling along with site remediation work, Pleasant Gap, PA. Dominion

Foundation investigation for the development of a report containing information regarding subsurface conditions, material design parameters, and bearing capacity to enable the client to design shallow foundations for multiple building additions. Duties including monitoring and description of the subsurface investigation sampling. U.S. Department of Veterans Affairs (VA Heinz Hospital), Fox Chapel, Pennsylvania / Alpha Corporation, Inc.

Foundation investigation for the development of a report containing information regarding subsurface conditions, material design parameters, allowable end bearing pressures, and side shear strengths for rock and soils settlement and bearing capacity to enable the client to design deep or shallow foundations for a parking lot addition. Duties including monitoring and description of the subsurface investigation sampling. U.S. Department of Veterans Affairs (VA Hospital), Pittsburgh Pennsylvania / RTKL Associates, Inc.

Solid waste landfill application study that included a subsurface boring and sampling investigation for geologic and hydrologic information, along with potential borrow source areas for the Quarrier Landfill Area "C" of the John E. Amos Electrical Generating Station, St. Albans, West Virginia. American Electric Power

Annual dam inspections:

Keystone (October 2004)
Two Lick Creek (October 2004)
Deep Creek (October 2004)
Stonecoal (November 2004, October 2006)
Allegheny Energy, Harrison Power Station, Sedimentation Pond No. 1 Dam (October 2006)

Subsurface boring/sampling investigation and Engineering Report preparation for Oversteepened Rock Embankment and Multiple Retaining Structures on SR 0088, Section A04, Library Road, Allegheny County, PA. Pennsylvania Department of Transportation, District 11-0

Multiple Final Geotechnical Design activities for the SR 0079, Section A12 Roadway Reconstruction project. Final design activities included: prepare Final Design Geotechnical Engineering Report, geotechnical design of large diameter drilled caisson retaining structure, geotechnical foundation design for high-mast lighting and sign structures, Structure Foundation Reports for multiple bridge replacements or rehabilitation, abandoned mine grouting specifications for multiple construction activities, and the development of construction provisions and geotechnical details for the roadway construction. Allegheny County, PA. Pennsylvania Department of Transportation, District 11-0

Subsurface boring/sampling investigation and Final Design Geotechnical Engineering Report preparation for Bridge Replacement on SR 0048, Section A11/A16, Mosside Boulevard Bridge, Allegheny County, PA. Pennsylvania Department of Transportation, District 11-0

Subsurface boring/sampling investigation and Structure Foundation Report preparation for Bridge Replacement on SR 3026, Section A01, Millers Run Road Bridge, Allegheny County, PA. Pennsylvania Department of Transportation, District 11-0

Subsurface boring/sampling investigation and Engineering Report preparation for roadway relocation on SR 0088, Section A09, Library Road, Allegheny County, PA. Pennsylvania Department of Transportation, District 11-0

Subsurface boring/sampling investigation and Engineering Report preparation for South Wall Design of S.R. 4034, Section A70, Erie East Side Access Highway, Erie County, PA Pennsylvania Department of Transportation, District 1-0

Performed subsurface investigation for identification of deep mine conditions in Pittsburgh Coal seam. Monitored, classified, and logged deep borings. Work involved geophysical survey of completed holes. Survey included resistivity, gamma, video and acoustic viewing of open bore-holes. Correlation of boring logs and geophysical survey for determination of subsidence features at completion of field exercises for report preparation. Duke-Flour Daniel Corporation

Paul G. Cass, P.E.

Associate – Sr. Consultant Transmission Line Engineering Group

Professional Registration

Professional Engineer
Pennsylvania, New York, Virginia & New Jersey

Educational Background

B.S. Civil Engineering, 1972
University of Pittsburgh

M.S. Civil Engineering, 1975
University of Pittsburgh

Employment History

2007-present
DiGioia, Gray & Associates, LLC
Associate

1994-2007
Duquesne Light Company
Principal Engineer

1981-1994
Duquesne Light Company
Sr. Engineer

1975-1981
GAI Consultants, Inc.
Geotechnical Engineer

1972-1973
GAI Consultants, Inc.
Geotechnical Engineer

Professional Affiliations

American Society of Civil Engineers, 1972 to present

Honors

Chi Epsilon (Civil Engineering Honorary Society)

Areas of Specialization

Transmission engineering including transmission line analysis and design; analysis and design of foundations for transmission and substation structures; transmission line siting and routing; maintenance and repair of transmission line and substation structures and foundations; analysis, design and modifications of microwave and antenna structures.

Professional Experience

As Group Manager of Transmission Line Engineering

Group Manager of Transmission Line Engineering at DGA which include responsibilities of transmission line & structure design, from inception through construction phases. Also included is the evaluations and assessments of existing lines and structures, including structural modeling and analysis, clearance studies, NESC Code conformance and design criteria evaluations.

Project Manager and Lead Engineer for the construction or relocation of fourteen 138kv transmission lines for Duquesne Light Co. The work included, line layout, line design, structure (towers, poles and steel h-frames) design, foundation design, letters of notification, permitting, material management and all construction documentation.

Authored a Manual on "Transmission Line Inspections, Recommendations, Maintenance and Work Management" for Duquesne Light Co. This comprehensive Reference Manual covers all aspects of inspecting and maintaining a transmission line system.

Project Manager for the Structural Evaluation and Modifications of Two 500 Ft Tall 345 kV Transmission Towers owned by ConEdison. This included addition of elevator platforms and tower reinforcement for pendulums to prevent conductor galloping.

Prepare and Instruct a Continuing Education Course in Transmission Line Design, Siting, Maintenance and Inspection for DGA engineers and engineers from outside utilities, such as Duquesne Light and Allegheny Power.

Project Manager for the design, permitting and construction documents for the relocation or construction of 14 transmission lines for Duquesne Light Company.

Project Manager and lead engineer on the development of a process and associated software which utilizes life cycle costing methods to optimize the design of transmission lines. This is a research project for the Electric Power Research Institute (EPRI). Project tasks included: Developed methodology to determine initial capital, operation, energy losses, transmission outage, maintenance and failure costs; prepared a spreadsheet program to determine costs during planning, line siting and final engineering phases; calculated present value costs for all cost items; integrated dependability concepts in the design of transmission lines; and prepared presentations and reports to EPRI on the project.

Project Manager for the inspection, design, and preparation of construction documents to rehabilitate and reconductor a 22-mile 138 kV transmission line originally constructed in 1916. Tasks included: inspections: tower and line modeling; line design; structure and foundation reinforcement; and the preparation of construction drawings for Reconductoring & structure reinforcement.

Project Manager and Lead Engineer of the analysis and recommendations of Allegheny Energy's 138 kV Whiteley Substation subsidence. In February, 2010, this 138 kV substation dropped 4.5 feet due to longwall mining underneath the substation. DGA predicted the types and area of overstress and also provided detailed recommendations to mitigate the problems. DGA monitored the station during the subsidence event and recommended adjustments and various schemes to be used to stabilize the structures. The substation successfully withstood the subsidence event and stayed energized during the event. (Duration 4 months.)

Engineer of record for the design of three new types of electric transmission lattice towers. The towers are for American Electric Power (AEP) with design by Brametal of Brazil. Responsibilities include checking and validation that the structures meet NESC Code, ASCE 10 for lattice transmission structures and AEP's Design specification.

Responsible for the analysis, evaluation of distress and recommendations for A-frame structure foundations for Florida Power & Light, St. Lucie-Midland transmission lines. DGA inspected, assessed, modeled and prepared repair recommendations to ascertain the cause and impact of cracking of foundations and anchor bolt section loss on hybrid concrete pile foundations used to support critical structures

Responsible for the inspection, assessment and recommendations of approximately 400 miles of 230kV and 69kV transmission lines for PPL. The purpose of this inspection/assessment process is to determine if the lines should be repaired (maintained), rehabilitated (reinforcement and/or upgraded) or rebuilt. This incorporated consideration of life cycle costs, structure reliability and deterioration.

Project Manager and Lead Engineer for the peer review of other consultants designs for reinforcement and upgrading of four different transmission lines. It included line modeling; design criteria; structure modeling; foundation analysis and the determination of the relative significance of the various deficiencies. This work was done for Orange and Rockland Utilities.

As Principal Engineer for Duquesne Light Company:

Project Engineer for the engineering, design and project management for construction and maintenance of transmission line, substation and underground facilities.

Developed and responsible for a periodic inspection program of all transmission line structures which is a comprehensive ground and aerial inspection program. Evaluation and analysis of the inspection data.

Development of maintenance/replacement recommendations and work management associated with the implementation of these recommendations.
Resident Geotechnical Engineer for foundation designs, construction issues and landslide evaluations

Performed engineering and investigative studies for the T&D Operating Departments

Project Engineer for the design of 138/345-kV Emergency Restoration Structures (11) utilizing a common pole and standard transmission hardware.

Project Manager for the development process of designing and building a temporary replacement 138-kV or 345-kV line in the event of a catastrophic structural failure.

Project Engineer for the designed "Controlled Failure" transmission structures modifications to suspension H-frame structures allowing the wire to fall to the ground just prior to a complete structure failure. This process was critical for tree "fall-in" areas.

Served as, "Expert Witness" for various lawsuits against Duquesne Light Company.

Manager for the development and utilization of the Transmission Line Structures (TLS) program for Duquesne Light Company consisting of:

A comprehensive database program covering transmission structure and transmission line design, references (drawings, etc.), inspection, materials, maintenance recommendations, and work management

Project Engineer for the analysis, strengthening and modification of microwave towers and other structures for the addition of antennas or microwave equipment and other associated appurtenances.

Supervisor of various technicians preparing construction drawings and the inspections for the transmission line engineering program.

Expert in the use of the Flip7 program and PLS-Cadd, PLS-Pole, and PLS-Tower programs

Integrated Lidar data into PLS-Cadd

Developed "Standards" and "Materials Management" documents using the PLS series programs

Developed and conducted a program to inspect, analyze and prepare recommendations for bowed, laminated wood cross-arms:

Video taped visual inspection of all cross-arms

Detailed inspections (coring) of over 500 cross-arms

All inspections and recommendations were conducted through a series of linked database programs.

Developed Standards for transmission line loadings; vault, manhole and ductbank construction; vault and precast manhole design; and the implementation of AutoCAD for transmission line and structural-type drawings.

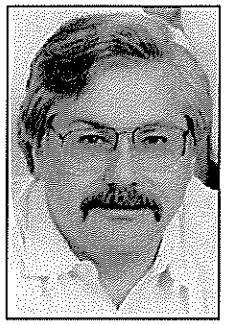
Wrote several engineering type computer programs utilizing QuickBasic and Autolisp. One program BIAXCOL3 (analysis of rectangular reinforced concrete columns under biaxial loads) was marketed very successfully by the American Concrete Institute for over eight years.

As Engineer for GAI Consultants, Inc.:

Inspected and evaluated 25 dams in Ohio

From 1979 thru 1981, contributed to the Drilled Pier Research Study for EPRI which included the development of a theoretical model for drilled pier behavior (evolved into the PADLL and MFAD computer programs), and the data reduction of all instrumentation and laboratory testing.

RESUME



NAME: H. Christopher Hooper

POSITION: Senior Project Manager

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Campbell, California 95008
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Email: chrishooper@enertech.net

EDUCATION: B.A. Mathematics with Computer Emphasis, San Jose State University - 1987
A.A. Fine Art, Foothill College - 1979

AREAS OF SPECIALIZATION:

Overall direction and supervision of EMF research projects; project coordination, scheduling and budgeting; employee recruitment, training, and management; engineering applications programming for personal computers; production, inventory and sales supervision; corporate advertising; environmental test and quality control evaluation.

SUMMARY OF EXPERIENCE:

1986 to Present Enertech Consultants: Senior Project Manager

Mr. Hooper has managed numerous applied research projects, including projects for public electric utilities, the Electric Power Research Institute (EPRI), the Department of Energy (DOE), and the California Department of Health Services (CDHS). His responsibilities include project organization and scheduling; development and training of measurement field crews; coordination with other managers and utility personnel; public presentations and training seminars; and preparation of research reports. Mr. Hooper was a co-principal investigator on the CDHS School EMF Exposure Assessment Project, where ninety schools throughout the state of California were measured over a three-year period to identify magnetic field sources and evaluate possible mitigation strategies. Mr. Hooper was project manager for EPRI's Nationwide Residential Magnetic Field Measurement Program, which involved three measurement teams simultaneously conducting field measurements within approximately 850 homes and with 23 different electric utilities across the United States. He has participated in a residential magnetic field measurement program involving survey measurements, design and implementation of an information database, and is co-author of an IEEE paper on magnetic fields in the home. Mr. Hooper has conducted electric and magnetic field measurements all across the U.S. and internationally for electric power utilities, private companies and individuals. He has participated in the design and development of several computer programs for evaluating exposure to 60 Hz electric and magnetic fields. He has participated in the research, development and testing of six new computerized magnetic field digital exposure meters and associated operational and data analysis software. Mr. Hooper has demonstrated computer software for the HVTRC staff at the EPRI High Voltage Transmission Line Design Seminar and for EPRI, and has co-authored an EPRI reference book with interactive CD-ROM on EMF management.

Mr. Hooper has performed computer modeling and electric/magnetic field calculations for numerous overhead and underground transmission line, distribution line, and substation projects. Modeling results have included two-dimensional contour maps, three-dimensional graphical plots, and calculated field levels along a pre-defined profile path. He has also utilized magnetic field shielding software to calculate field reductions due to inherent and specified shielding conditions, and has incorporated those results into the computer models for analysis. Mr. Hooper has also trained internal company staff and external company personnel on the use of EMF modeling software. In addition, Mr. Hooper has prepared numerous reports involving calculation and field reduction modeling for various clients.

1984 - 1985 Stanford Linear Accelerator Center: Production Supervisor

Mr. Hooper was Production Supervisor of the Arc Magnet Manufacturing Facility for the Stanford Linear Collider. Mr. Hooper supervised all aspects of arc magnet production, including component and product Q.C., magnet fabrication, mechanical inspection, coil winding, and inventory. His duties included production scheduling, manpower requirements and budgeting, personnel interviews and regulation, product acceptability, engineering evaluations and recommendations, and coordination with installation and other departments. Mr. Hooper supervised a thirty-man work force and million dollar inventory during his association with S.L.A.C.

PROFESSIONAL AFFILIATIONS: IEEE - Member

SELECTED PUBLICATIONS AND REPORTS:

"EPRI Appliance Measurement Study", R. Iriye and H. Christopher Hooper, Electric Power Research Institute, Palo Alto, CA, EPRI Technical Report 1020862, 2010.

"Characterization of Magnetic Fields from Power Distribution Transformers", H. Christopher Hooper, Electric Power Research Institute, Palo Alto, CA, EPRI Technical Report 1019010, 2009.

"Residential Magnetic Fields and Measures of Neutral-to-Earth Voltage: Variability Within and Between Residences", Rob Kavet, H. Christopher Hooper, Health Physics – The Radiation Safety Journal, Volume 97, Issue 4, October 2009.

"A Pilot Study for the Replication of the Draper Study of Leukemia, Brain Tumors, and Distance to Power Lines in California", L. Kheifets, H. Christopher Hooper, Electric Power Research Institute (EPRI), Palo Alto, CA, 1014939, May 2007.

"A Nested Case-Control Study of Brain Tumors Among Employees at a Petroleum Exploration and Extraction Research Facility", Patricia A. Buffler, et. al., Journal of Occupational and Environmental Medicine, Volume 49, Number 7, pg. 791-802, July 2007.

"Diurnal Characteristics of EMF Quantities: San Jose Measurement Study", Rob Kavet, H. Christopher Hooper, presented at the EPRI EMF Health Assessment & RF Safety Scientific Advisory Committee Meeting, Menlo Park, CA, June 4-5, 2007.

"Structural Steel Attenuation of External Magnetic Fields in Buildings", J. Hoburg, L. Zaffanella, et. al., Electric Power Research Institute (EPRI), Palo Alto, CA, 1014858, May 2007.

"EMF Workstation 2005", H. Christopher Hooper, presented at the EEI/EPRI International EMF Seminar, Washington DC, May 2007.

"Evaluation of Taiwan Residential Magnetic Field and Contact Voltage Measurement Study", H. Christopher Hooper, presented at the EPRI EMF Health Assessment and RF/Wireless Joint Area Council, Monterey, CA, February, 2004.

"3D Bumvision Software User Evaluation", H. Christopher Hooper, Electric Power Research Institute, Palo Alto, CA, EPRI Research Project TR-1006289, September 2001.

"Activity-Based Assessment of Magnetic Field Exposures", Michael Yost, Jennifer Touchstone, J. Michael Silva, H. Christopher Hooper, Luciano Zaffanella, Margaret Wrensch, Public Health Institute, California EMF Program, Oakland, CA, November 2000.

"The Electric and Magnetic Field Management Reference Book", L. Zaffanella, M. Silva, D. Fugate, J. Cooper, B. Clairmont, H. Christopher Hooper, T. Sullivan, J. Pappa, Electric Power Research Institute, Palo Alto, CA, EPRI Research Project TR-114200 (AP-114200), December 1999.

"An Evaluation of Electric Field Exposure Measurements Using the Positron Meter", J. Niple, R. Iriye, H. Christopher Hooper, Electric Power Research Institute, Palo Alto, CA, EPRI Research Project TR-111555, Final Report, November 1998.

"Electric and Magnetic Field Exposure Assessment of Powerline and Non-Powerline Sources for Public School Environments", L. Zaffanella, H. Christopher Hooper, Public Health Institute, California Department of Health Services, EMF Program, Emeryville, CA, October 1998.

"Pilot Study of Personal Magnetic Field Measurements Among Teachers", L. Zaffanella, H. Christopher Hooper, G. Lee, California Department of Health Services, Emeryville, CA, July 1998.

"Power Frequency Magnetic Fields in the Home", M. Silva, N. Hummon, D. Rutter, C. Hooper, IEEE Transactions on Power Delivery, Vol. PWRD-4, No. 1, pp. 465-478, January, 1989.

EMDEX System Manuals - Volume 1: User's Manual, Volume 2: Technical Reference Manual, EPRI EN-6518, Vol. 1, Research Project RP799-16; Enertech Consultants, October, 1989.

Domestic Magnetic Field Database: User's Manual and Documentation; EA-5972-CCML; EPRI Research Project RP799-16; Enertech Consultants, Computer Code Manual, August, 1988.

RESUME

NAME : Don Ruby

POSITION : Senior Software Engineer

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Campbell, California 95008
(408) 866-7267 x.13 FAX : (408) 866-7279
Email : druby@enertech.net

EDUCATION : A.S. Electronics, West Valley College – 1988
NCE: Novell Engineering Certification – 1996
MCSE: Microsoft Certified Systems Engineering Courses - 1997

AREAS OF SPECIALIZATION :

Overall direction and implementation on a variety of EMF calculation software projects; project coordination, scheduling and budgeting; engineering applications programming for personal computers; internal company networking, data archiving and retrieval systems, and company website development, implementation, and maintenance .

SUMMARY OF EXPERIENCE :

1998 to Present **Enertech Consultants: Senior Software Engineer**

Mr. Ruby has managed numerous EMF calculation software projects, including the current Electric Power Research Institute (EPRI) EMF Workstation 2008, implementation of the new Structural Steel magnetic field reduction and calculation module within the EMF Workstation, development of EPRI's Radio Frequency (RF) Estimator software program, and Enertech's EMCALC 2007 magnetic field instrumentation and data analysis software. Mr. Ruby has been responsible for the EMF Workstation project since the 2005 version, including updates, development and implementation of new features, maintenance releases, and coordination with BETA sites for testing and software approval from EPRI. One example of new developmental features is the Structural Steel module which is presently being incorporated into the EMF Workstation. This feature will allow for the calculation of the magnetic field reduction due to the presence of structural steel buildings.

In addition to the management and development of the EMF Workstation, Mr. Ruby has utilized the software for many electric utility projects by performing computer modeling of transmission and distribution lines and substations for clients such as Consolidated Edison Company of New York, Pacific Gas & Electric Company (PG&E), and Orange & Rockland.

EPRI's RF Estimator provides the capability of calculating radio frequency field intensities within a three-dimensional computer model from RF sources. Mr. Ruby was responsible for adding new features and capabilities to the existing software and producing a new release for EPRI.

Mr. Ruby has also been responsible for the maintenance and release of updated versions of Enertech's EMCALC software. This software accompanies the EMDEX II and EMDEX LITE magnetic field meters which

are sold around the world in 52 countries. The software allows users to modify the operating parameters of the recording field meters, as well as download and analyze the recorded measurement data. Features include two-dimensional contour plots and three-dimensional graphs of the magnetic field, statistical analysis, exportation of measurement data, and other various features.

In addition to his software engineering skills, Mr. Ruby is the Network Administrator for Enertech and maintains the network servers, software installations, and system updates. Mr. Ruby is also the webmaster for Enertech's website, and is responsible for maintaining website content, updates, and company information.

Mr. Ruby has also participated in magnetic field measurement programs. Mr. Ruby has served on the measurement team assigned to EPRI's Magnetic Field and Contact Voltage Survey program in conjunction with the University of California's Childhood Leukemia Study. Mr. Ruby has also supported field measurement projects for electric utilities, including PG&E.

1994 - 1988 Law Firm of Ropers, Majeski, Kohn, Bentley, Wagner, & Kane: Network Admin.
Mr. Ruby was the Network Administrator for the law firm, which included maintenance of their network systems, software installation and troubleshooting of individual computer systems for firm employees, and implemented software upgrades. Mr. Ruby was responsible for these tasks at the law firm's six different offices in California.

RESUME

NAME: James Michael Silva

POSITION: President - ENERTECH Consultants
494 Salmar Ave.
Suite 200
Campbell, CA 95008

EDUCATION: B.S. Engineering University of Alabama
M.S. Engineering Auburn University

PROFESSIONAL ENGINEERING REGISTRATION: California - **Electrical Engineering**

Other P.E. Licenses: New York, Texas, Connecticut, Massachusetts, Pennsylvania, Alabama, Nebraska.

SUMMARY OF EXPERIENCE:

Mr. Silva has worked at The Southern Company (1970-1979) in transmission line design. He was responsible for supervising the preparation of design specification, special environmental studies on corona, audible noise, vibration studies, and electric & magnetic fields, and technical planning relating to electric transmission lines. He has also worked in the substation-estimating group. He worked for approximately 1-1/2 years at the Electric Power Research Institute (1977-1978) as a project manager for AC and DC overhead lines. In this position, he directed many research projects relating to electric power transmission lines including: An evaluation of electric field effects of transmission lines (work done at Project UHV), Conductor Motion Reference Book, mcchanical vibration studies, study of flashover mechanisms for contaminated insulation, corona performance and audible noise, instrumentation development for HVDC lines and stations, design data for ±600 kV to ±1200 kV HVDC lines, and many related projects. He worked at GAI Consultants (1979-1982) in transmission line engineering projects. He also was a lecturer on transmission line engineering and vibration topics. In 1982, Mr. Silva founded ENERTECH Consultants, where he is currently employed as President and as a Research Engineer. ENERTECH is involved in a wide range of engineering and research projects including EMF exposure assessment for transmission lines and development of EMF software and instrumentation. Mr. Silva was a past advisor to the EPRI and Department of Energy research programs, and a participant in the biological effects technical exchange program with the Soviet Union (Cooperative Health Agreement on Bioeffects of ELF Fields). He is a past member of a National Electric Safety Code committee. Mr. Silva has also served as an advisor to a variety of technical committees related to EMF effects of electric power facilities.

Mr. Silva is currently an active member of the Bioelectromagnetics Society (BEMS) and a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE) Power Engineering Society. In IEEE he has served for ten years as the secretary of the Corona and Field Effects Subcommittee and is a member of the following working groups: AC Fields, DC Fields and Ions, Design and Environmental Considerations, and Environmental Treatment of Transmission Lines. He worked on the IEEE Team to prepare a guide booklet and layman/regulator's paper on corona and field effects of transmission lines. He has received awards and recognition for some of his published technical papers. He has delivered numerous lectures on EMF research activity and is very active in exposure assessment research. He has served as a scientific reviewer and publication referee for IEEE, BEMS, the Journal of Exposure

Analysis and Environmental Epidemiology, the Journal of Occupational and Environmental Hygiene, and the American Journal of Epidemiology.

Mr. Silva has been active on research projects to evaluate public exposure to transmission line electric and magnetic fields and is a frequent lecturer on EMF. The primary focus of his EMF research is the development of exposure assessment techniques, software, and instrumentation. Important elements in his exposure assessment experience have been the planning, organization and execution of exposure measurements at a variety of locations throughout the U.S. This has included Enertech's work on large EMF exposure assessments, such as: the EPRI 1000 Home Nationwide Study, the DOE 1000 Person Study, and the California State-Wide School Measurement Study, California Study of Pregnancy Outcomes, and the Nationwide study of cancer promotion in children. In addition, Mr. Silva has been involved in a variety of magnetic field mitigation and shielding projects. He has also directed work on state-of-the-art exposure instrumentation (sold in 58 countries), such as the EMDEX II, EMDEX-Lite, EMDEX-Snap, Amp-Logger, WaveCorder, and the GPS-Pal.

Mr. Silva has directed the development of EXPOCALC, a computer program that can be used to model transmission line electric and magnetic field exposure. He also wrote the technical manual that describes EXPOCALC. The software uses data collected by him during an extensive exposure measurement program in several states across the U.S. EXPOCALC includes many new technical methods that were developed as a result of new instrumentation, computer modeling, and exposure measurements. He has also directed development of the EMF Workstation (EMFW) software and co-authored the 500 page EPRI Handbook/CD-ROM of Electric and Magnetic Field Management Principles for Power System Fields. This book describes EMF mitigation and shielding techniques. He led a team that developed a small personal GPS logger. He has recently completed research on the potential for electric power lines to affect GPS use. Mr. Silva has assisted the Electric Power Research Institute by managing the EPRI research program on Electromagnetic Compatibility (EMC) and is presently managing the RF Safety and Wireless Technology program.

Professional Affiliations:

IEEE - Power Engineering Society - Senior Member
Bioelectromagnetics Society – Member

Special Recognition and Activities:

1978 University of Texas Power System Seminar - Lecture Series

1979 University of Southern California Lloyd Hunt Distinguished Lecturer-Power Engineering

1980 Ohio State University Electrical Engineering Colloquium - Distinguished Lecture Series

1981 Electric Research Institute of Mexico - Guest Lecturer at the International Symposium on Transmission Lines held in Cuernavaca, Mexico

1983 Chairman of Health Effects Session at Third International Conference on Live-Line Maintenance in Atlanta, Georgia

1988 IARC (International Agency for Research on Cancer) Workshop on Exposure Assessment Research Coordination in Lyon, France

1991 Chairman of the Task Force on Wire Codes and Magnetic Fields at the EPRI Community Exposure Workshop in Memphis, TN.

1992-1994 Technical Referee (reviewer) for Bioelectromagnetics Society Journal publications

1994 Invited speaker on EMF at American Conference on Occupational Medicine in Chicago, Illinois

1998 Co-Chairman of Sources and Exposure Metrics for ELF Epidemiology Discussion Session at NRPB/World Health Organization International Workshop on Exposure Metrics and Dosimetry for EMF Epidemiology held in Oxford, England, September 7-9, 1998.

LIST OF PUBLICATIONS, REPORTS, COMMITTEE DOCUMENTS, PRESENTATIONS

Lectures at University of Texas Power System Seminar - "Current Research Projects Relating to HV/EHV/UHV Transmission Lines", Austin, Texas, February 28, 1978.

Silva, J.M., "Environmental Considerations for the Modern Transmission System", Educational Television presentation Lloyd Hunt Distinguished Lecture Series in Power Engineering, Los Angeles, California, February 27, 1979.

Lecturer at Ohio State University - Electrical Engineering Colloquium Distinguished Lecture Series, "Research on the Biological Effects of Electric and Magnetic Fields of Transmission Lines", Columbus, Ohio, April 10, 1980.

Ramey, G.E. and Silva, J.M., "An Experimental Evaluation of Conductor Aeolian Fatigue Damage Mitigation by Amplitude Reduction", IEEE Transactions on Power Apparatus and Systems, Vol. PAS-100, No.12, pp. 4935-4940, December 1981.

Chairman and Speaker: Institute of Electrical and Electronics Engineers Panel Session on the "National Electrical Safety Code (NESC)- 5 mA Rule and Electric Field Induction" at IEEE Winter Power Meeting, New York City, February 1983.

"Electrical Effects of AC Power Transmission Lines: An Introduction for the Public", IEEE Power Engineering Society, Corona & Field Effects Working Group Brochure, February 1983.

"Modeling Public Exposure to AC Fields", platform presentation by J.M. Silva at U.S. Department of Energy Annual EMF Contractors Research Review Meeting, Kansas City, MO, 1983.

Deno, D.W., Silva, J.M., "Method for Evaluating Human Exposure to 60 Hz Electric Fields", IEEE Transactions on Power Apparatus and Systems, Vol. PAS-103, No.7, pp. 1699-1706, July 1984.

Silva, J.M., Kavet, R.I., "Estimating Public Exposure to Power-Frequency Electric Fields", DOE60 Symposium Series, 23rd Hanford Life Sciences Symposium on Interaction of Biological Systems with Static and ELF Electric and Magnetic Fields, pp. 419-435, Richland, WA, October 2-4, 1984.

Silva, J.M. et.al, "AC Field Exposure Study: Human Exposure to 60 Hz Electric Fields", EPRI Report EA-3993, April 1985.

Silva, J.M., Zaffanella, L.E., Hummon, N.P., "An Activity Systems Model for Estimating Human Exposure to 60 Hz Electric Fields", IEEE Transactions on Power Apparatus and Systems, Vol. PAS-104, No.7, pp. 1923-1929, July, 1985.

"Corona and Field Effects of AC Overhead Transmission Lines: Information for Decision Makers", IEEE Power Engineering Society, Corona and Field Effects Subcommittee- AC Fields Working Group document on EMF, corona, and audible noise, New York, July 1985.

Silva, J.M., Huber, D.L., "Exposure to Transmission Line Electric Fields During Farming Operations", IEEE Transactions on Power Apparatus and Systems, Vol. PAS-104, No. 9, pp. 2632-2640, September, 1985.

Deno, D.W., Silva, J.M., "Probability and Consequence of Gasoline Ignition Under HVAC Transmission Lines", IEEE Transactions on Power Apparatus and Systems, Vol. PAS-104, No.11, pp. 3181-3188, November, 1985

The EXPOCALC Code, Version 1.10: A Tool for Estimating Human Exposure from Transmission Line Electric Fields - User's Manual and Documentation: EA-4489-CCMP; EPRI Research Project RP799-16; Enertech Consultants, J.M. Silva, Principal Investigator; Computer Code Manual, April 1986.

"Magnetic Field Exposure Assessment: Instrumentation, Residential Measurements, and Exposure Modeling Software", Silva, J.M., platform presentation at U.S. Department of Energy Annual Review of Research on Biological Effects of Electric and Magnetic Fields, Denver, CO, 1986.

Deno, D.W., Silva, J.M., "Transmission Line Electric Field Shielding by Objects', IEEE Transactions on Power Delivery, Vol. PWRD-2, No. 1, pp. 269-280, January, 1987.

"Magnetic Fields: A Status Report", J.M. Silva, presented at Fortieth Annual Power Distribution Conference, University of Texas-Austin, published in Conference Proceedings, October, 1987.

EXPOCALC Version 2.1: An Exposure Assessment Tool for Transmission Line Electric and Magnetic Fields - User's Manual and Documentation; EA-5765-CCML; EPRI Research Project RP799-16; Enertech Consultants, J.M. Silva, Principal Investigator, Computer Code Manual, April 1988.

Domestic Magnetic Field Database: User's Manual and Documentation; EA-5972-CCML; EPRI Research Project RP799-16; Enertech Consultants, J.M. Silva, Principal Investigator; Computer Code Manual, August 1988.

"Estimating Electric and Magnetic Field Exposure", Silva, J.M., paper presented at the 1988 Seminar on Power-Frequency Electric and Magnetic Field Exposure Assessment, Colorado Springs, CO., October, 1988.

Silva, J.M., Hummon, N.P., Rutter, D.A., Hooper, H.C., "Power Frequency Magnetic Fields in the Home", IEEE Transactions on Power Delivery, Vol. PWRD-4, No. 1, pp. 465-478, January, 1989.

EMDEX System Manuals - Volume 1: User's Manual, EPRI EN-6518, Vol. 1, Research Project RP799-16; Enertech Consultants, J.M. Silva, Principal Investigator, October, 1989.

EMDEX System Manual - Volume 2: Technical Reference Manual, EPRI EN-6518, Vol. 2, Research Project RP799-16; Enertech Consultants, J.M. Silva, Principal Investigator, October, 1989.

Silva, J.M., Kavet, R., "An Alternative Hypothesis for Association Between Distribution Wiring Configurations and Cancer: Planning Phase", RP 2966-2, EPRI EN-6863, June 1990.

"Extremely Low-Frequency Electric and Magnetic Fields and Risk of Human Cancer", World Health Organization-International Agency for Research on Cancer; IARC Ad Hoc Working Group (24 members including J.M. Silva), Bioelectromagnetics, 11:91-99, 1990.

"Measurements of Power Frequency Magnetic Fields Away From Power Lines", A Report of the IEEE PES AC Magnetic Fields Working Group, M. Misakian, M. Silva, R. Baishiki, principal authors, Paper No. 90 SM 423-4 PWRD presented at 1990 Summer Power Meeting, IEEE Transactions on Power Delivery, 1990.

"Studies of Power System Magnetic Fields: Characterization of Sources in Residential Environments, Measurements of Exposure, Influence on Computer Screens", U.S. Committee, CIGRE-ELECTRA, Paris, France, 1990.

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EMDEX II System Documentation - Volume 2: Technical Reference Manual, EPRI Report EN-7497, Enertech Consultants, September 1991.

Chairman of Wire Codes and Field Levels Working Group and presentation on Wire Code Interpretations, EPRI Community Exposure Workshop, Memphis, TN, November 1991.

RESICALC: Magnetic Field Modeling Program, EPRI Report TR-101776, Enertech Consultants, and December 1992.

Power Line Calculator for Windows, EPRI Report TR-101408, Enertech Consultants, December 1992.

Kavet, R., Silva, J.M., "Magnetic Field Exposure Assessment for Adult Residents of Maine Who Live Near and Far Away From Overhead Transmission Lines", Bioelectromagnetics, Vol. 13, No. 1, pp. 35-55, 1992.

"Small integrating meter for assessing long-term exposure to magnetic fields", Kaune, W.T., Niple, J.C., Liu, M.J., Silva, J.M., Bioelectromagnetics, Vol. 13, No. 5, pp. 413-428, 1992.

"Measurement of Electromagnetic Transients in Residential Environments", Guttman, J., Niple, J., Silva, M., platform presentation at U.S. Department of Energy Annual Review of Research on Biological Effects of Electric and Magnetic Fields from the Generation, Delivery, and Use of Electricity, San Diego, 1992.

"A Protocol for Spot Measurements of Residential Power Frequency Magnetic Fields", IEEE Magnetic Fields Task Force of the AC Fields Working Group, IEEE Transactions on Power Delivery, Vol. 8, No. 3, pp. 1386 - 1394, July, 1993.

"Reversed-Phase Lines May Reduce EMF Levels", Silva, J.M., Transmission & Distribution, pp. 44-45, November 1993.

"High-Bandwidth Measurements of Transient Magnetic Fields in Residential Environments", Guttman, J., Niple, J., Silva, M., Electricity and Magnetism in Biology and Medicine, San Francisco Press, 1993.

"Transient Data Acquisition System Used in the California Pilot Study: A Series of 24-Hour Measurements of Transient Magnetic Fields Performed in 21 Residences", Guttman, J.L., Niple, J.C., Silva, J.M., The Annual Review of Research on Biological Effects of Electric and Magnetic Fields from the Generation, Delivery, and Use of Electricity, U.S. DOE, Savannah, GA, 1993.

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Silva, M., Marshall, T., "Magnetic Fields in Schools: Sources and Management", IEEE/PES Transmission and Distribution Conference and Exposition, Chicago, April 10-15, 1994.

"Handbook of Shielding Principles for Power System Magnetic Fields", Vols: 1 and 2, Clairmont, et. al., EPRI Report TR-103630, April 1994.

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"IEEE Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines", Institute of Electrical and Electronics Engineers, Corona and Field Effects Subcommittee - AC Fields Working Group, IEEE/ANSI Std. 644-1994, 1994.

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"Computer CRT Monitor Performance in the Presence of Power-Frequency Magnetic Fields", EEI Task Force on EMF, December, 1997.

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Electric and Magnetic Field Management Reference Book, M. Silva and L. Zaffanella, EPRI Reference Book and CD-ROM, Research Project TR-114200, December, 1999.

Silva, J.M., "The Nationwide Differential Global Positioning System and Electric Power Line Interference", presented at Institute of Navigation (ION) GPS 2000 Conference, Salt Lake City, Utah, September 20, 2000.

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"Power System Electromagnetic Compatibility", Silva, J.M., Olsen, R.G., Young, F.S., EPRI Resource Paper, Product No. 1001049, Palo Alto, CA, December, 2000.

"Alternative Magnetic Field Exposure Metrics: Relationship to TWA, Appliance Use, and Demographic Characteristics of Children in a Leukemia Survival Study", Foliart, D.E., Iriye, R.N., Tarr, K.J., Silva, J.M., Kavet, R.I., Ebi, K.L., Bioelectromagnetics, Vol. 22, No. 8, pp. 574-580, December 2001.

"Evaluation of the Potential for Power Line Noise to Degrade Real Time Differential GPS Messages Broadcast at 283.5-325 kHz", Silva, J.M., IEEE Transactions on Power Delivery, vol. 17, No. 12, pp 326-333, April, 2002.

"Evaluation of the Potential for Power Line Carrier (PLC) to Interfere with the Nationwide Differential GPS Network", Silva, J.M., Whitney, B., IEEE Transactions on Power Delivery, vol. 17, No. 12, pp 348-352, April, 2002.
"An Introduction to Electromagnetic Compatibility (EMC) Standards", Ramie, J., Silva, J.M., Olsen, R.G, EPRI Resource Paper, Product No. 1005494, Palo Alto, CA, July, 2002.

"Use of Global Positioning System (GPS) Receivers under Power Line Conductors", J.M. Silva, R.G. Olsen, IEEE Transactions on Power Delivery, vol. 17, No. 4, pp 938-944, October 2002.

"Correlation of year-to-year magnetic field exposure metrics among children in a leukemia survival study", Foliart, D.E., Iriye, R.N., Silva, J.M., Mezei, G., Tarr, K.J.,Ebi, K.L., Journal of Exposure Analysis and Environmental Epidemiology, 12(6), pgs 441-447, 2002.

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"Electromagnetic Noise Emission Measurements Near FACTS Devices at the Inez UPFC Station", D. Klinect, D. Nichols, B. Mehraban, S. Sebo, L. Xu, X. Liu, B. Cramer, M. Silva, R. Olsen, and J. Ramie, Paper Presented at the 16th International Zurich Symposium on Electromagnetic Compatibility, Zurich, Switzerland, February 14-18, 2005.

"Electromagnetic Noise Emission Measurements Near the Flexible AC Transmission System (FACTS) Device at the Sullivan (TVA) Station", D. Klinect, D. Nichols, S. Sebo, L. Xu, X. Liu, B. Cramer, M. Silva, R. Olsen, and J. Ramie, Paper Presented at the 2005 PowerTech Conference, St. Petersburg, Russia, June, 2005.

"Limits Applied to Electromagnetic Noise Emission Measurements Near FACTS Devices", R. Olsen, J. Ramie, B. Cramer, M. Silva, S. Sebo, L. Xu, X. Liu, D. Klinect, D. Nichols, Paper Presented at the 2005 PowerTech Conference, St. Petersburg, Russia, June, 2005.

"Magnetic Field Exposure and Long-term Survival among Children with Leukemia", Foliart DE, Pollock BH, Mezei G, Iriye R, Silva JM, Ebi KL, Kheifets L, Link MP, Kavet R., British Journal of Cancer 2006; 94 (1): 161-164. (Corrigendum. British Journal of Cancer 2006; 94 (6): 940.).

"Magnetic field exposure and survival among children with leukemia" (Abstract), Foliart DE, Pollock BH, Mezei G, Iriye R, Silva JM, Ebi KL, Kheifets L, Link MP, Kavet R. Bioelectromagnetics Society, 28th Annual Meeting Proceedings, Cancun, Mexico, June 2006.

Mezei G, Li CY, Sung FC, Silva M, Chen PC, Chen LM. "Survey of residential power frequency magnetic field exposure among children in Taiwan". (Abstract) Bioelectromagnetics Society, 28th Annual Meeting Proceedings, Cancun, Mexico, June 2006.

"Power Frequency Magnetic Field Exposure of Children at Schools Near High Voltage Transmission Lines" (Abstract), Cy Li, FC Sung, PC Lee, FL Chen, G Mezei, M Silva, Annual Meeting of the International Society of Environmental Epidemiology , Paris, September 2006.

"Survey of Residential Extremely-Low-Frequency Magnetic Field Exposure among Children in Taiwan", Chung-Yi Li, Gabor Mezei, Fung-Chang Sung, Michael Silva; Pei-Chun Chen, Pei-Chen Lee, Li-Mei Chen, Environment International Journal, October 2006.

"Magnetic field exposure and prognostic factors in childhood leukaemia", Foliart DE, Pollock BH, Mezei G, Iriye R, Silva JM, Ebi KL, Kheifets L, Link MP, Kavet R. Bioelectromagnetics, vol. 28, No. 1, January, 2007.

"A Nested Case-Control Study of Brain Tumors Among Employees at a Petroleum Exploration and Extraction Research Facility", Buffler PA, Kelsh M, Kalmes R, Lau E, Chapman P, Wood S, Brorby G, Silva M, Hooper C, Rizzo B, Wood R. Journal of Occupational and Environmental Medicine. 2007. Jul;49(7):791-802.

"Assessment of non-response bias in a survey of residential magnetic field exposure in Taiwan". Li CY, Mezei G, Sung FC, Silva M, Lee PC, Chen PC, Chen LM. Bioelectromagnetics. Vol 28, No. 5, 340-348, July, 2007.

Theoretical Evaluation of Magnetic Field Determinants for Residences Above Electric Transformer Rooms", M. Silva, G. Mezei, L. Kheifets, C. Hooper, Poster P-56, BEMS Annual Meeting, San Diego, CA, June, 2008.

BIRDSALL SERVICES GROUP
ENGINEERS & CONSULTANTS

/// RESUME

EDUCATION
Widener University
Chester, PA
B.S.: Civil Engineering

PROFESSIONAL REGISTRATION
Professional Engineer: NY, NJ, CT, FL

PROFESSIONAL AFFILIATIONS
American Society of Civil Engineers
Florida Society of Professional Engineers
National Water Well Association
Harrison Zoning Board of Appeals – Chairman

W. CHARLES UTSCHIG, JR., PE

Senior Vice President

PROFESSIONAL BACKGROUND

Mr. Utschig has over 30 years of experience in the field of civil engineering, specializing in real estate development of all types including commercial, residential, industrial and recreational. Mr. Utschig has directed and supervised a team of engineers, designers, computer operators and drafts people. This team included as many as 15 technical personnel and was responsible for the design, permitting and approval of development projects such as: a 600,000 SF office campus for AT&T, large residential developments for Toll Brothers throughout the Northeast Region, regional shopping centers (exceeding 500,000 SF), and recreational facilities including a signature golf course designed by Jack Nicklaus located in Westchester, New York.

Mr. Utschig has extensive experience in the design of sewer and water systems including pump stations, stormwater management systems, the design of water quality control and flood control measures, highway improvements including traffic signal design, the design of drainage systems, and the preparation of Environmental Impact Statements.

PROJECT EXPERIENCE

Little Tor Road Substation, Clarkstown, NY: Principal-in-charge of the design of the civil engineering aspects of a new 138-KV substation, including: Environmental Assessment Report, Stormwater Pollution Prevention Plan as per NYSDEC, Site Plan Approval Documents including; layout design, grading design, utilities design, erosion control design, earthwork analysis, profiles, and driveway design.

Sugarloaf Road Substation, Chester, NY: Principal-in-charge of the design of the civil engineering aspects of a new 138-KV substation, including: Environmental Assessment Report, Stormwater Pollution Prevention Plan as per NYSDEC, Site Plan Approval Documents including; layout design, grading design, utilities design, erosion control design, earthwork analysis, profiles, and driveway design.

Gas Main Reinforcement Route 17A, Warwick & Florida, NY: Principal-in-charge of site design of new 16" Steel Gas Main line with a total length of approximately 11,300 LF, including: Survey, DOT Application, NOI application as per NYSDEC, Site Plan Approval Documents including; layout design, grading design, utilities design, erosion control design, earthwork analysis, profiles, and driveway design.

Decker Substation, Wallkill, NY: Principal-in-charge of the design of the civil engineering aspects of a new 138-KV substation, including: Environmental Assessment Report, Stormwater Pollution Prevention Plan as per NYSDEC, Site Plan Approval Documents including; layout design, grading design, utilities design, erosion control design, earthwork analysis, profiles, and driveway design.

W. CHARLES UTSCHIG, JR., PE *(Continued)*

Utility Construction -Con Edison-, Westchester County, NY: Principal-in-charge of a team of engineers and inspectors providing construction inspection and implementation of Maintenance and Protection of Traffic on NYSDOT Highways for multiple Con Edison projects, located in different municipalities through out Westchester County.

Gas Main Replacement, Nanuet, NY: Principal-in-charge of the design of the civil engineering aspects of a new 16" Steel Gas Main with a total length of approximately 2,000 LF, including: NYS Thruway Authority Access Application, Wetland and wetland buffer disturbance design and permitting, Site plan approval documents: layout design (trenching & horizontal drilling), profiles, erosion control design and maintenance & traffic protection design.

Hartley Road Substation, Goshen, Orange County, NY: Project manager responsible for completing an initial ecological constraints review for a utility company. Subsequently delineated the jurisdictional wetlands and waters and obtained a jurisdictional determination from the US Army Corps of Engineers.

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BIRDSALL SERVICES GROUP
ENGINEERS & CONSULTANTS

/// RESUME

EDUCATION
Rutgers University
New Brunswick, NJ
BA: Civil and Environmental Engineering

PROFESSIONAL REGISTRATION
Professional Engineer: NY

PROFESSIONAL AFFILIATIONS
New York Society of Professional Engineers

HONORS & AWARDS
Young Engineer of the Year, Westchester/Putnam County Chapter of New York Society of Professional Engineers, 2007

MICHAEL FINAN, PE, LEED AP

Senior Associate – Project Manager

PROFESSIONAL BACKGROUND

Mr. Finan, a Senior Project Manager, has ten years of experience in land development projects in addition to structural, environmental, and architectural projects. Mr. Finan has a broad range of experience in the various scopes of civil engineering. Prior to joining BSG, Mr. Finan was responsible for the management, design, and construction of a variety of Westchester private and government sites.

PROJECT EXPERIENCE

Little Tor Road Substation, Clarkstown, NY: Senior Project Manager of the design of the civil engineering aspects of a new 138-KV substation, including: Environmental Assessment Report, Stormwater Pollution Prevention Plan as per NYSDEC, Site Plan Approval Documents including; layout design, grading design, utilities design, erosion control design, earthwork analysis, profiles, and driveway design.

Sugarloaf Road Substation, Chester, NY: Project Manager of the design of the civil engineering aspects of a new 138-KV substation, including: Environmental Assessment Report, Stormwater Pollution Prevention Plan as per NYSDEC, Site Plan Approval Documents including; layout design, grading design, utilities design, erosion control design, earthwork analysis, profiles, and driveway design.

Gas Main Reinforcement Route 17A, Warwick & Florida, NY: Senior Project Manager of site design of new 16" Steel Gas Main line with a total length of approximately 11,300 LF, including: Survey, DOT Application, NOI application as per NYSDEC, Site Plan Approval Documents including; layout design, grading design, utilities design, erosion control design, earthwork analysis, profiles, and driveway design.

Decker Substation, Wallkill, NY: Senior Project Manager of the design of the civil engineering aspects of a new 138-KV substation, including: Environmental Assessment Report, Stormwater Pollution Prevention Plan as per NYSDEC, Site Plan Approval Documents including; layout design, grading design, utilities design, erosion control design, earthwork analysis, profiles, and driveway design.

Utility Construction -Con Edison-, Westchester County, NY: Senior Project Manager of a team of engineers and inspectors providing construction inspection and implementation of Maintenance and Protection of Traffic

MICHAEL FINAN, PE, LEED AP *(Continued)*

on NYSDOT Highways for multiple Con Edison projects, located in different municipalities throughout Westchester County.

Gas Main Replacement, Nanuet, NY: Senior Project Manager of the design of the civil engineering aspects of a new 16" Steel Gas Main with a total length of approximately 2,000 LF, including: NYS Thruway Authority Access Application, Wetland and wetland buffer disturbance design and permitting, Site plan approval documents: layout design (trenching & horizontal drilling), profiles, erosion control design and maintenance & traffic protection design.

Hartley Road Substation, Goshen, Orange County, NY: Senior Project Manager responsible for completing an initial ecological constraints review for a utility company. Subsequently delineated the jurisdictional wetlands and waters and obtained a jurisdictional determination from the US Army Corps of Engineers.

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THOMAS M. MCCHESNEY, SRA - APPRAISER'S QUALIFICATIONS

MEMBERSHIPS AND AFFILIATIONS:

Member of Appraisal Institute - SRA Designation

New York State Certified Residential Real Estate Appraiser #45-2845

Appraisal Institute - Mid Hudson Chapter
1997 President
1996 Vice President
1995 Secretary
1993 - 1995 - Education Committee Chairman
1990 - 1993 - Education Committee
1998 - 2001 - Board of Directors
2005 - Present - Board of Directors

Appraisal Institute - Region IV
1995 - 1997 - Regional Ethics and Counseling Panel

EDUCATION:

Ramapo College of New Jersey, Mahwah, New Jersey
Bachelor of Science 1985
Major: Business Administration
Concentration: Economics / Finance

County College of Morris, Randolf, New Jersey
Associates of Arts 1982
Major: Business Administration

American Institute of Real Estate Appraisers
Real Estate Appraisal Principles 1987

American Institute of Real Estate Appraisers
Residential Valuation 1988

American Institute of Real Estate Appraisers
Standards of Professional Practice 1989

American Institute of Real Estate Appraisers
Basic Valuation Procedures 1989

Appraisal Institute
Capitalization Theory and
Techniques - Part A 1992

Appraisal Institute
Standards of Professional Practice - Part A 1997
Standards of Professional Practice - Part B 1997

Appraisal Institute
Standards of Professional Practice - Part C 2002

SEMINARS:

Society of Real Estate Appraisers
Standards of Professional Practice 1989

Appraisal Institute
Valuing Land When There Are No Comparables 1993

Appraisal Institute
Preparation of Tax Certiorari 1993

Appraisal Institute
New URAR 1993

Appraisal Institute
Valuation by Subdivision Analysis 1994

Appraisal Institute
Appraisal Reporting of Complex
Residential Properties 1994

Appraisal Institute
Appraisal Review - Residential Properties 1994

Appraisal Institute
Understanding Limited Appraisals 1994

Independent Fee Appraisers
Basic Residential HUD Requirements 1995

Appraisal Institute
Litigation Appraising - Part 1 - Current
Issues in Tax Certiorari 1995

Appraisal Institute	
How to complete New York State FHA Appraisals	1996
Appraisal Institute	
Appraising High Value and Historic Homes	1996
Appraisal Institute	
Special Purpose Properties: The Challenge Of R.E. Appraising in Limited Markets	1996
Appraisal Institute	
Current Issues in Tax Certiorari	1997
Appraisal Institute	
Planning Boards, Land Use Control and Zoning Board of Appeals	1997
Appraisal Institute	
Attacking and Defending an Appraisal in Litigation	1998
Appraisal Institute	
Unsyndicated partial Interest Appraisals	1998
Appraisal Institute	
Emerging Technologies Forum	1998
Appraisal Institute	
Property Value Studies in Relation to Community Residences	1998
Manfred Real Estate Learning Center	1999
New FHA/HUD Guidelines	
McKissock Data Systems	
Regression Foundations	2000
Regression Applications	2000
NYS Association of Realtors, Inc.	
Residential Construction, Home Inspection, ADA, Land, Environmental Inspection	2000
Appraisal Institute	
Appraising Vacant Land	2002

Appraisal Institute Scope of Work: Expanding your range of services	2003
Appraisal Institute Mathematically Modeling Real Estate Data	2004
Appraisal Institute Introduction to Income Capitalization	2005
Appraisal Institute Appraisal Consulting: A solutions approach for professionals	2005
Appraisal Institute Residential Market Analysis and Highest and Best Use	2005
Appraisal Institute Residential Market Analysis and Highest and Best Use	2005
Employee Relocation Council Relocation Training Program	2006
Appraisal Institute 2006 Changes to USPAP: The Demise of Departure	2006
McKissock Appraising Historic Properties	2006
Appraisal Institute Online Valuation Resources	2007
Appraisal Institute Uniform Standards of Appraisal Practice	2007
Appraisal Institute Evaluating Residential Construction	2007
Appraisal Institute Analyzing Distressed Real Estate	2008
Appraisal Institute	

Analyzing Real Estate in Distressed or Troubled Markets	2008
Appraisal Institute Uniform Standards of Appraisal Practice	2008
Appraisal Institute REO Appraisal	2009
Appraisal Institute: USPAP Update Course	1/2010

EXPERIENCE REAL ESTATE:

3/93 to Present
Valuation Consultants, Inc., Newburgh, New York
Owner and Senior Residential Appraiser/Manager

3/86 to 3/93
Appraisal Services, Newburgh, New York
Senior Appraiser

7/85 to 3/86
Anchor Mortgage Services, Inc., Wayne, New Jersey
Post Closing Mortgage Reviewer

8/82 to 9/84
Louis F. McChesney Appraisal, Sparta, New Jersey
Appraiser Assistant

APPRAISAL EXPERIENCE:

Has appraised all types of residential properties, condominiums and multi family residences.

Has performed property analysis and appraisal for private and corporate investors, financial institutions, attorneys, major corporations, home transfer companies and others. Here listed are a few selected employers:

A: GENERAL

Bank of America
Boston Safe Deposit and Trust
JPMorgan Chase
Citibank, N.A.

Coldwell Relocation Management Services, Inc.
Community Bank of Orange County
Community Bank of Sullivan County
Community Preservation Corporation
GMAC
TD BankNorth
Key Bank of New York
Lakeland State Bank
M & T Bank
Manhattan Savings Bank
Masbeth Federal Savings
Merrill Lynch Relocation
New York State Facilities Development Corp.
North Fork Bank
Orange County Trust
Provident Bank
Prudential Relocation
Putnam County Savings Bank
Remax International Relocation
Rhinebeck Savings Bank
Riverside Bank
Travelers Relocation
Ulster Savings Bank
Walden Federal Savings Bank
Walden Savings Bank
Webster Bank
Supreme Court of the State of NY - Suffolk
Hon. William J. Kent
Newman & Cahn, LLP
Robert J. Del Col, Esq.
Bloom & Bloom, P.C.

B. AREAS OF APPRAISAL EXPERIENCE - NEW YORK STATE

COUNTIES: Orange, Dutchess, Putnam, Ulster, Rockland, and Sullivan