MY COMPUTER / L:/ DER / EDOCS / SITE-SPECIFIC

REGION 4 COUNTY Rensselaer TOWN Nassau NAME Dewey Loeffel

DOCUMENT TYPE (CIRCLE)	PROGRAM (CIRCLE)	SITE NUMBER	DOCUMENT DATE (YYYY-MM-DD)
agreement	.		
application	.		
brief	.		
consent	.		
email	.		
factsheet	.		
image	.		
isr	.		
letter	.		
memo	.		
nov	.		
prap	.		
report	.	HW.442006.2007-12.ARCADIS_2007_Area_28_Wetland_Monitoring_Report.pdf	
rod	.		
siteplan	.		
spcc	.		
stip	.		
var	.		
video	.		
workplan	.		

ARCADIS BBL
Infrastructure, environment, facilities

Imagine the result

General Electric Company
Albany, New York

2007 Area 28 Wetland Monitoring Report

Loeffel Site Environs
Nassau, New York

December 2007

ARCADIS BBL

2007 Area 28 Wetland Monitoring Report

Loeffel Site Environs
Nassau, New York

General Electric Company
Albany, New York

Prepared for:
General Electric Company

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.449.0017

Our Ref.:
B001007300

Date:
December 2007

Table of Contents

Table of Contents

Figures

1. Introduction

1.1 Background and Objectives

This report presents the results of wetland monitoring efforts conducted in 2007 at Area 28 (the site) along the Valatie Kill downstream from the Loeffel Site Environs. Area 28 is approximately 3 miles northeast of the Village of Nassau in Rensselaer County, New York (Figure 1). This report has been prepared on behalf of the General Electric Company (GE) in compliance with the monitoring requirements contained in the authorization (2003-00261) from the U.S. Army Corps of Engineers (USACE) under Nationwide Permits (NWPs) 13 and 38 for bank stabilization and remedial activities on the site (Nieves, 2003). In accordance with the Special Conditions of the NWP authorization (Nieves, 2003), restored and created wetlands must be monitored annually for 5 years. In addition, stream monitoring is to be performed in the first, third, and fifth years following restoration, and the results are to be included in the wetland monitoring report for those years (Dangler, 2003). Remediation and restoration of the site was conducted as required by the Second Stipulation and Order of Partial Settlement (89-CU-1135; 2003) from August 2003 to July 2004 under the oversight of the New York State Department of Environmental Conservation (NYSDEC). This report presents monitoring results for 2007, the fourth year following the restoration activities.

1.1.1 Wetland Restoration

Remedial actions at the site included the removal of soils and vegetation from two wetland areas. Restoration of the site wetlands was performed in accordance with the *Stream and Wetland Restoration/Enhancement Plan* (SWR/EP), which was prepared as a component of the Preconstruction Notification to the USACE for the NWPs (Blasland, Bouck & Lee, Inc. [BBL], 2003) and as part of NYSDEC-approved *Remedial Action Work Plan* (RAWP). The SWR/EP addressed stream and wetland restoration and enhancement activities to mitigate impacts from the remedial actions. Two wetlands were affected by remedial actions at the site. One 0.2-acre wetland located along the western bank of the Valatie Kill was excavated due to site-related constituents present in underlying soils, and a 0.01-acre wetland on the east bank of the Valatie Kill was filled as part of bank stabilization efforts. To mitigate these impacts, the 0.2-acre wetland was restored and expanded to 0.24 acres, and a backwater area of the wetland was planted with aquatic plants as an additional enhancement to the wetland (Figure 2). Wetland topsoil placement and grading were performed in fall 2003. The wetland was seeded with a wetland seed mix in spring 2004 and covered with an erosion control blanket to protect the seed from storm flows. In addition, trees, shrubs, and willow stakes were planted through the blanket in spring 2004

to establish woody vegetation and to aid in anchoring the blanket and the banks surrounding the wetland.

Additional woody species were planted in the 2005 and 2006 growing seasons to ensure that woody tree and shrub performance standards would be met (Table 1). Furthermore, protective structures were installed as a component of maintenance activities in the summer of 2006 to reduce damage caused by high flow in the Valatie Kill, which in the past is thought to have caused the uprooting of planted trees and shrubs.

1.1.2 Monitoring Requirements

In accordance with the special conditions of the NWP authorization (Nieves, 2003), the wetland monitoring activities consisted of quantifying wetland plant survival and percentage of ground cover for comparison to annual performance standards presented in the NWP authorization, and providing photographs of the site from permanent photo locations.

The annual wetland monitoring program consists of a qualitative inspection in the spring and a quantitative vegetation evaluation in the summer. The spring inspection is performed to evaluate the need for maintenance activities that may be required to adaptively manage the wetlands towards performance standards established in the NWP authorization. The summer monitoring event documents the progress of the wetland vegetation relative to the performance standards for the restored and enhanced wetland.

This report presents the results of wetland and stream monitoring efforts performed in 2007, the fourth full growing season following initial restoration. Annual wetland monitoring will continue for one more year and the stream will be monitored next year as required by the NWP authorization (Nieves, 2003).

1.2 Report Organization

This report is organized into the following six sections:

- Section 1 presents the site background and objectives of the annual monitoring program.
- Section 2 presents the methodology for the wetland monitoring efforts.
- Section 3 presents the results of the wetland monitoring efforts.

- Section 4 presents proposed wetland maintenance activities.
- Section 5 presents the conclusions of the monitoring report.
- Section 6 presents the references cited in this report.

2. Wetland Monitoring Methodology

The monitoring methodology for the qualitative spring evaluation and the quantitative summer monitoring is described below.

2.1 Qualitative Spring Evaluation

The qualitative evaluation of the restored wetlands occurred on May 22, 2007 and consisted of a visual assessment of the site grading, hydrology, and vegetation status. The restored wetland area was traversed, and the status of planted shrubs and the emergence of seeded wetland vegetation were observed. Due to their ease of observation before dense ground vegetation became established, all surviving shrubs were counted to evaluate their percent survival in the 2007 growing season. Percent survival was calculated for shrubs by dividing the number of observed surviving plants by the number initially planted in 2004. The percent shrub survival was compared with the 90% shrub survival performance standard for the fourth post-planting growing season (Table 1) to evaluate the current status of the woody vegetation. Observations from the spring evaluation were recorded and are summarized in Section 3 of this report.

2.2 Quantitative Summer Monitoring

Quantitative summer monitoring activities for the restored wetland area were conducted on September 7, 2007. The status of seeded herbaceous vegetation in the restored wetland area was evaluated by determining percent ground cover for herbaceous plant species in standardized 1-square-meter sample quadrats, randomly located along each of three transects (Figure 2). Three random sample plots were established along each transect for a total of nine sample plots. Data collected from each sample plot consisted of visual estimates of the percent ground cover in the sample plot and the percent ground cover by each plant species in the plot. The average percent vegetative cover for the entire wetland was calculated by averaging the observed percent cover in all sample plots. The average percent vegetative cover for the wetland was compared with the 75% vegetative cover performance standard required by the end of the fourth growing season (Nieves, 2003). Photographs were taken of the wetland area to document the progress of the wetland vegetation over time.

3. Field Observations and Results

3.1 Spring 2007 Inspection

The spring inspection was performed on May 22, 2007 to evaluate the status of the restored and created wetlands and to determine if maintenance activities would be required to maintain the wetland development towards performance standards. The restored wetland area appeared to be maintaining its design elevation, and no signs of eroded channels were observed in the wetland.

Tree and shrub survival in the Area 28 wetland was evaluated as part of the spring 2007 inspection due to their ease of observation prior to the emergence of the herbaceous vegetation. All surviving shrubs were identified to species and counted. Table 2 summarizes the number of trees and shrubs observed in spring 2007 and the number originally planted in April 2004. As shown on Table 2, the percent tree and shrub survival in 2007 is greater than 100%, which is likely the result of natural recruitment. The natural recruitment and spread of native woody species indicates that the appropriate wetland hydrologic conditions have been established at the site and that the original species planted on the site are the correct plant community for the wetland. The number of willows observed in 2007 may also reflect the establishment of the live cribwalls along the eastern shore of the wetland that were constructed with live willow cuttings. As these cuttings grow and mature they will provide habitat diversity in the wetland as well as overhanging bank vegetation that will provide shade and fish cover for the Valatie Kill.

3.2 Summer 2007 Wetland Monitoring

The quantitative herbaceous vegetation plot monitoring of the restored/created wetland was performed on September 7, 2007. Figure 2 presents the locations of transects and sample plots within the wetland. At the time of the site visit, the Area 28 wetland was observed to be stable at the designed elevation and densely vegetated. No evidence of soil erosion or channel cutting was observed in the wetland. The original relation of the wetland ground elevation to the stream channel water elevation provided the designed hydrology for the wetland at base flows. Hydrologic conditions ranged from pockets of 1 to 2 inches of standing water to moist soils approximately 1 foot above the water table. The wetland exhibited dense herbaceous vegetation up to 7 feet in height. Several healthy shrubs were observed around the perimeter of the wetland area and along the adjacent banks. The backwater area contained a variety of planted aquatic vegetation species and approximately 6 inches of standing water.

Table 3 summarizes the results of the quantitative vegetation quadrat data for the wetland. As shown, the average percent vegetative cover for the nine sample plots in the wetland was 100%, which exceeds the NWP authorization performance standard of 75% cover by the fourth growing season. The dominant species found within these plots included: reed canary grass (*Phalaris arundinacea*), common bur reed (*Sparganium eurycarpum*), red-osier dogwood (*Cornus stolonifera*), and woolgrass (*Scirpus cyperinus*). Representative photographs of the Area 28 wetland are presented on Figures 3 and 4.

Purple loosestrife (*Lythrum salicaria*) was the only invasive species observed in the restored/created wetland. Purple loosestrife was found to be less than 5% of the ground cover in two of the nine plots in the Area 28 wetland. The observed density of purple loosestrife is below the performance standard of 10 percent maximum cover by invasive weeds.

3.3 Observed Fish and Wildlife

Small fish, frogs and aquatic organisms were observed throughout the wetland and stream area during the spring and summer site visits.

4. Proposed Maintenance Activities

4.1 Herbaceous Vegetation

The percent ground cover observed in 2007 exceeded the performance standard of at least 75% ground cover in the fourth growing season. In addition, invasive weeds were not present at densities that require control. Therefore, no maintenance activities related to herbaceous vegetation are proposed at this time.

4.2 Trees and Shrubs

The results of the 2007 tree and shrub survival evaluation indicated that performance standards for tree and shrub survival were met and that more stems per acre exist in the wetland now than were originally planted in 2004. Therefore, no maintenance activities are required for the woody vegetation.

5. Summary and Conclusions

The restored and enhanced Area 28 wetland appeared healthy and developing toward natural sustainability. Herbaceous vegetation of the wetland is well established and exceeds the performance standard of 75% ground cover for the fourth growing season. Tree and shrubs survival exceeded performance standards with additional desirable species naturally recruiting into the area.

Wetland monitoring efforts will continue in 2008, with a qualitative inspection in the spring, and a quantitative monitoring event in the summer. The percent ground cover and shrub survival will be summarized and documented in the monitoring report for 2008, which will be submitted to the USACE by December 31, 2008. In 2008, the stream will also be monitored (i.e., classified and described) as required by the NWP authorization. Results of the stream monitoring will be included in the 2008 monitoring report.

6. References

BBL. 2003. Preconstruction Notification Area 28 Remedial Action. Loeffel Site Environs Nassau, New York (March).

Dangler, Andrew. 2003. Electronic mail from Andrew Dangler (USACE) to Christopher Torell (BBL) dated August 1, 2003.

Nieves, George. 2003. Letter from George Nieves (USACE Western Permits Section) to Anthony Esposito (BBL) dated April 30, 2003.

Tables

Table 1
Wetland Vegetation Performance Standards

2007 Area 28 Wetland Monitoring Report
General Electric Company - Loeffel Site Environs, Nassau, New York

	Season				
Wetland Type	1	2	3	4	5
	% Vegetative Cover				
Emergent	40	50	60	75	85
	% Survival				
Scrub-Shrub	100	100	95	90	85

Source: Area 28 *Wetland Delineation Report and Restoration Plan, Loeffel Site Environs, Nassau, New York* (BBL, 2002).

Table 2
Area 28 Wetland Tree and Shrub Survival Summary

2007 Area 28 Wetland Monitoring Report
General Electric Company - Loeffel Site Environs, Nassau, New York

Common Name	Number Planted in 2003	Number Observed in 2007	% Survival in 2007
Shrubs			
Dogwood	40	54	135
Spirea	40	29	73
Willow	40	84	210
Northern Arrowood	40	35	88
Shrub Total	160	202	126
Trees			
Maple	10	12	120
Totals	170	214	126

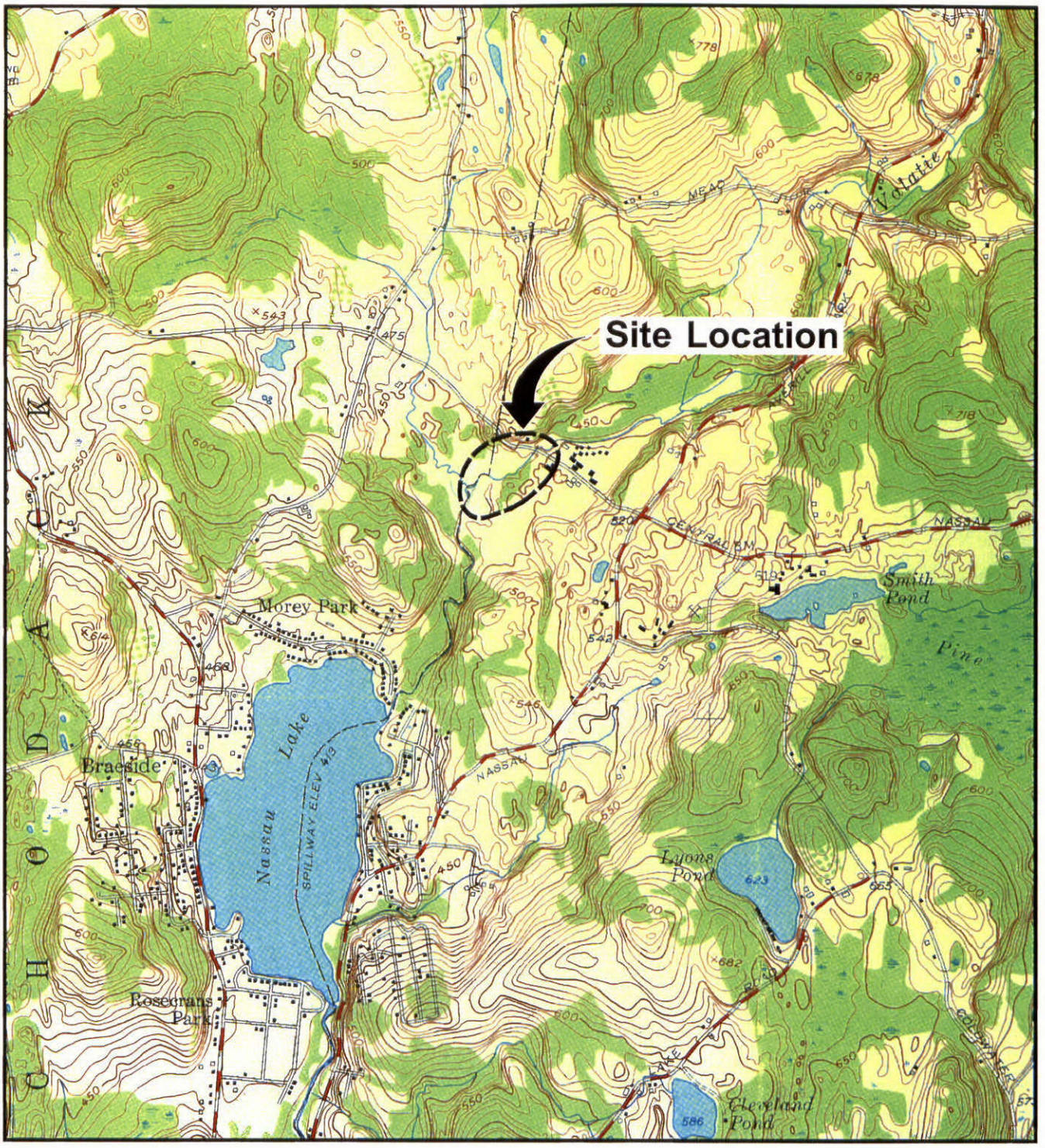
Table 3
Area 28 Wetland Herbaceous Vegetation Sample Plot Summary

2007 Area 28 Wetland Monitoring Report
General Electric Company - Loeffel Site Environs, Nassau, New York

Plant Species		% Cover								
		Transect 1			Transect 2			Transect 3		
Common Name	Scientific Name	Plot 1	Plot 2	Plot 3	Plot 1	Plot 2	Plot 3	Plot 1	Plot 2	Plot 3
Bedstraw	*Galium* sp.			10						
Blue Violet	*Viola papilionacea*	<5	5	<5					<5	
Boneset	*Eupatorium perfoliatum*				5					
Burdock	*Arctium minus*							10		5
Clearweed	*Pilea pumila*		10		5	5		<5	5	5
Climbing False Buckwheat	*Polygonum scandens*						10	5	5	
Common Bur Reed	*Sparganium eurycarpum*		25							
Daisy Fleabane, Lesser	*Erigeron strigosus*			5						
Deertongue	*Panicum clandestinum*		5	<5	5			5	10	5
Fall Panicgrass	*Panicum dichotomiflorum*				5					
False Nettle	*Boehmaria cylindrica*	10								
Fox Sedge	*Carex vulpinoidea*	5								
Foxtail Grass	*Setaria* sp.	5								<5
Grassleaf Goldenrod	*Euthamia graminifolia*			10				25		15
Hairy Bedstraw	*Galium pilosum*							<5		
Joe Pye Weed	*Eupatorium purpureum*	10					10			
Jumpseed	*Tovara virginiana*		5							
Multiflora Rose	*Rosa multiflora*			15						
Pennsylvania Smartweed	*Polygonum pennsylvanicum*		<5		35	10				5
Purple Loostrife*	*Lythrum salicaria*	<5			<5					
Reed Canary Grass	*Phalaris arundinacea*					55	35			
Red-Osier Dogwood	*Cornus stolonifera*						25			
Rice Cut Grass	*Leersia oryzoides*		<5		25			25		10
Shallow Sedge	*Carex lurida*		10							<5
Spotted Jewelweed	*Impatiens capensis*	5	20		10	15	5	25	30	40
Swamp Tickseed	*Bidens tripartita*				5					10
Tall Goldenrod	*Solidago altissima*	25	10						30	
Tall Nettle	*Utrica procera*			10		5			20	
Tearthumb	*Polygonum sagittatum*	5				5	5	5		
Threeseed Mercury	*Acalypha rhomboidea*					<5				<5
White Clover	*Trifolium repens*		5	5	5	5	10			5
White Vervain	*Verbena urticifolia*			10						
Wood Anemone	*Anemone quinquefolia*									<5
Wool Grass	*Scirpus cyperinus*	25								
Unknown Grass	--	10		5						
Unknown Grass	*Panicum* sp.		5	<5			<5			<5
Unknown	--			30						
Total % Ground Cover		100	100	100	100	100	100	100	100	100

Note:
* = Invasive species

Figures



REFERENCE: Base Map Source, USGS 7.5 Min. Topo. Quad., Nassau, New York, 1953.

2000' 0 2000'

Approximate Scale: 1" = 2000'

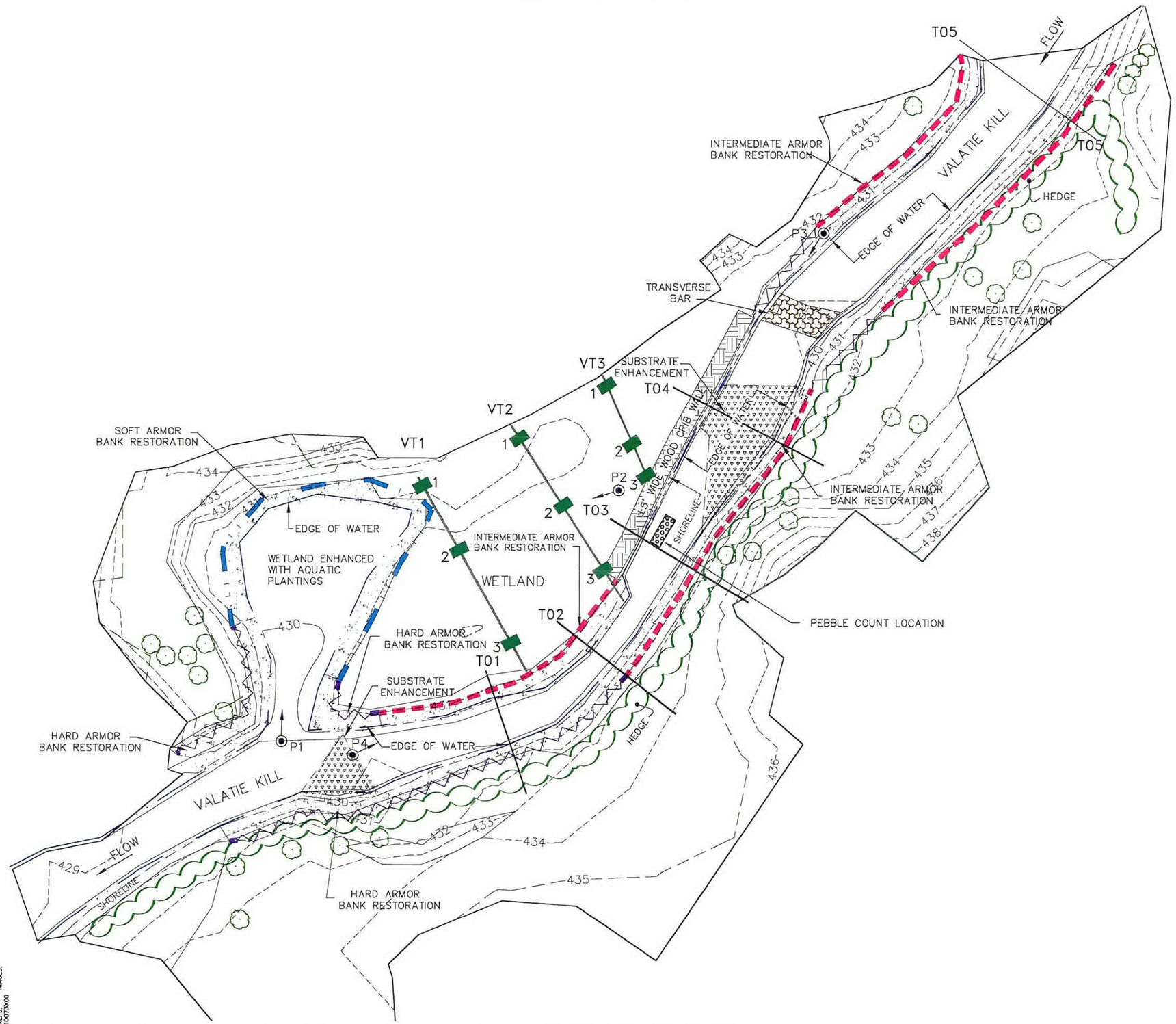
GENERAL ELECTRIC COMPANY
LOEFFEL SITE ENVIRONS
2007 AREA 28
WETLAND MONITORING REPORT

AREA 28
SITE LOCATION MAP

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
1

11/20/07 SYR-D85-DJH-KLS
C:\10073900\2007WMR\CDR\10073N01.cdr



LEGEND:

- RESTORED TREE
- P13 — PHOTOGRAPH LOCATION AND DIRECTION
- VEGETATION AND TRANSECT QUADRAT LOCATION
- STREAM TRANSECT LOCATION
- EDGE OF TOPSOIL
- AREA OF HARD ARMOR
- AREA OF INTERMEDIATE ARMOR
- AREA OF SOFT ARMOR
- PEBBLE COUNT LOCATION
- SUBSTRATE ENHANCEMENT AREA
- LIVE CRIB WALL
- TRANSVERSE BAR

NOTES:

1. HORIZONTAL DATUM: SITE SPECIFIC VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29)
2. THIS MAP WAS CREATED USING FIELD SURVEY MEASUREMENTS MADE BY WENDEL DUCHSCHERER IN AUGUST 2003 THROUGH JUNE 2004.

0 15' 30'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
LOEFFEL SITE ENVIRONS
2007 AREA 28
WETLAND MONITORING REPORT

AREA 28 WETLAND PHOTOGRAPH AND TRANSECT LOCATION MAP

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
2

Photograph 1 - Area 28 Backwater Wetland, looking west.

P1

Photograph 2 - Area 28 Wetland, looking downstream from the west bank of the Valatie Kill.

P2

GENERAL ELECTRIC COMPANY
LOEFFEL SITE ENVIRONS
2007 AREA 28
WETLAND MONITORING REPORT

PHOTOGRAPHS OF AREA 28 WETLAND

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
3

11/20/07 SYR-D85-DJH-KLS
C:\10073900\2007\WMR\CDR\10073G01.cdr

Photograph 3 - Area 28 Wetland, looking downstream from the west bank of the Valatie Kill.

P3

Photograph 4 - Area 28 Wetland, looking upstream at the southeast bank of the wetland.

P4

GENERAL ELECTRIC COMPANY
LOEFFEL SITE ENVIRONS
2007 AREA 28
WETLAND MONITORING REPORT

EAST BANK OF AREA 28 BACKWATER WETLAND PHOTOGRAPHS

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
4

11/20/07 SYR-D85-DJH-KLS
C:\10073900\2007\WMR\CDR\10073G02.cdr