



**US Army Corps  
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New England District

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# **Final 2004 ANNUAL REPORT**

## **WETLAND & UPLAND HABITAT RESTORATION AND LONG TERM ADAPTIVE MONITORING AND MAINTENANCE PROGRAM**

### **AREA OF CONTAMINATION (AOC) 57 DEVENS, MASSACHUSETTS**

**January 2007**

PREPARED BY:

DEPARTMENT OF ARMY  
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS  
CONCORD, MASSACHUSETTS 01742

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# **2004 ANNUAL REPORT**

## **AREA OF CONTAMINATION (AOC) 57**

### **WETLAND & UPLAND HABITAT RESTORATION AND LONG TERM ADAPTIVE MONITORING AND MAINTENANCE PROGRAM**

#### **1.0 OBJECTIVES**

The objectives of the Area of Contamination (AOC) 57 Wetlands and Upland Habitat Restoration and Long Term Adaptive Monitoring and Maintenance Plan (i.e. the Habitat LTMP) are to evaluate the restoration measures implemented in AOC 57 - Areas 2 and 3 during the first three or more growing seasons after site remediation and restoration activities to ensure success and to identify and implement needed corrective actions based on the periodic monitoring (USACE 2007). The Record of Decision (ROD) requires monitoring for a period of five years after wetland restoration. The locations of the two restoration sites are provided in Figure 1. The remediation and restoration were completed in October 2003 in accordance with the January 2002 Work Plan (Conti 2002) and 2003 Work Plan Amendment for Additional Soil Removal (Conti 2003), as reported in the Final Interim Remedial Action Completion Report (Conti 2004). Consequently the long term monitoring began in 2004 with annual monitoring inspections scheduled twice a year in the Late Spring/Early Summer and Late Summer/Early Fall time frames. The Habitat LTMP summarized the restoration approach and construction measures for the restoration of impacted wetland/upland habitat, provided the subsequent long term adaptive monitoring and maintenance plan approach that was developed concurrently during implementation of the 2004 program, and defined the relevant performance standards to evaluate the implemented restoration measures.

As the first annual habitat long term monitoring and maintenance program report, this report summarizes the results of our 2004 periodic monitoring field observations of restored wetland/upland habitat relative to the performance standards with recommendations, if any, for future corrective actions. A copy of the field data/inspection report for each site visit to Areas 2 and 3 is provided in Appendix A with representative photographs provided in Appendix B.

#### **2.0 AOC 57 AREAS 2 AND 3**

**2.1 Area 2:** The wetland boundary, 2002 and 2003 final soil removal excavation limits, and the limit of wetland restoration are shown in Figure 2. Details of the restoration approach and construction measures for the restoration of impacted wetland and upland habitat are provided in the Habitat LTMP (USACE 2007). Approximately 1,744 square feet of wetlands was restored at Area 2 as shown in Figure 3.

**2.2 Area 3:** The wetland boundary, planned/final excavation limit and approximate limit of site restoration are shown in Figure 2. Details of the restoration approach and construction measures for the restoration of impacted upland habitat are provided in the Habitat LTMP (USACE 2007). Since cleanup objectives were attained within the planned/final excavation limits, no wetland resource areas were disturbed during remediation of Area 3. The silt fence and hay bales installed immediately downgradient at the edge of the planned/final excavation limit and approximate limit of site restoration may have intruded slightly into the wetland. Since removal of the silt fence may have disturbed the edge of the Area 3 wetland, this wetland edge was monitored as part of the Habitat LTMP.

### **3.0 MONITORING PLAN PERFORMANCE STANDARDS & CONTROL OF INVASIVE/EXOTIC PLANTS**

This section provides the relevant performance standards for evaluation of the wetland and upland habitats and the protocol of controlling invasive/exotic plants as discussed in the Habitat LTMP (USACE 2007).

#### **3.1 Long Term Adaptive Monitoring Plan Performance Standards**

The objectives of the Devens AOC57 Habitat Long Term Adaptive Monitoring and Maintenance Program are:

1. Measurement of the success of the restoration relative to attainment of the Performance Standards in the restored areas to identify and implement needed corrective actions; and
2. Monitoring of the exotic weeds (the three species of concern are purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*) and Japanese knotweed (*Polygonum cuspidatum*)) in the restored upland and wetland areas. If present the exotics will be removed by approved methods described below.

The Performance Standards for AOC 57, consistent with those established in the Devens Consolidated Landfill (DCL) Wetland and Upland Habitat Restoration Plan (WUHRP) (Stone & Webster 2002), for wetland areas are:

1. Seeded areas for wetlands shall have an average 75% perennial native obligate/facultative vegetative cover; and
2. Contain no non-vegetated (bare) areas more than 250 square feet.

Performance standards were also established in the WUHRP for uplands. They were based on whether they were considered level or steep slope uplands. The difference between these standards is the single criterion of slope stability.

The standards for level uplands are:

1. Seeded areas shall have an average of 75% perennial native vegetative cover; and
2. Contain no non-vegetated (bare) areas more than 500 square feet.

The standards for steep slope uplands are:

1. Shall be stabilized slope with 75% perennial native vegetative cover; and
2. Contain no non-vegetated bare areas more than 500 square feet.

However, due to the relatively small overall size of the two AOC57 restored sites in comparison to the larger DCL restored sites, the second performance standard will not be used as a measure of success.

The entire restored wetland, upland and ecotone transition areas are systematically observed via the meandering survey methodology coupled with the concept of adaptive monitoring. The meandering survey involves the members of the Team, usually 2-3 individuals, traverse the restored area several times observing and recording the vegetation within about 10 feet of either side of their path. Species are noted and identified according to their wetland status. This observational data is compared relative to the above applicable listed Performance Standards. Wetland status is assigned according to Cowardin's classification (Cowardin et al. 1969).

### **3.2 Control of Invasive/Exotic Plants**

The second objective the adaptive monitoring program is to check for the appearance of the three cited exotics: 1) purple loosestrife; 2) common reed (*Phragmites*); and 3) Japanese knotweed. If these specific varieties of plants were observed, they were removed from the site. The protocol for invasive/exotic plant removal follows.

1. Purple loosestrife is pulled from the ground and if the plant was not in flower or in seed, it is left onsite. If the plant is in flower or seed, it will be pulled, bagged and removed from the site. It is virtually impossible to eradicate purple loosestrife once it is established.
2. *Phragmites* is treated in July-August, later in the growing season, with 25% Rodeo by a licensed MA applicator. Each plant is cut a few inches from the ground between two nodes and 25% Rodeo is injected in the hollow stem. The superior segment of the stem is bagged and disposed in a dumpster offsite. The portion of the site where the *Phragmites* was removed is flagged for future examination to be certain there was no re-growth. Numbers of plants treated and removed are recorded to maintain qualitative/quantitative information to monitor and document the success of the eradication.
3. Depending on the area of the Japanese knotweed growth, the plants are either cut a few inches from the ground and a mist of 25% Rodeo applied if there is a large plot of plants or 25% Rodeo is injected into the hollow stem if there are only a few plants. As with *Phragmites*, Rodeo is applied by a licensed MA applicator

with the proper protective procedures. If the Japanese knotweed is in flower or seed the upper portion of the plant is bagged and removed from the site. Since Japanese knotweed growth habits differs from *Phragmites*, individual shoots are not counted but relative size of the patch is noted to monitor effectiveness of the herbicide treatment. The site of the infestation is flagged and checked during the periodic monitoring to ascertain the removal was successful.

#### **4.0 2004 MONITORING PROGRAM RESULTS AND RECOMMENDATIONS**

This section provides an overall annual summary based on several monitoring field inspections conducted during the first monitoring year in 2004 in the Late Spring/Early Summer and Late Summer/Early Fall time frames following the remediation and wetland restoration at Areas 2 and 3 within Area of Concern (AOC) 57. A brief description of each of the primary sites, an evaluation of wetlands and/or adjacent uplands relative to meeting performance standards, and recommendations for specific management activities such as exotic plant control and site-specific problems are provided. A copy of the field data/inspection report for each site visit is included in Appendix A. Representative photographs of Areas 2 and 3 from the 2004 inspections are provided in Appendix B.

##### **4.1 AOC57-Area 2**

###### **4.1.1 Performance Standards**

Area 2 consists of an upland site that slopes downward to the restored wetland. Based on the 2004 inspections, the upland site met the Performance Standards. Seven red maples are at the base of the slope where the upland grades into the wetland. Thirty-four white oaks have survived on the upland slope. Ground cover on the slope consisted of rabbit's foot clover, cow thistle and other grasses and herbs. Plant wanderers and colonizers from off site were observed to be reseeding the area with tree species like red maple and black birch along with colonizing shrubs such as sweet fern are growing into the site. During the June-August observations, there was a small amount of erosion limited to the rock-lined drainage swale at the east side of the restoration. A silt barrier was present at the top of the slope. During the 2004 observations, silt from the adjacent upgradient unvegetated upland area from construction activities related to the storm water detention pond being constructed for MassDevelopment had started to top the silt barrier and flow down the restored slope. This uncontrolled erosion and sedimentation resulted in additional erosion within the drainage swale and deposition of fine silt within the wetland and covering of vegetation.

The wetland restoration exceeded the Performance Standards. Soft rush, broad-leaved cattail, burr reed, cotton grass, tussock sedge, silky dogwood and alder are a partial list of species identified during the several monitoring visits. One small patch of *Phragmites* was treated and no additional growth was noticed at the October site visit. Amphibian and/or reptile activities were evident such as turtle egg-nesting sites on the upland slope, and green/bull frogs in the small pools at the edge of the wetland. Silt fence was removed from the periphery of the wetland restoration prior to winter.

#### **4.1.2 Recommendations**

It is imperative that the uncontrolled drainage and resulting erosion and sedimentation from the upland area (up gradient of AOC 57) from construction activities related to the storm water detention pond be diverted from flowing onto AOC 57 Area 2. If this condition persists, the wetland will continue to be filled with fine silt, negatively impacting the vegetation along with compromising restored wetland values and functions.

The white oaks growing on the upland slope and red maples at the wetland/upland interface are demonstrating the negative effects of deer browsing and vole damage. Based on future inspections, wire cages may be constructed and installed to prevent deer browse damage and plastic vole shields be installed to prevent girdling at the base of the tree. The wire cages can remain for several years and be removed when the trees can survive the browsing. The vole protectors are made of degradable plastic.

#### **4.2 AOC57-Area 3**

##### **4.2.1 Performance Standards**

Area 3 consists of an upland site that slopes downward to the edge of the existing wetland. Based on the 2004 inspections, the upland site met the Performance Standards. Thirteen white oaks have survived on the upland slope. The upland plant cover, ground and tree cover, is similar to AOC 57 Area 2. The wetland transition area also contains similar wetland vegetation as Area 2 and exceeds the Performance Standards. As of October 2004, there was no evidence of erosion from the adjacent upland onto Area 2. Silt fence was removed October 2004 in order not to impact the migration of animals from the upland into the wetland for winter habitat.

##### **4.2.2 Recommendations**

Install deer browse and vole protectors on the red maples and white oaks if warranted based on future inspections.

#### **5.0 REFERENCES**

Conti Environmental, Inc. (Conti) 2002. Remedial Action Work Plan, AOC 57, Devens, MA; Prepared for U.S. Army Corps of Engineers, New England District. January 2002.

Conti Environmental, Inc. (Conti) 2003. Work Plan Amendment for Additional Soil Removal, AOC 57, Devens, MA; prepared for U.S. Army Corps of Engineers, New England District, September 2003.

Conti Environmental, Inc. (Conti) 2004. Final Interim Remedial Action Completion Report, Contaminated Soil, AOC 57, Devens, MA; prepared for U.S. Army Corps of Engineers, New England District, Contract DACW33-01D-0003, Task Order 0002.

Cowardin et al, 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, U.S. Dept of the Interior, Washington, D.C.

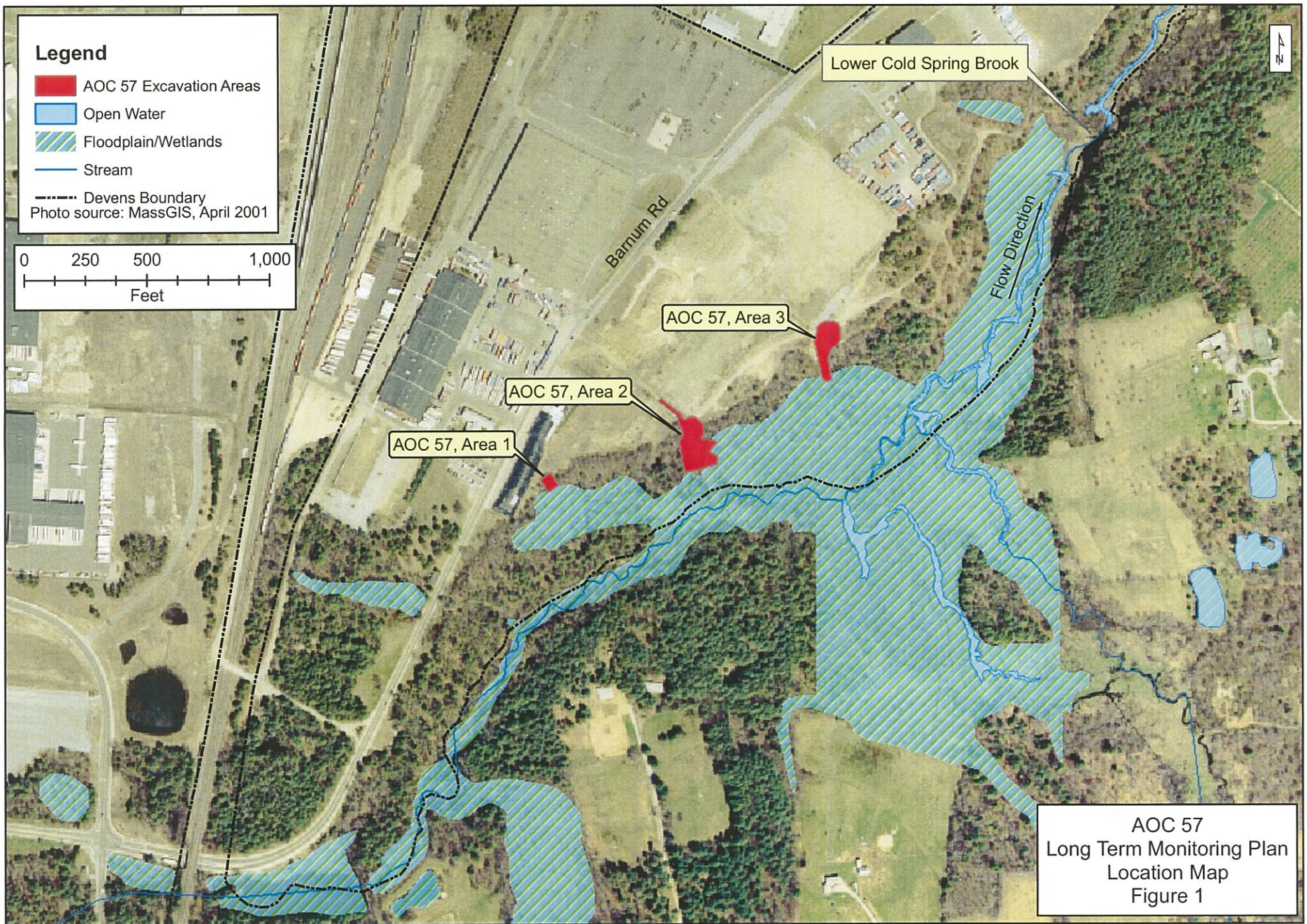
Reed, P.B., Jr., 1988. National List of Plant Species That Occur in Wetlands: Northeast Region (Region 1). U.S. Fish and Wildlife Service Biological Rep. 88(26.1). 111 pp.

Stone and Webster. 2002. Wetland and Upland Habitat Restoration Plan: Landfill Remediation Project Devens Reserve Training Area Devens, Massachusetts. Prepared for U.S. Army Corps of Engineers, New England District.

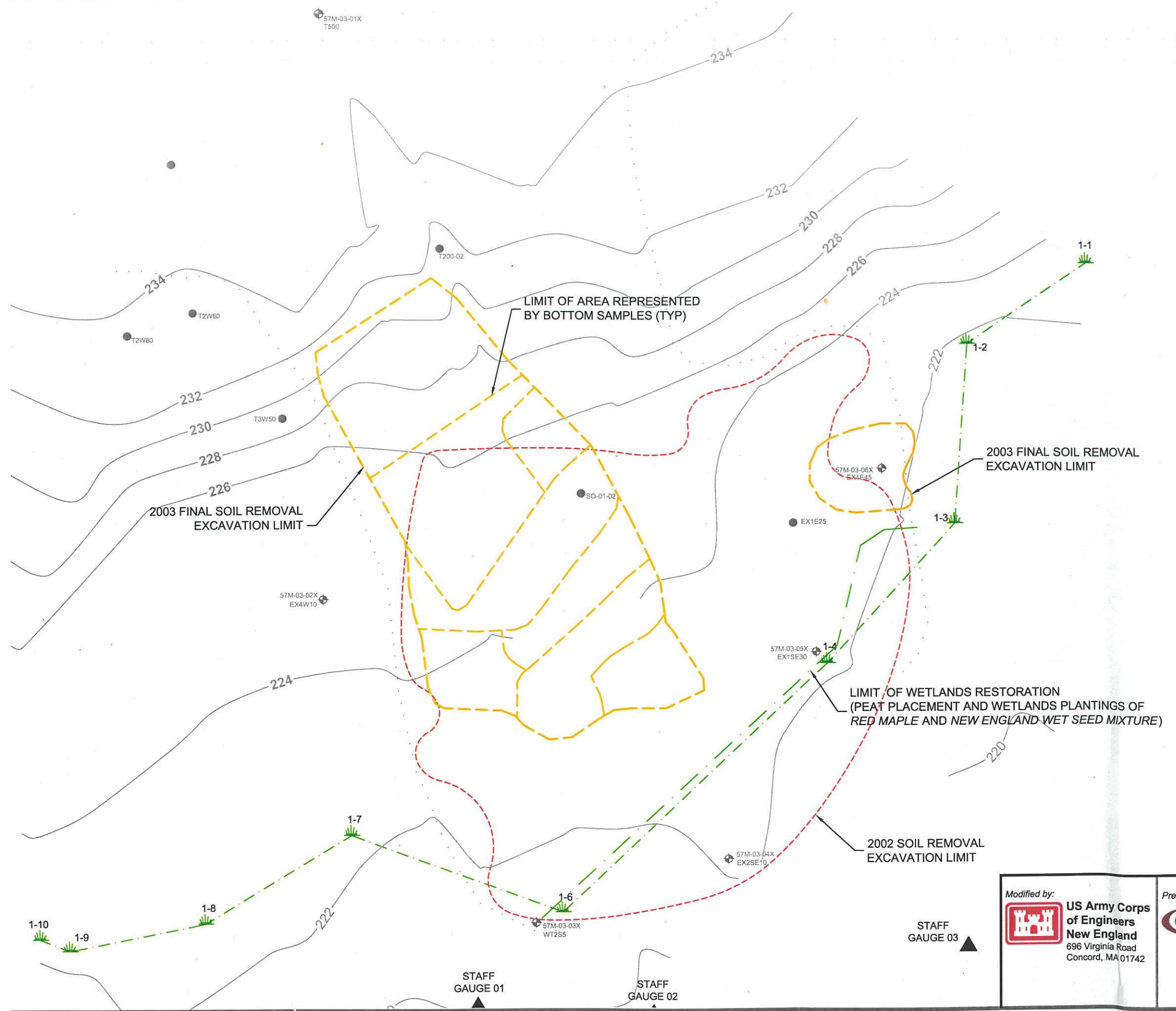
Tiner, R.W., JR. 1988. Field Guide to National Nontidal Wetland Identification. Maryland Department of Natural Resources, Annapolis, MD and U.S. Fish and Wildlife Service, Newton Corner, MA. Cooperative Publication. 283 pp. + plates.

United States Army Corps of Engineers (USACE). 2007. Final Wetland & Upland Habitat Restoration and Long Term Adaptive Monitoring and Maintenance Plan, Area of Contamination (AOC) 57, Devens, Massachusetts. Prepared by Department of the Army, New England District, US Army Corps of Engineers, Concord, Massachusetts.





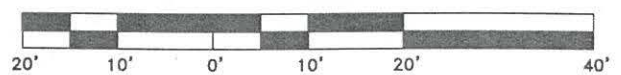




**LEGEND**

- SPOT ELEVATION (FINAL GRADE DEC 2003)
- FINAL EXCAVATION LIMIT (2003)
- APPROXIMATE DEPTH OF EXCAVATION FROM ORIGINAL GRADE (FT) (2002 & 2003)
- WETLAND STAFF GAUGE INSTALLED DEC. 2003 (ZERO=220 FT. MSL)
- 12-INCH CMP SUMP INSTALLED DEC 2003
- SIDEWALL COMPOSITE SAMPLE TREE LINE
- WT3 GEOPROBE BORING LOCATION
- 12-IN. CORRUGATED METAL PIPE SUMP
- 1-1 WETLAND FLAG ID
- 228 SURFACE CONTOURS (PRE-EXCAVATION)
- GEOPROBE/HOLLOW STEM AUGER SOIL BORING
- SO-01-02
- NEW MONITORING WELL MONITORING WELL No. IS 57M-XX-XXX SOIL BORING No. EX1E45
- LIMIT OF CONTI EXCAVATION (2002)
- LIMIT OF FLAGGED WETLANDS

**APPROXIMATE SCALE**

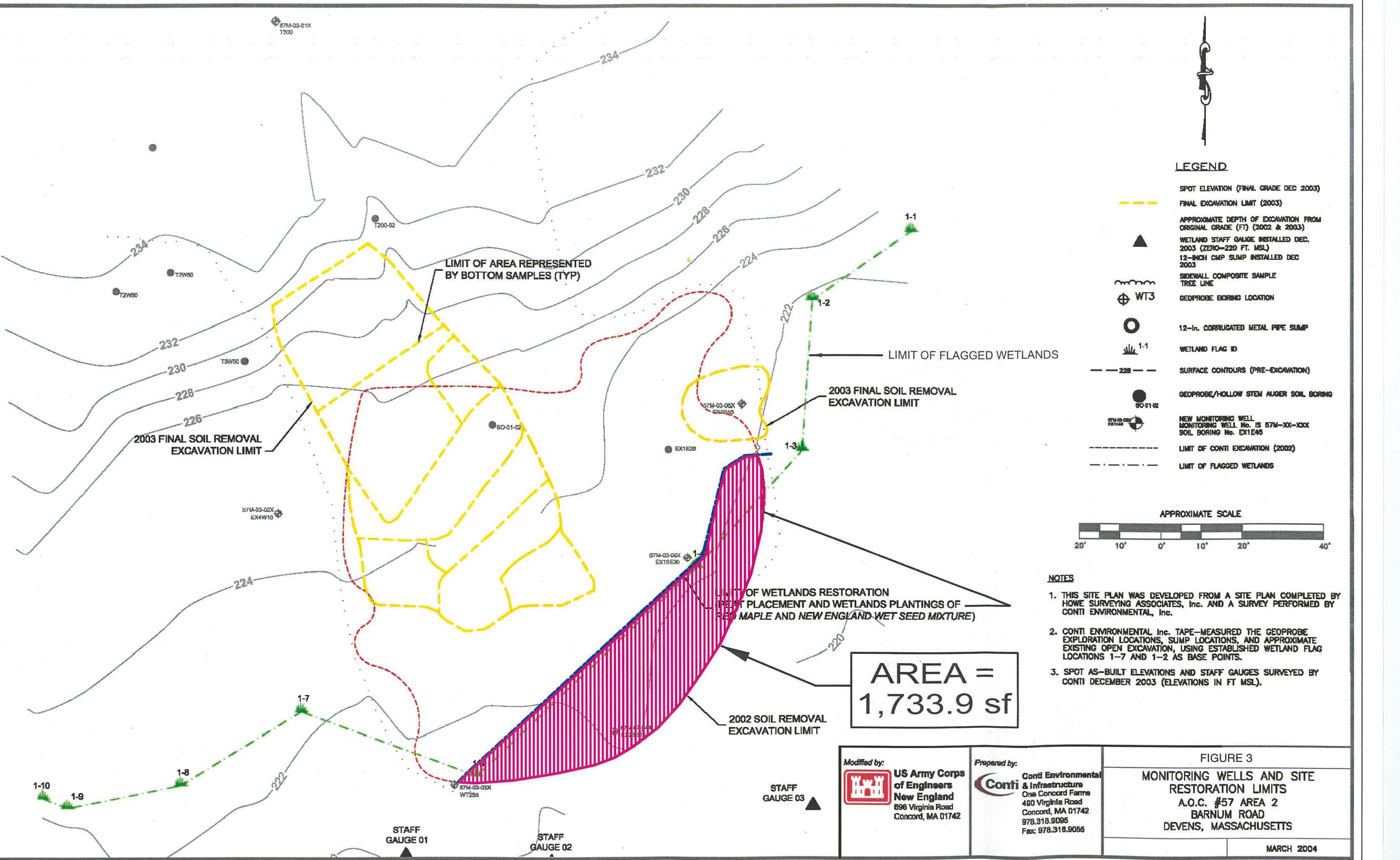


**NOTES**

1. THIS SITE PLAN WAS DEVELOPED FROM A SITE PLAN COMPLETED BY HOWE SURVEYING ASSOCIATES, Inc. AND A SURVEY PERFORMED BY CONTI ENVIRONMENTAL, Inc.
2. CONTI ENVIRONMENTAL Inc. TAPE-MEASURED THE GEOPROBE EXPLORATION LOCATIONS, SUMP LOCATIONS, AND APPROXIMATE EXISTING OPEN EXCAVATION, USING ESTABLISHED WETLAND FLAG LOCATIONS 1-7 AND 1-2 AS BASE POINTS.
3. SPOT AS-BUILT ELEVATIONS AND STAFF GAUGES SURVEYED BY CONTI DECEMBER 2003 (ELEVATIONS IN FT MSL).

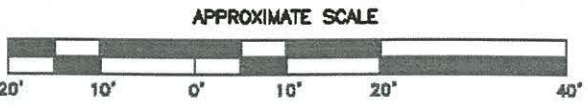
<b>FIGURE 2</b> <b>MONITORING WELLS AND SITE RESTORATION LIMITS</b> <b>A.O.C. #57 AREA 2</b> <b>BARNUM ROAD</b> <b>DEVENS, MASSACHUSETTS</b>		
Modified by:  <b>US Army Corps of Engineers New England</b> 696 Virginia Road Concord, MA 01742	Prepared by:  <b>Conti Environmental &amp; Infrastructure</b> One Concord Farms 490 Virginia Road Concord, MA 01742 978.318.9095 Fax: 978.318.9055	MARCH 2004





LEGEND

- SPOT ELEVATION (FINAL GRADE DEC 2003)
- FINAL EXCAVATION LIMIT (2003)
- APPROXIMATE DEPTH OF EXCAVATION FROM ORIGINAL GRADE (FT) (2002 & 2003)
- WETLAND STAFF GAUGE INSTALLED DEC. 2003 (ZERO-220 FT. MSL)
- 12-INCH CMP SUMP INSTALLED DEC 2003
- SIDEWALL COMPOSITE SAMPLE TREE LINE
- WT3 GEOPROBE BORING LOCATION
- 12-IN. CORRUGATED METAL PIPE SUMP
- WETLAND FLAG ID
- SURFACE CONTOURS (PRE-EXCAVATION)
- GEOPROBE/HOLLOW STEM AUGER SOIL BORING
- NEW MONITORING WELL MONITORING WELL No. IS 57M-XX-JCXX SOIL BORING No. EX1E45
- LIMIT OF CONTI EXCAVATION (2002)
- LIMIT OF FLAGGED WETLANDS



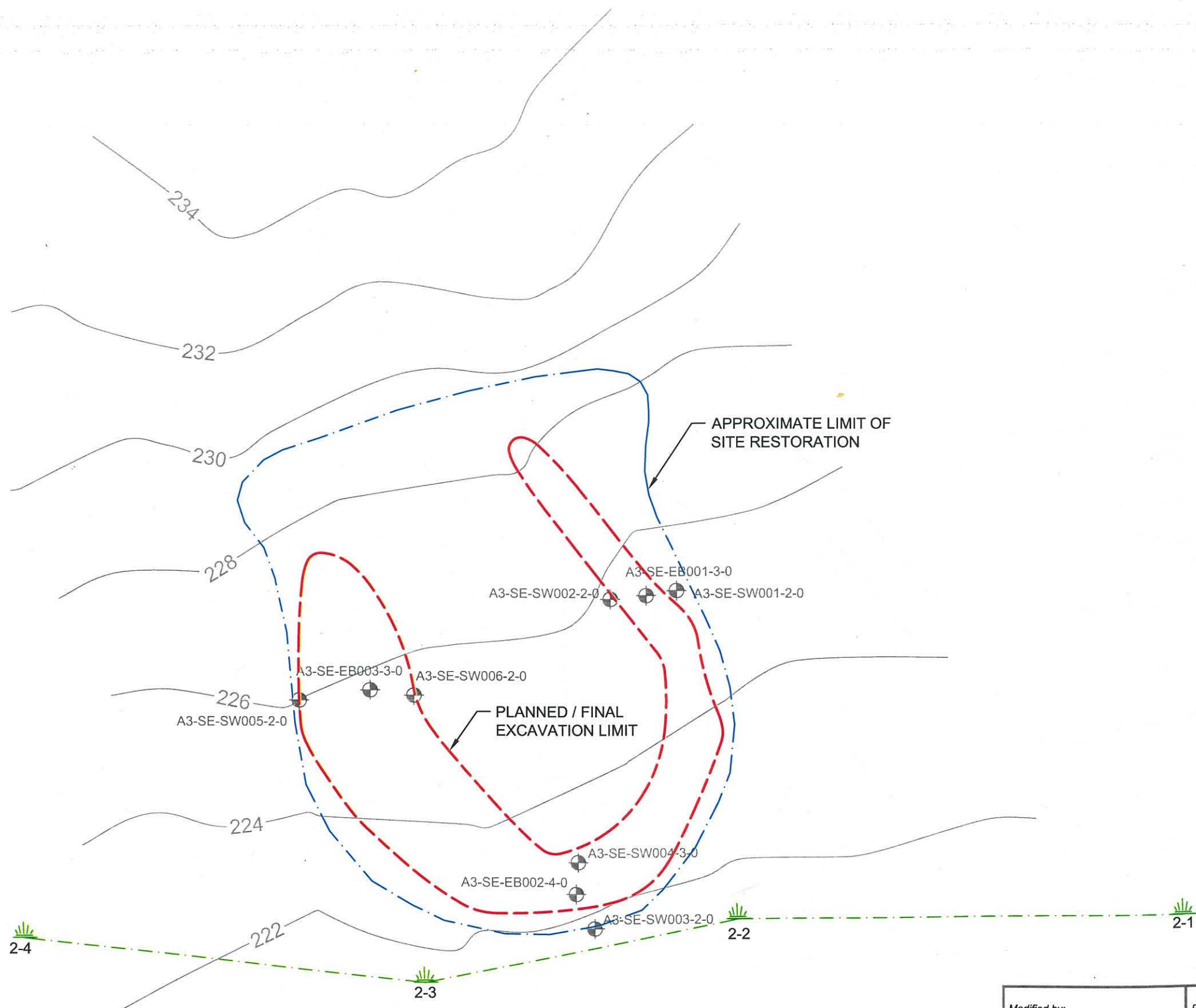
NOTES

1. THIS SITE PLAN WAS DEVELOPED FROM A SITE PLAN COMPLETED BY HOWE SURVEYING ASSOCIATES, Inc. AND A SURVEY PERFORMED BY CONTI ENVIRONMENTAL, Inc.
2. CONTI ENVIRONMENTAL Inc. TAPE-MEASURED THE GEOPROBE EXPLORATION LOCATIONS, SUMP LOCATIONS, AND APPROXIMATE EXISTING OPEN EXCAVATION, USING ESTABLISHED WETLAND FLAG LOCATIONS 1-7 AND 1-2 AS BASE POINTS.
3. SPOT AS-BUILT ELEVATIONS AND STAFF GAUGES SURVEYED BY CONTI DECEMBER 2003 (ELEVATIONS IN FT MSL).

AREA = 1,733.9 sf

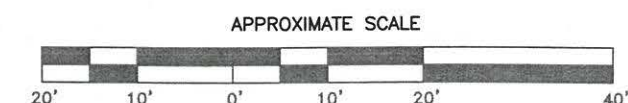
Modified by: <b>US Army Corps of Engineers New England</b> 698 Virginia Road Concord, MA 01742		Prepared by: <b>Conti Environmental &amp; Infrastructure</b> One Concord Farms 490 Virginia Road Concord, MA 01742 978.318.9095 Fax: 978.318.9055	FIGURE 3 MONITORING WELLS AND SITE RESTORATION LIMITS A.O.C. #57 AREA 2 BARNUM ROAD DEVENS, MASSACHUSETTS
			MARCH 2004





# LEGEND

- 1-1
- WETLAND FLAG ID
- SURFACE CONTOURS (PRE-EXCAVATION)
- LIMIT OF FLAGGED WETLANDS
- A3-SE-SW001-2-0
- CONFIRMATION SAMPLE LOCATION



## NOTES

1. THIS DRAWING WAS DEVELOPED FROM A SITE PLAN COMPLETED BY HOWE SURVEYING ASSOCIATES, Inc. AND FIELD MEASUREMENTS PERFORMED BY CONTI ENVIRONMENTAL, Inc.

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## FIGURE 4

**MONITORING WELLS AND SITE  
RESTORATION LIMITS**  
A.O.C. #57 AREA 3  
BARNUM ROAD  
DEVENS, MASSACHUSETTS

MARCH 2004

## **APPENDIX A**

### ***Area of Contamination (AOC) 57 Field Inspection Notes***

#### ***In Chronological Order***

#### **Description of Wetland Vegetation Designation Used in Field Notes**

“There is no single, correct, indisputable, ecological sound definition for wetlands, primarily because of the diversity of wetlands and because the demarcation between dry and wet environments lies along a continuum” (Cowardin et al. 1979). The prevailing hydrology is the primary factor of whether wetlands and/or upland plants dominate and varies seasonally as well as over time (e.g. year to year). One of the three attributes of a wetland is the particular type of vegetation this wetland is able to support. Plants that are found in the wetland areas where the roots are submerged and the plants can grow are called hydrophytes. The U.S. Fish and Wildlife Service have published a list of more than 2500 species of vascular plants that occur in wetlands, in this case from Maine through Virginia and west to Ohio and Kentucky (Reed 1988). These plants are listed using their scientific name followed by their common name and published in a *National List of Scientific Plant Names*. Each plant is given a regional indicator status along with information on the plant habit, where it lives, and general distribution. This system provides four categories to determine this plant’s ability to live in a wetland. These categories according to Tiner (1988) are:

1. Obligate (OBL) greater than 99% occurrence in wetlands;
2. Facultative Wetland (FACW) 66-99% occurrence in wetlands;
3. Facultative (FAC), 33-66% occurrence in wetlands; and
4. Facultative Upland (FACU), 1-33% occurrence in wetlands.

This is the classification system and these are the symbols used in this report to describe the vegetation found in the wetland and upland areas at the various restored wetland and upland sites at Devens. It is the frequency of the presence of these plants that is used to measure whether the wetland and the upland restoration has attained the stated Performance Standards. Obligate and Facultative Wetland plants are almost always found in wetlands and are therefore the best vegetative indicators of wetlands. In addition to the above classification and to better characterize the facultative categories, a positive sign (+) is placed after the FACW to indicate a plant on the wetter side of FACW, and a negative sign (-) for a plant on drier side of FACW. As a relevant example, wool grass, *Scirpus cyperinus*, a common floral constituent of Devens wetlands is classified as a FACW+, indicating it should be found in a slightly wetter habitat than umbrella sedge, *Cyperus strigosus*, that is classified as FACW. This describes the terminology used to characterize habitat as wetland or upland based on their percent vegetative cover.

*Citations are provided in Section 5.0 References.*

**Field Notes - Monitoring of Devens Habitat Restoration Sites**  
**16 June 2004**

*CENAE Crew: Bob Davis, Peter Trincherro, Mike Penko, with John McDowell*

**AREA 2**

**UPLAND-** seeded, 75% well covered with grass/herbs, 20% spotty cover, 5% bare/eroded; 34 red oak leafed out, about 1.5 " diameter stem, several with stump growth. Animal evidence- snapping turtle egg nest on slope raided by raccoon

**Wetland**

Water level has dropped, small ponded area at edge, exceeds 75% indigenous wetland cover criterion.

Species observed:

Tussock sedge obl  
Lurid sedge obl  
Umbrella sedge obl  
Wool grass Facwet+  
Broad-leaved cattail obl  
Soft-stemmed Bullrush obl  
Bristle-backed sedge Facwet+  
Jewelweed Facwet  
Cinnamon fern facwet  
Sensitive fern facwet  
Phragmites facwet – treated chemically  
Purple Loosestrife facwet+ two stems pulled  
Honeysuckle fac-  
Red maple 7 saplings  
Alder seedlings obl

Animal evidence- heard bullfrog, snapping turtle egg, racoon

**Actions**

Monitor exotics, small area of erosion between rock lined drain chute and wetland, will be scarified/reseeded in the fall. Before winter stakes and silt screen will be removed. The site will be monitored for exotics/invasives, loosestrife and common reed, and removal/herbicide action taken. Phragmites cut at node, stem injected with 25% Rodeo and upper end of the stem, upper end of stem removed and destroyed off site. Pesticide treatment by MA licensed applicator.

**AREA 3** = Not Inspected on 16 June 2004.  
.....

## Field Notes - Monitoring of Devens Habitat Restoration Sites

23 June 2004

*CENAE Crew: Bob Davis, Peter Trinchero, with Debbie Acone et al. (see Devens Wetlands Inspection Sign-in Sheet for all present at end of field notes)*

### AREA 2

**Upland-** No change since 16 June 2004.

**Wetland-** Monitored the several herbicide treated stems of Phragmites. Plants are brown and brittle, at this point 100 % effective treatment. One additional new shoot of Phragmites was observed adjacent to the treated stems.

Animal evidence- 3 additional snapping turtle nests were exposed and raided. A leopard frog was observed.

#### **Actions**

Additional herbicide treatment required. Silt fence remains and requires removal. Reseeding of bare and mildly eroded areas to be completed in the fall.

### AREA 3

This is an area that was overlooked during the previous monitoring. It is about 100 yards east of AOC /2. The site decontamination did not intrude as extensively into the wetland as AOC/2 but the intrusion was more than indicated on the site drawings. Upon examination, it was determined there was sufficient intrusion to include this as a monitoring site. The monitoring indicated this limited wetland area is a successful wetland mitigation by having more than 75 % of the cover native wetland plants.

#### **Upland**

There is potential for minor erosion from the adjacent un-vegetated upland area. A small area was observed with several dry rivulets, with the fine material at the bottom of the slope at the wetland edge with the coarse material remaining on the slope. Thirteen of the red oaks that were planted on the upland slope have leafed out. Some shrubs, autumn olive, have reseeded at the upland edge of the mitigated area from plantings just off the site.

#### **Wetland**

Personal communication with the Project Engineer indicated the removal activities extended several feet farther into the wetland than originally expected. The silt screen was placed too far into the wetland resulting in a small amount of silt deposited into the wetland proper. A shallow pool area recently dried and was in the process of being vegetated with jewelweed. A narrow swath of wetland vegetation developed in front of the silt screen, at the base of the mitigation. The narrow wetland area possesses more than 75% of the area with native wetland cover, which satisfies the performance standard.

Jewelweed facwet  
Species Observed:  
Cinnamon fern facwet  
Blue flag obl  
Silky willow obl  
Soft rush facwet+

**Action**

No exotics visible.

The silt screen will be removed and may be removed anytime since it is no longer needed. Monitoring for exotics will continue. The erosion, although not serious, should be controlled with a fall hydro seeding. A layer of organic material should be applied with the seed to hold sufficient moisture for not only germination but also growth.

**ATTENDANCE SHEET-DEVENS WETLANDS INSPECTION**

**23 June, 2004**

<u>Name</u>	<u>Organization</u>	<u>Phone</u>
Debbie Acone	USACE	978-318-8130
Julie Paquette	DEC	978-772-8831
Peter Lowitt	DEC	978-772-8831
Takasmi Tada	BRAC	978-796-2036
Becky DaSilva	MADEP	978-767-2707
Brian Duval	MADEP	508-849-4051
David Salvatore	MADEP	508-767-2842
Ron Ostrowski	MADEV	978-772-6340
John McDowell	USACE	978-772-0159
Lynne Welsh	MADEP	508-849-4007
Pete Trinchero	USACE	978-318-8004
Bob Davis	USACE	978-318-8236
Bart Hoskins	USEPA	617-918-8375
Christine Johnson	USACE	978-318-8125



\*\*\*\*\*

## **Field Notes - Monitoring and Eradication of Exotic/Invasive Plants**

**24 August 2004**

CENAE Wetland Monitoring Team: Robert Davis, Mike Penko and Peter Trincherro  
As stated in the AOC 57 Monitoring Plan and in the Post Remediation Inspection Plan, Phragmites australis (common reed), Lythrum (purple loosestrife), and Polygonum (Japanese knotweed) were monitored and eradicated. Herbicide application was by Mike Penko, a MA licensed applicator, according to the procedure described in the monitoring plan. The purple loosestrife was pulled and disposed onsite. Purple loosestrife was not completely removed from all sites because the level of effort required for this removal would exceed the time allotted for Phragmites/Japanese knotweed eradication.

### **AREA 2**

**Upland-** Because of the relatively wet summer conditions, several of the bare areas of the slope have been vegetated since the last inspection with smartweed, rabbit's foot and red clover. Toward the upper portion of the slope there are several areas that remain not vegetated and that should be scarified, reseeded and covered in the fall. There are a few small areas of erosion that should be treated in a similar manner. The numbers of live, planted maples and oaks remain the same and they were pruned to remove dead growth. Wanderer birch seedlings have seeded from the periphery.

**Wetland-** Seasonal succession of the established and healthy wetland continues with Joe-Pie-Weed and narrow leaved and rough leaved goldenrod in bloom. The grasses, sedges and cattail are beginning to seed. Shallow pools of standing water remain at the base of the slope. The dead remains of the treated Phragmites are present. No additional Phragmites is present. Several bunches of purple loosestrife were pulled but extensive stands of purple loosestrife were present in adjacent wetlands making future eradication efforts at AOC 57 probably futile. The silt fence remains to be removed at the fall monitoring visit.

### **AREA 3**

**Upland-** As with Area 2, most of the bare patches have grown in with clover and smartweed. Several small areas remain which should be reseeded and covered to prevent future erosion. The planted trees were pruned.

**Wetland-** No Phragmites observed and several clumps of purple loosestrife were pulled. As with Area 2, the purple loosestrife removal may be a futile effort since there were major infestations in surrounding areas. Shallow pools of standing water are present in the wetland with well established wetland vegetation. The silt fence remains to be removed during the fall monitoring visit.

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## **Field Notes - DEVENS HABITAT LONG TERM MONITORING**

**30 September 2004**

The CENAE Habitat Long Term Monitoring Team of Robert Davis and Peter Trincherro visited the Devens wetland/upland restoration sites on September 30, 2004. As with the

spring and summer 2004 visits, goals were to record the progress of the restoration efforts, to monitor the success of the eradication of exotics on previous visits, and to remove silt barriers/fencing that remained on some of the sites. It is important existing silt fence be removed to eliminate barriers to wildlife between upland and wetland habitats, where these animals will find refuge for the winter. Where possible, minor habitat improvements such as erosion control, were noted and planned for implementation at a future visit. Because of the wet late summer/early fall pre-freeze conditions, plant cover was luxuriant.

### **AOC 57 Area 2**

**Upland-** There has been a degradation of the upland restoration site due to current construction activity north and west of AOC57 immediately adjacent to Area 2. A large silt basin is in the final stages of construction upland/up-gradient of AOC 57. The activity of heavy equipment modifying the topography and spilling of materials such as clay liner, has directed the flow of surface water toward the straw filled conical silt barrier. AOC57 Area 2 is vulnerable because of the topography. The recent heavy and frequent rain has overtopped the silt barrier and eroded the upper end of the site. About six inches of substrate has been eroded down the slope into the wetland area. A thin layer of recently deposited silt was observed within the wetland. This erosion is limited to the eastern portion of the site.

This problem must be corrected prior to the winter freeze to avoid any additional erosion into the wetland, especially by spring runoff. The off-site road will require regrading to channel surface water from AOC 57. The eroded areas should be refilled and seeded.

The steep-sloped upland areas comply with the performance standards of 75% native vegetation cover with no bare areas exceeding 500 square feet. The ground cover is dominated by rabbit foot clover (*Trifolium arvense*), common on arid soils with low nutrient content. The next most dominant ground cover is a variety of smartweed (*Polygonum*). The 34 red oak remain, although a couple of the trees were recently browsed by deer. The growth at the base of the trees was cut back to encourage growth. Recent wanderers to the slope include sweetfern (*Comptonia perigrina*), birch seedlings, white pine (*Pinus strobus*) and red maple (*Acer rubrum*).

There are small areas on the slope, less than 10 feet in diameter, that are bare and need of cover. Hand broadcast hydro seed mix will prevent additional erosion from these sites.

**Wetland-** The wetland continues to more than comply with the performance standards of 75% native wetland cover. This restoration is an attractive site, with many of the flora in bloom. At the transition between upland and wetland is a 20 ft swath of yellow Devil's Beggar-ticks in bloom. This monoculture grades into a healthy wetland with amphibian inhabited shallow pools. No additional *Phragmites* remains subsequent to the herbicide treatment. Many clumps of purple loosestrife remain but they remain equally distributed in the restoration. Much loosestrife is present offsite. The majority of the silt fence was removed. Unfortunately there are several areas where the barrier failed. These areas had

a second layer of fabric applied above the partially buried lower level. The top application was totally removed but in a few areas the lower buried areas will require removal with a shovel and pick. All support stakes were removed to prevent the barrier from interfering with wildlife migration. The buried fabric will be removed at a subsequent visit. The rolls of discarded silt fence fabric were placed at the edge of the site for removal and disposal (to be arranged with NCRO).

The six red maples planted at the edge of the restoration continue to thrive. In addition to the purple loosestrife, wanderers from the surrounding wetland such as honeysuckle, red maple/birch seedlings and willow continue to appear.

A list of dominant wetland vegetation observed follows.

Common Name	Genus/Species	Wetland Status
Devil's Beggar-ticks	<i>Bidens frondosa</i>	FACW
Wool Grass	<i>Scirpus cyprinus</i>	FACW+
Umbrella Sedge	<i>Cyperus strigosus</i>	FACW
Tussock Sedge	<i>Carex stricta</i>	OBL
Soft-stemmed Bulrush	<i>Scirpus validus</i>	OBL
Marsh Purslane	<i>Ludwigia palustris</i>	OBL
Cinnamon Fern	<i>Osmunda cinnamomea</i>	FACW
Sensitive Fern	<i>Onoclea sensibilis</i>	FACW
Broad-leaved Cattail	<i>Typha latifolia</i>	OBL
Purple Loosestrife	<i>Lythrum salicaria</i>	FACW
Speckled Alder	<i>Alnus rugosa</i>	FACW+
Japanese Honeysuckle	<i>Lonicera japonica</i>	FAC-
Red Maple	<i>Acer rubrum</i>	FAC
Joe-Pie-Weed	<i>Eupatorium fistulosus</i>	FACW

Fauna observed consisted of many adult amphibians in the pools. A 12-inch snake of unknown variety was observed in the silt barrier and released.

### **AOC 57 Area 3**

**Upland-** This area was not impacted by the upland/offsite construction activity. The 13 red oaks were in fine condition. Annual plant growth at the base of the trees was cut. As with Area 2, Area 3 fully complies with 75% native vegetation cover on the upland slope with no areas of 500 square feet without vegetative cover. There are small areas lacking vegetation that could be scarified and manually hydro seeded. Wanderers from the surrounding upland forest are scattered throughout the slope such as white pine, birch and sweet fern. As with Area 2, this is secondary succession in progress. The current dominant vegetation on this upland slope consists of smartweed, rabbit foot clover, various grasses and sedges.

**Wetland-** The wetland restoration complies with the requirement of 75% native wetland cover, with only miniscule areas of the wetland lacking cover. No *Phragmites* was recorded at this site, although clumps of purple loosestrife are scattered throughout the restoration area and the existing, surrounding wetland. All the silt fencing and stakes were removed from the site, gathered for removal and disposal (to be arranged with NCRO).

The dominant vegetation observed at the site was similar to that at Area 2 with the following additional flora recorded:

Common Name	Scientific Name	Wetland Status
Nodding Bur Marigold	<i>Bidens cornuta</i>	OBL
Common Burdock	<i>Arctium minus</i>	UP
Rough-leaved Goldenrod	<i>Solidago patula</i>	OBL
Multiflora Rose	<i>Rosa multiflora</i>	FACU
Jewelweed	<i>Impatiens capensis</i>	FACW
Small White Aster	<i>Aster vimineus</i>	FAC
New York Aster	<i>Aster novi-belgi</i>	FACW+

Many amphibians were observed in the wetland pools.

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**Field Notes - Devens Wetland Restoration Sites**  
**October 13, 2004**

On October 13, 2004, the wetland monitoring team consisting of Team Leader Robert Davis, Ben Loyd and Peter Trincherro spent about 4 hours visiting the several Devens wetland restoration sites to remove silt fence, evaluate ongoing exotic plant eradication efforts and to monitor the condition of the restored wetlands. It was critical the silt fence is removed prior to winter since it may act as a barrier to animals accessing winter cover in the wetland.

**AOC 57 - Area 2**

Silt fence was removed from the edge of the wetland. There were a few areas where the silt fence was buried. Removal of the silt fence in these areas would have disrupted the wetland so the support poles were broken and the fencing was cut at the surface of the ground. Fence was collected and placed at the top of the site for off-site removal. This restoration also more than satisfies the 75% criterion. A small clump of *Phragmites* was noted just east of the second monitoring well from the east. Purple loosestrife was observed but not removed due to time restraints. Plant cover for both the wetland and the upland was similar to Site 3. There was significant erosion onto Site 2 as a result of construction activity above the site. This construction was associated with the building of a large silt basin just west and upland of the wetland restoration. The access road created to construct this structure diverts amounts of upland drainage onto the upland slope of AOC 57, Site 2. Although there was a small amount of erosion visible at previous

monitoring visits from this upland area, there was erosion under the silt blanket. This increased runoff due to the construction activity resulted in much greater erosion from the upland especially on the east side of the site. The continuation of the erosion, especially during the winter and spring conditions, may impact the wetland vegetation with silt. In addition, the overflow from the newly constructed runoff basin directly flows into the wetland associated with Site 2. The impact of the new runoff basin on the two reconstructed wetlands in AOC 57 is unknown. It may act to prevent silt from entering the wetland, but it may also concentrate nutrients resulting in additional eutrophication of the wetland.

**AOC 57 - Area 3**

Silt fence was removed from the upland/wetland interface, and placed at the top of the site for off-site disposal. The water level in the wetland area exceeded the levels of the previous visit in August. The wetland restoration remains successful exceeding the 75% wetland plant cover. Fall conditions prevailed with much of the above ground vegetation in seed, dying back or with leaves in fall color. No Phragmites was observed, but several clumps of purple loosestrife were observed and pulled from the ground. Soft rush, broad-leaved cattail, burr reed, cotton grass, tussock sedge, blue vervain, silky dogwood and alder dominated the wetland area. The upland area was well stabilized with no evidence of erosion on the slopes. Red maple and white pine wanderers had colonized the edges of the upland slopes. Ground cover on the upland slopes consisted of rabbit foot clover, cow and bull thistle with many other unidentified grasses and weeds. The conservation mix provided to stabilize the slope is being replaced by colonizing species. There was no loss of red maple and oak saplings planted on the upland.

The wetland team leader subsequently reported these conditions concerning the observed erosion and sedimentation onto AOC57 Area 2 to the USCAE Project Manager for corrective action.

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**APPENDIX B**

***Area of Contamination 57 (AOC) - Photo Log Areas 2 and 3***



AOC 57 – Area 2: Restoration Work – Silt Fence Removal (July 2004)

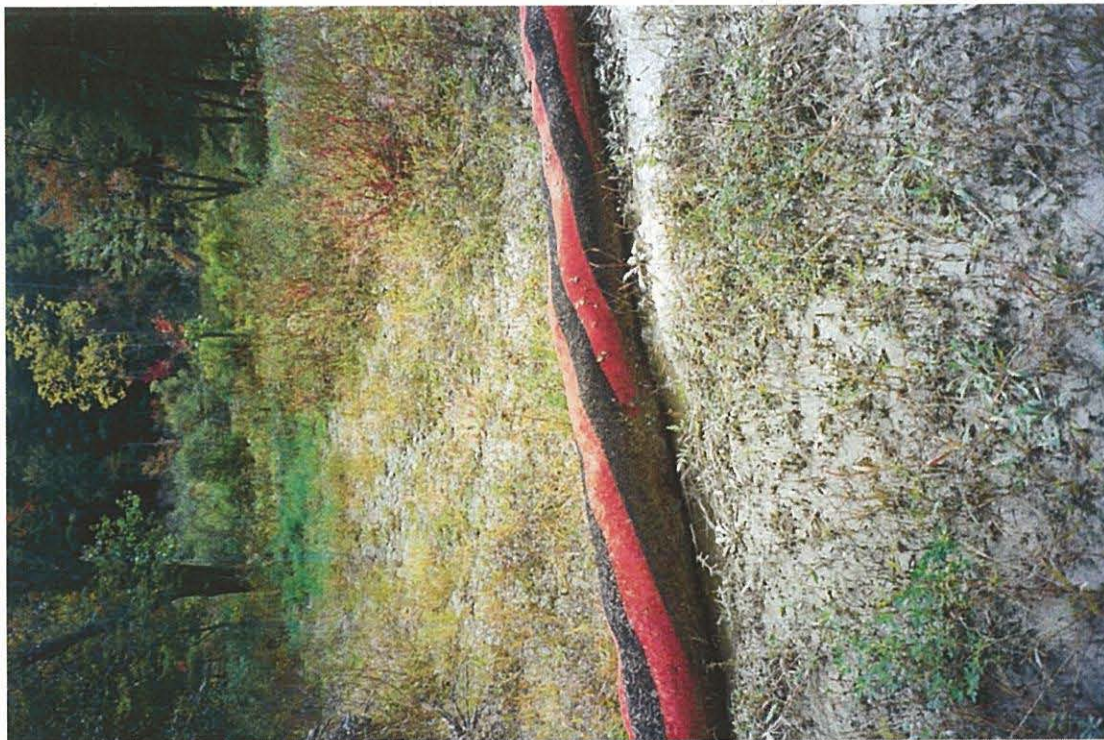


AOC 57 – Area 2: Edge of Wetland With Layer of Fine Silt (July 2004)



**APPENDIX B**

***Area of Contamination 57 (AOC) - Photo Log Areas 2 and 3***



AOC 57 – Area 2: Silt Barrier/ Siltation (July 2004)



AOC 57 – Area 2: Siltation on Upland Slope (July 2004)



**APPENDIX B**

***Area of Contamination 57 (AOC) - Photo Log Areas 2 and 3***



AOC 57 – Area 2: Silt Barrier/ Siltation on Upland Slope (July 2004)



**APPENDIX B**

**Area of Contamination 57 (AOC) - Photo Log Areas 2 and 3**



AOC 57 – Area 3: Restoration Work, Silt Fence Removal (July 2004)



AOC 57 – Area 3: Wetland Transition Area (July 2004)



APPENDIX B

*Area of Contamination 57 (AOC) - Photo Log Areas 2 and 3*



AOC 57 – Area 3: Wetland Vegetation (July 2004)



AOC 57 – Area 3: Wetland Vegetation (July 2004)