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1 November 2004

Mr. Frank J. Gally, III  
Rhode Island Department of Environmental Management  
Office of Waste Management  
Site Remediation Program  
235 Promenade Street  
Providence, Rhode Island 02908

RE: Response to Comments from the Rhode Island Department of Environmental Management,  
Dated 19 August 2004, on the Remedial Action Work Plan for the Lincoln Luce  
and Braid Former Ponagansett Dump, 67 Melissa Street, Providence, Rhode Island  
Case No. 2001-024  
EA Project No. 61846.01

Dear Mr. Gally:

On behalf of The Trust for Public Land, EA Engineering, Science, and Technology, Inc. (EA) is offering the following responses to your comments regarding EA's July 2004 Remedial Action Work Plan (RAWP) for the above-referenced site.

1. **In accordance with Rule 10.02 of the Remediation Regulations, please remit to this Office the Remedial Action Approval Application Fee in the form of a check for one-thousand dollars (\$1000.00) made payable to the "General Treasurer – State of Rhode Island."**

The Remedial Action Approval Application Fee was submitted to the Rhode Island Department of Environmental Management in August 2002.

2. **Please collect representative samples of prospective clean-fill (to be used in construction of the engineered barrier) for Polycyclic Aromatic Hydrocarbons (PAHs) laboratory analysis.**

In addition to the analyses proposed in the RAWP (volatile organic compounds, total priority pollutant metals, and total petroleum hydrocarbons), prospective clean fill will be submitted for laboratory analysis of PAHs. Samples will be collected at the same frequencies established in the RAWP. The page of the RAWP associated with this clarification has been revised and is included as Attachment B.

3. **Please provide, identify, and include in the RAWP the types of vegetation proposed for stabilizing the engineered barriers for the landfill and the riparian buffer area. Prior to issuing any Letter of Compliance, all engineered barriers shall be stabilized with established, adequate, and uniform vegetative cover.**

Attachment A includes plans and specifications for vegetation proposed for stabilizing the riparian buffer area. The remainder of the engineered cap will be stabilized with a grass seed mixture appropriate for the region. All plantings are scheduled for completion in Spring 2005.



- 4. The design details in the RAWP depict a different engineered barrier than the one discussed in the RAWP narrative. Similarly, the engineered barrier discussed in the Soil Management Plan is also inconsistent with the other design proposed in the RAWP. Please revise these accordingly.**

The engineered barrier proposed for the site consists of a geotextile fabric covered with a minimum of 8 in. of gravel and 4 in. of organic soil as described in the Soil Management Plan and shown on the drawings. The page of the RAWP associated with this clarification has been revised to indicate the design proposed on the drawings and in the Soil Management Plan. This revised page is included as Attachment B.

- 5. The engineered barrier proposed in the RAWP for the riparian buffer area consists of only 12 inches of topsoil. The engineered barrier proposal does not meet the Department's standard design requirements for two (2) feet of clean fill or equivalent. Please revise the proposed engineered barrier design for this area to one consistent with Department requirements.**

The 12-in. thick soil barrier was selected for the riparian buffer area because it is anticipated that removal/regrading of discrete waste (e.g., surficial debris and soil piles) and placement of the proposed cover soil and riparian buffer plantings detailed in Attachment A will not result in a net decrease in flood storage capacity. In order to eliminate flood storage reduction and install the requested 2-ft thick cap, the area would have to be cut by an additional foot prior to installation of the 2-ft cap. This additional cut would require removal of substantial vegetation along the riparian zone and riverbank. It is important to maintain the existing vegetation for a number of reasons:

- The foliage acts to slow floodwaters on or near the bank and minimize erosion of landfilled materials.
- Plant root structure acts as a soil binder that further protects the bank from erosion or slope failure.
- Plant structure removes water from the soil through transpiration reducing hydrostatic forces that could cause failure of certain soils.
- The foliage provides a stable location for establishment of volunteer and planned plant growth that further stabilizes the area and provides a natural appearance.
- Canopy from larger trees reduces impact of solar radiation on the water surface, maintains cooler airflow over the stream, and is more conducive to survival of coldwater fish species.

It is important to note that installation of a geotextile and a 1-ft thick cap in this area will result in similar loss of vegetation.

EA recommends maintenance of the vegetative cover in the riparian zone to the extent practicable to minimize erosion and slope failure, and our design reflects this recommendation.

- 6. Please verify that the Tenax geotextile proposed for use in constructing the engineered barrier over the landfill meets the Department's general geotextile requirements for use in an engineered barrier (i.e., a minimum burst strength of 400 psi and a minimum of puncture strength of 120 lbs).**



Attachment C includes a specification sheet for ProPex 4510 manufactured by Amoco, which is proposed as a substitute for the Tenax material in the RAWP. ProPex 4510 meets requirements for puncture and burst strength. We note that other 10-oz, non-woven geotextiles meeting the requirements may be used in lieu of ProPex.

- 7. Please identify, and include in the RAWP, specific plans for controlling dust at the Site during the performance of the Remedial Action.**

The Request for Proposals to be prepared for the general contractor to perform the remedial action will include requirements for an onsite water truck at all times during construction activities in order to control dust.

- 8. Please provide a more detailed remediation schedule addressing the sequencing and duration of the main elements of the proposed Remedial Action. This would include, but may not be limited to, debris and surficial solid waste removal, establishment of erosion controls, clearing and grubbing, regrading, cap construction, buffer restoration, seeding, and post-remediation site inspections and reseeded as necessary to ensure the establishment of adequate and uniform vegetative cover.**

Attachment D includes a revised remediation schedule with milestones for construction activities. The general contractor will prepare a detailed schedule in Spring 2005. This schedule will include actual milestone dates.

- 9. Please be advised that the Department will require the submission of monthly status reports to document progress through the completion of the Remedial Action. The Department will also require that daily inspections are performed by a qualified environmental professional for the duration of earthmoving activities and through the completion of engineered barrier construction.**

Agreed.

- 10. Based on the information on-file to date, the Department does not concur with the proposal for the future segregation of lots from the Site for the construction of residences.**

The limits of the former Ponagansett Dump will be established during initial construction activities. Following this investigation, future use alternatives will be proposed for the non-dump portions of the site.

- 11. The RAWP indicates that the City of Providence may potentially use the Site as a future tree farm. Please be advised that any temporary plantings at the Site shall be performed utilizing raised beds that incorporate a barrier between the plantings and the engineered cap to prevent the engineered cap from being disturbed.**

Agreed.

- 12. Prior to the Environmental Land Usage Restriction (ELUR) being recognized in the City of Providence land evidence records, it shall be subject to Department review and approval as part of the Remedial Action Closure Report submitted upon completion of the Remedial Action.**



The ELUR to be filed for the site will be included in the Remedial Action Closure Report for the Rhode Island Department of Environmental Management's review prior to filing in the City of Providence land evidence records.

13. **Section 9 – Security Procedures of the RAWP indicates that the Site is completely secured with fencing. This is not entirely accurate. Based on recent security issues on the adjacent Lincoln Lace and Braid property, additional security fencing may be necessary to prevent unauthorized access to the Site. Please be advised that the Trust for Public Land, in its capacity as owner of the Site, is responsible for ensuring adequate and effective security through the completion of the Remedial Action.**

The Request for Proposals to be prepared for the general contractor to perform the remedial action will include a requirement for complete fencing around the site during remediation activities.

14. **Please provide a revised site plan that depicts the following:**

- a. **The location of the 100-year floodplain associated with the Woonasquatucket River. The narrative states that most of the restoration activity is planned within the 100-year floodplain.**
- b. **All existing and proposed grades within the 100-year floodplain.**
- c. **The limits of the proposed riparian restoration area. These are not clearly depicted on the plans provided.**
- d. **All proposed grades within the riparian restoration area. Proposed grades illustrated on the provided plans cannot be determined. If necessary, please provide a larger scale drawing of this area.**
- e. **The proposed locations for all materials to be stockpiled.**
- f. **The locations of proposed dewatering areas, if any, along with a details of the proposed dewatering basins.**

Revised Figures 2 through 5 are included in Attachment E. The revised figures include the information requested above. Because handling of saturated soil is not expected, no proposed dewatering areas nor related details have been included in the revised figures. All construction material stockpiles will be located within the limits of construction. As a clarification, please note that the narrative incorrectly stated that most of the restoration activity would occur within the 100-year floodplain. In fact, none of the restoration area lies within the floodplain. The page of the RAWP associated with this clarification has been revised and is included as Attachment B.

15. **Please explain the “proposed grade break” line depicted on the “Proposed Redevelopment Plan.” It appears that grading is proposed outside of the line.**

In general, a grade break line indicates the point where a design slope transitions from one consistent grade (e.g., 20 percent) to another (e.g., 5 percent). In this case, the proposed grade break depicted on the Proposed Redevelopment Plan (Figure 5) indicates the point at which the final grade in the cap area tapers to meet the existing grade, as shown on the Typical Cap



Termination Detail (Detail 5 on Figure 4). Grading is proposed outside the line because the proposed grade continues beyond the grade break until it intersects the existing grade.

16. **Please note that if displacement of the 100-year floodplain is proposed at this site, such displacement must be compensated for on a one-to-one basis along the same stretch of the watercourse, and must be depicted on revised plans. Relief from this requirement may be obtained if a registered professional engineer can demonstrate to the satisfaction of the Freshwater Wetlands Program that the displacement of floodplain is so limited in scope that it will not impact the subject or adjacent freshwater wetlands, and/or any off-site property.**

The revised Proposed Redevelopment Plan (Figure 5) includes the limit of the 100-year floodplain based on the 100-year flood stages provided on Federal Emergency Management Agency flood insurance maps and existing conditions survey data. As indicated on the revised Proposed Redevelopment Plan, none of the riparian restoration area lies within the 100-year floodplain.

17. **Please make sure that the revised plans do not depict the proposed bike path. This construction is not exempt under Rule 6.08 and will not be authorized as part of the review process subject of this remediation activity. Similarly, only those activities specifically defined in Rule 6.08 are eligible for a wetlands exemption. Any additional work beyond that required to remediate the Site as enumerated in Rule 6.08 (such as the proposed bike path) will require the submission and review of an appropriate Application to the Freshwater Wetlands Program, such as a Request for Preliminary Determination. Such application will determine if the additional activities can be authorized as an insignificant alteration, or if the proposed work represents a significant alteration of the subject wetlands.**

The proposed bike path alignment has been removed from the revised Proposed Redevelopment Plan as requested.

If you have any further questions or concerns about this property, please do not hesitate to contact me at 401-736-3440.

Sincerely,

EA ENGINEERING, SCIENCE,  
AND TECHNOLOGY, INC.

A handwritten signature in black ink, appearing to read 'Timothy C. Regan'. The signature is fluid and cursive, with a long horizontal line extending from the end of the name.

Timothy C. Regan, P.E., M.B.A.  
Client Manager/Senior Engineer

**Attachment A**

**Plans and Specifications  
for Vegetation Proposed for  
Stabilizing the Riparian Buffer Area**

# WOONASQUATUCKET RIVER

*Providence, Rhode Island*

## PONAGANSETT AVENUE REMEDICATION PROJECT

## HABITAT RESTORATION/ PLANTING SPECIFICATIONS

*SEPTEMBER 2004*

*Prepared for:*

EA Engineering, Science and Technology, Inc.

*Prepared by:*

***Kleinschmidt***  
*Energy & Water Resource Consultants*

WOONASQUATUCKET RIVER  
Providence, Rhode Island

PONAGANSETT AVENUE  
REMEDICATION PROJECT

Habitat Restoration/  
Planting Specifications

September 2004

Prepared for:

EA Engineering, Science and Technology, Inc.

Prepared by:

***Kleinschmidt***  
Energy & Water Resource Consultants

WOONASQUATUCKET RIVER  
PROVIDENCE, RI

PONAGANSETT AVENUE REMEDIATION PROJECT

HABITAT RESTORATION/  
PLANTING SPECIFICATIONS

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WOONASQUATUCKET RIVER  
PROVIDENCE, RI

PONAGANSETT AVENUE REMEDIATION PROJECT

HABITAT RESTORATION/  
PLANTING SPECIFICATIONS

1.0 *GENERAL*

1.1 Summary

This document describes riparian buffer restoration activities which are limited to the area of restoration (see Sheet 2 Planting Plan). Remediation activities will precede restoration of the riparian forest buffer. These activities will focus on the removal of contaminated soil, debris, and invasive vegetation. Efforts will be taken to preserve mature trees and other desirable native vegetation. Surficial debris, soil piles and discrete waste will be removed/regraded, these areas will be supplemented with approximately 1 foot of clean, high organic content fill. The site will then be revegetated to stabilize soils and enhance species diversity and structural complexity. These activities will be conducted using best management practices and every effort to minimize impacts to the surrounding landscape will be taken.

This section covers specifications regarding acquisition and handling of plant material, planting, post planting maintenance, and performance criteria. Specifications for supplemental topsoil, amendments to this topsoil, topsoil testing, and topsoil placement are also included.

1.2 Qualifications for Plant Installation

Plant installation shall be supervised by an experienced landscaping firm and a wetland scientist/habitat restoration specialist. Volunteer labor from local conservation/watershed groups, may be used to supplement professional landscaping staff and the restoration specialist.

### 1.3 Shipment, Delivery, Inspection, Storage, and Handling of Materials

#### 1.3.1 Shipping Containers

- a. **Plugs and container-grown trees and shrubs.** Containers shall be sufficiently rigid to hold root ball shape and protect plant from damage during shipping.

#### 1.3.2 Identification of Plant Material

Trees and shrubs shall be identified with durable waterproof, u-v stabilized labels, and weather-resistant ink stating the correct plant name and size.

#### 1.3.3 Protection of Plant Material During Shipment

Plant material shall be protected during shipment and delivery to prevent desiccation or excessive damage to the branches, stems, or leaves.

#### 1.3.4 Inspection

Plant material and other products shall be inspected upon arrival at the jobsite for conformity to the specifications. Any unacceptable materials shall be removed from the jobsite.

#### 1.3.5 Storage of Plant Material

Plant material not installed on the day of arrival at the site shall be stored in appropriate designated areas. All plant material, including container-grown trees and shrubs, shall be kept moist. Plants shall be protected from exposure to wind and shall be shaded from the sun.

#### 1.3.6 Storage of Other Materials

Mulch and planting stakes et al. shall be stored in areas designated or approved by the Project Manager.

## 2.0 **PRODUCTS**

### 2.1 Plants

#### 2.1.1 Vegetation Zones

- a. The restoration planting plan for the Ponagasset Remediation Project consists of two distinct vegetation zones. The species composition of each zone reflects morphological and physiological adaptations of the species occupying them to their specific habitats. In a pristine riparian habitat, stream/river specific hydrology and soil characteristics are primary determinants of the extent of these zones. Since remediation activities will strive to preserve mature trees and other desirable native vegetation when possible, an enhancement planting approach has been taken. This approach stresses under-story, and shade tolerant plantings as the primary components of the Revegetation activities. In addition, only woody species have been selected for these plantings in order to enable installation between 15 September and 1 November.
  
- b. The following passages briefly describe the physical characteristics which are commonly associated with these zones. The diversity of species outlined in the zone descriptions is reflective of the inherent uncertainties of restorative planting success. For this reason many of the species are redundant throughout the various zones, these redundancies are also found in nature as certain plant species are tolerant of a wide range of hydrologic and soil saturation scenarios. Due to the uncertainty of the normal high water levels in this section of the Woonasquatucket River, specific elevation boundaries for these zones are not described.

#### **Zone A-Floodplain Forest**

The floodplain forest community is made up of plant species which are tolerant of both saturated and unsaturated

soils and infrequent seasonal inundation. This community is typically found approximately 1' to 5' above normal high water levels. See Section 2.1.2 Table 1 for species composition, planting densities and stock sizes.

**Zone B- Riparian Uplands**

Uplands Riparian upland communities are typically made up of species that are tolerant of infrequent inundation, usually associated with flooding events above annual high water levels. This community is typically found +5' above normal high water levels, however exact location may vary. See Section 2.1.2 Table 2 for species composition, planting densities and stock sizes.

2.1.2 Vegetation Zone Tables

**Table 1: Zone A- Floodplain Forest**

Zone A- Floodplain Forest					
Scientific name	Common Name	Size	Quantity (~12' ctrs)	USFS Indicator Status (Region 1)	Inundation Tolerance*
<b>Trees</b>					
<i>Acer rubrum</i>	Red maple	4-6'	2	FAC	25
<i>Acer saccharinum</i>	Silver maple	2-3'	2	FACW	25
<i>Betula alleghaniensis</i>	Yellow birch	3-4'	2	FAC	N/A
<i>Fraxinus pennsylvanica</i>	Green ash	18-24"	2	FACW	75
<i>Nyssa sylvatica</i>	Black gum	4-6'	2	FAC	25
<i>Quercus bicolor</i>	Swamp white oak	4-6'	2	FACW+	25
<b>Shrubs</b>					
<i>Aronia arbutifolia</i>	Red chokeberry	2-3'	4	FACW	25
<i>Ilex verticillata</i>	Winterberry	18-24"	6	FACW+	25
<i>Lindera benzoin</i>	Spicebush	2-3'	2	FACW+	13-25
<i>Clethra alnifolia</i>	Sweet pepparbush	18-24"	8	FAC+	NA
<i>Viburnum trilobum</i>	American cranberrybush	2-3'	7	FACW	NA
<i>Myrica pensylvanica</i>	Bayberry	2-3'	3	FAC	25
<i>Sambucus canadensis</i>	Elderberry	18-24"	3	FACW-	26-100
<i>Vaccinium corymbosum</i>	Highbush blueberry	3-4'	4	FACW-	13-25
<i>Viburnum cassinoides</i>	Wild raisin	18-24"	3	FACW+	N/A
<b>Total Plants</b>			52		
<b>Total Area of Zone A-Floodplain Forest (enhancement)</b>			<b>0.13 acres</b>		

\* Inundation tolerance indicates the percentage of the growing season in which the species can tolerate flooding inundation, from: Thurnhorst G.A. (1993) *Wetland Planting Guide for the Northeastern United States: Plants for Wetland Creation, Restoration, and Enhancement*. Environmental Concern, Inc., St. Michaels, Maryland.

**Table 2: Zone B- Riparian Uplands**

Zone B- Riparian Uplands				
Scientific name	Common Name	Size	Quantity	USFS Indicator Status (Region 1)
<b>Trees</b>				
<i>Acer saccharum</i>	Sugar maple	4-6'	2	FACU-
<i>Cornus florida</i>	Flowering dogwood	18-24"	14	FACU
<i>Fagus grandifolia</i>	Beech	4-5'	6	FACU
<i>Ostrya virginiana</i>	Ironwood	18-24"	6	FACU-
<i>Pinus strobus</i>	White pine	2-3'	5	FACU
<i>Prunus serotinus</i>	Black cherry	3-4'	7	FACU
<i>Quercus alba</i>	White oak	2-3'	2	FACU/FACU+
<i>Quercus rubra</i>	Red oak	3-4'	4	FACU-
<i>Quercus velutina</i>	Black oak	3-4'	5	NI
<i>Tilia americana</i>	Basswood	2-3'	8	FACU
<b>Shrubs</b>				
<i>Aronia arbutifolia</i>	Red chokeberry	2-3'	8	FACW
<i>Clethra alnifolia</i>	Sweet pepparbush	18-24"	12	FAC+
<i>Cornus racemosa</i>	Gray dogwood	2-3'	9	FAC
<i>Ilex verticillata</i>	Winterberry holly	3-4'	8	FACW+
<i>Lindera benzoin</i>	Common spicebush	18-24"	4	FACW-
<i>Vaccinium angustifolium</i>	Lowbush blueberry	18-24"	6	FACU-
<i>Viburnum trilobum</i>	American cranberrybush	2-3'	6	FACW
<i>Comptonia peregrina</i>	Sweet fern	18-24"	8	NI
<i>Corylus americana</i>	Hazelnut	18-24"	12	FACU-
<i>Gaylussacia baccata</i>	Black huckleberry	18-24"	9	FACU
<i>Hammamelis virginiana</i>	Witchhazel	18-24"	14	FAC-
<i>Kalmia latifolia</i>	Mountain laurel	2-3'	18	FACU
<i>Myrica pennsylvannica</i>	Bayberry	18-24"	9	FAC
<i>Prunus maritima</i>	Beach plum	18-24"	10	UPL
<i>Rhus typhina</i>	Staghorn sumac	18-24"	8	UPL
<b>Total Plants</b>			200	
<b>Total Area Zone B- Riparian Uplands (Enhancement)</b>			<b>0.44 acres</b>	

2.1.3 Source

Plant material shall be provided by a nursery which procures and/or produces native material specifically for restoration or construction projects. Possible sources of this plant material include, but are not limited to, the following:

New England Wetland Plants, Inc.  
800 Main Street  
Amherst, MA 01002  
Phone: 413-256-1752

NYS Urban and Community Forestry Council  
87 State Street  
Brooklyn, NY 11201  
Phone: 718-834-4589

Plant material shall derive from stock native to the northern United States, east of Ohio and north of 39.5 degrees north latitude.

#### 2.1.4 Substitutions

Plant material shall be provided as indicated on the Planting Plan drawings for all vegetation zones in the restoration area. Requests for substitutions shall be submitted in writing to the Project Biologist for approval.

#### 2.1.5 Quality

##### 2.1.5.1 Trees and Shrubs

Vigorous, healthy plants having healthy and well-branched root systems shall be provided. If in leaf, plants shall be provided free from disease with no leaf damage, chlorosis, or wilting and no insect damage, sun-scald injury, or broken branches. If dormant (without leaves), stems shall be pliable and exhibit healthy (light green to yellowish green) cambium. Plants with brittle stems, unhealthy cambium, or broken branches will not be accepted.

#### 2.1.6 Size

Plants shall be furnished in sizes indicated. Plants larger in size than specified are acceptable.

### 2.1.7 Measurement

Trees and shrubs shall be measured from the base of the plant to the highest naturally occurring branch or leaf. Drooping branches shall not be extended while the plant is being measured.

## 2.2 Other Materials

### 2.2.1 Fertilizer

Fertilizer shall be a commercial grade tablet or granular release (8 to 14 month) variety such as Osmocote 18-5-11, Agriform 20-10-5, or approved equal. Fertilizer shall be provided by the contracting landscaper and application methods/rates shall be determined by this firm in the field at the time of planting.

### 2.2.2 Topsoil

Topsoil shall be suitable planting medium (*i.e.*, loam with proper proportion of sand, silt and clay—no more than about 28% clay and no more than about 70% sand). Supplemental topsoil and amendments shall be added as necessary to create a suitable growth medium. Soil physical properties (*i.e.*, pH texture, organic content, lack of salt or contaminants) shall be suitable for plant growth at the time of plant installation. The soil shall be free of debris, noxious weeds, substances, or other materials harmful to plant growth. Consistence shall be friable (*in situ* soil density must be < 1.40 g/cm); pH levels should range from 5.0 to 7.0. The depth of clean topsoil over subsoil shall be a minimum of 6 inches. Greater depths are acceptable.

### 2.2.3 Top Dressing

Three to four inches of well-aged organic mulch is to be spread around restorative plantings as top dressing over clean topsoil. Mulch can be shredded and composted hardwood mulch (usually a mixture of hardwood chips, twigs, and leaves) or composted organic matter. Uncomposted organic matter or fresh (green) wood, twigs, clippings, or other waste is not acceptable. When planting

woody plant material, mulch shall be spread back a few inches from the base of the stems to discourage boring insects and fungi. The mulch application shall minimize watering requirements (by retarding evaporation and high soil temperatures) and will improve appearance. Silt fences should be used to prevent mulch from washing downslope to the river in the event of flooding. Additional silt fencing may need to be installed to protect restoration areas from run-off originating from topographically higher project areas.

### 3.0 *EXECUTION*

#### 3.1 Site Preparation

##### 3.1.1 Invasive Species

The Ponagansett Remediation site is typical of many disturbed sites in that it harbors numerous invasive plant species. Invasive plants of note at this site include; Japanese knotweed (*Fallopia japonica*), and Oriental bittersweet (*Celastrus orbiculatus*). If these populations are not addressed they will undoubtedly compromise the integrity of the restoration project. The aggressive nature and superior competitive ability of these plants in disturbed habitats (i.e. newly planted areas), will negatively affect botanical diversity and survivorship of restorative plantings.

The following recommendations and action plans are proposed with the understanding that trained professionals will identify and treat targeted invasive species at this site. It is important to note that these recommendations will only be effective if diligent maintenance and monitoring schedules are adhered to.

##### 3.1.1.1 Japanese knotweed (*Fallopia japonica*):

Japanese knotweed (*Fallopia japonica*) is a clonal herbaceous perennial expanding primarily from rhizomes; however it has been observed propagating from inter-nodal aerial tissue as well. This herbaceous perennial combines early emergence with a fast growth rate to

establish a dense leaf canopy, its photosynthetic potential facilitates large and extensive rhizome growth. This strategy excludes many native annuals and herbaceous perennials through effective above and below-ground competition.

Treatment options include chemical and mechanical approaches, while a combination of the two is most effective. Multiple cuts in one growth season are required to significantly effect resource assimilation to belowground parts. Application of glyphosate (Rodeo) to cut stems near the time of leaf senescence (fall) will transport the herbicide to belowground parts detrimentally effecting the vigor of the rhizome system and reducing the following years aboveground biomass production.

Replacement planting is recommended post herbicide treatment to reduce the risk of re-establishment. In addition to replacement therapy, a monitoring regime should be adhered to for at least five years. This should include cutting above ground growth and spot applications of glyphosate to particularly resilient areas. All cut stems of *F. japonica* should be bagged and removed from the site, failure to properly dispose of these cut stems can result in the further spread of this invasive. While eradication of this invasive is unlikely, control of fairly young colonies is possible if the treatment recommendations outlined above are followed.

#### 3.1.1.2 Oriental bittersweet (*Celastrus orbiculatus*):

Oriental bittersweet (*Celastrus orbiculatus*) is a woody climbing vine which utilizes surrounding vegetation or buildings for structural support. Its climbing habit can result in the constriction of vascular systems and/or smothering of surrounding vegetation. It has also been suggested that *C. orbiculatus* vines contribute to higher incidence of tree mortality due to reduced photosynthesis of host plants. The additional weight of these vines burden their host which is thought to increase the likelihood of host plant upheaval under severe weather conditions.

Prolific seed production and an avian dispersal vector compound control difficulties.

Recommended treatment of *C. orbiculatus* should combine severing the connection of climbing vines from their associated root balls (severed vines can be expected to die and decompose in a couple of years), with cut stem application of herbicide (Garlon3A) in early fall or mid summer. Late fall herbicide applications require lower concentrations than summer applications (0.5% vs. 1.0% respectively), therefore fall application is recommended. Due to constraints inherent in the work site vines should be cut during the winter (when they are easily identified) and treated prior to restorative planting and followed up in the fall with a second application. Monitoring should last four-five years and recognize the likelihood of the need for repeated herbicide applications.

#### 3.1.1.3 Poison Ivy (*Toxicodendron radicans*)

While poison ivy is not generally considered an invasive species, compounds within this plant are known to cause allergic reactions causing rashes and other skin irritations in humans. For this reason its abundance at the Ponagansett Avenue Restoration site are of special concern considering that plant installations may be completed by volunteers.

The treatment recommendation for *T. radicans* is a foliar application of herbicide (Rodeo). Cut stem application may be necessary for large specimens or vines with significant amounts of biomass that is not accessible by foliar herbicide application. Treatment may need to be repeated over multiple seasons, but should be initiated at least two weeks prior to the use of volunteers on site in order to allow the herbicides to take effect and reduce the likelihood of human skin irritations.

## 3.2 Planting

### 3.2.1 Planting Times

Planting times shall be as follows, unless otherwise approved by the Nursery Contractor and the Contracting Officer:

**Trees and Shrubs.** 15 May to 15 June or 15 September to 1 November.

### 3.2.2 Planting Conditions

Planting shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted to and approved by the Project Biologist.

### 3.2.3 Planting

Plant material shall be installed at the densities indicated on the contract drawings.

- a. **Plugs, trees, and shrubs.** Material shall be set plumb and held in position until sufficient soil has been firmly placed around the root mass or plug. Plants shall be set in relation to surrounding grade so that they are even with the depth at which they were grown in the container. Plastic containers shall be removed prior to planting. Under no circumstances shall trees and shrubs be planted in standing water.

### 3.2.4 Fertilization

Container-grown trees and shrubs shall be fertilized with a granular or tablet form of slow release fertilizer placed at the bottom of the hold dug for planting. Each plant shall be fertilized with 30 grams of 12- to 14-month

Agriform 20-10-5 or approved equal or as directed by the project landscaping contractor once field conditions are apparent..

#### 3.2.5 Clean Up

Excess and waste material from the planting operation shall be removed and disposed of off the project site.

### 3.3 Erosion Control

A line of properly toed-in silt fence shall protect downslope areas from work in the project area. Additional erosion control measures may be prescribed by the project manager depending on site specific conditions.

### 3.4 Maintenance

#### 3.4.1 Watering

Planted areas shall be watered during the initial growing season as necessary to maintain an adequate supply of moisture within the root zone. Irrigation water may be pumped from the Woonasquatucket River during high flow months such as May and June. When the River is at low levels and there is little flow, as determined by best professional judgement, River water shall not be used for irrigation.

#### 3.4.2 Replacement

If performance standards are not met, the contracting officer may require replanting or reseeding. Material provided for replacement shall be in accordance with Subsection 2.1.2. Replacement plants shall be installed in accordance with Section 3.2. An extended plant establishment period may be required for replacement plants.

### 3.5 Performance Standards and Monitoring

#### 3.5.1 General

Following planting, long-term monitoring of restored areas shall be completed as necessary and as possible. Monitoring is especially crucial during the first two months after plant installation, “plant establishment period”. At the end of the period, certain performance standards as described below should be strived for.

#### 3.5.2 Plant Establishment Period

The plant establishment period shall commence immediately after planting and extend two months past planting.

#### 3.5.3 Performance Standards

The following performance standards should be met at the end of vegetation establishment period unless otherwise directed by the contacting office.

- a. Sideslopes shall be stabilized with native vegetative cover and have no eroding areas.
- b. Eighty percent of planted trees and shrubs shall be in a vigorous growing condition with at least 75 percent of branches alive and supporting a typical number of leaves for a healthy sapling of the species or, if dormant, with healthy (light green to yellowish green) cambium.

### 3.6 Inspections, Corrective Action, and Acceptance

#### 3.6.1 Preliminary Inspection

Immediately after planting is complete, a preliminary inspection shall be held by the Project Biologist and by the landscaping contractor. The quantity and type of plants installed and general acceptability in accordance with the planting plan shall be determined.

## **Attachment B**

**Revised Page Indicating the  
Design Proposed on the Drawings  
and in the Soil Management Plan**

The protective cover soil layer of the closure cap system, also commonly termed the vegetative support soil layer, will consist of a minimum of 12 in. of certified clean fill material placed over the entire landfill extending to the designated boundaries of the closure cap. The vegetative support soil layer is designed to provide for root growth while buffering the underlying layers from damage due to the effects of frost penetration, root penetration, and loading of the finished surface of the landfill closure cap. The upper 4 in. of this soil layer will be specified as an organic topsoil having characteristics to promote adequate vegetation, stability, and erosion resistance.

This fill material will meet the RDEC and GB Leachability Criteria, and will be sampled for arsenic at a frequency of one sample per 500 tons. One-quarter of the total number of compliance samples of clean fill will be sampled for VOCs, Total Priority Pollutant (PP13) Metals, PAHs and TPH. Laboratory results will be forwarded to RIDEM upon receipt.

### **3.1.4 Riparian Buffer Restoration**

The Trust for Public Land has received funding from the Natural Resources Conservation Service to create/restore a buffer adjacent to the Woonasquatucket River along the river side of the future bike path alignment. This riparian restoration opportunity involves regrading of the existing buffer north of the future bike path alignment during site closure activities to enhance infiltration, accommodate stormwater runoff, and create micro-habitat diversity.

This restoration area is located adjacent to the Woonasquatucket River, and will enhance and encourage the wildlife habitat that currently frequents the surrounding area. None of the area subject to this restoration is located within the 100-year flood plain. In order to provide this riparian buffer zone, existing conditions in an area adjacent to the Woonasquatucket River will be maintained during construction to the extent possible. This area encompasses approximately 0.8 acres and is depicted on Figure 5. Disturbance in this area will be limited to activities necessary to remove identified surficial debris and regrade isolated areas to promote positive drainage. Maintaining current conditions will provide an aesthetic value as discussed, in addition, the existing root mass will help stabilize the slope to avoid excessive erosion during and following construction. Following debris removal and limited regrading, a minimum of 12-in of organic loam material will be placed on the slope, and the riparian buffer zone planting will be implemented to stabilize the slope as depicted on Figures 4 and 5. This restoration area will remain undeveloped as part of the redevelopment plan for the site, and will be subject to all of the requirements of the sitewide ELUR that will be placed on the property following remedial activities.

### **3.1.5 Environmental Land Usage Restriction**

An ELUR documenting the required maintenance and annual inspection of the engineered cap will be recorded in the land evidence records for the property following remedial action activities. This ELUR will include the SMP to provide protocol for future intrusive activities.

**Attachment C**

**Specification Sheet for ProPex 4510  
Manufactured by Amoco**

# ProPex<sup>®</sup>

geotextiles

## 4510

**ProPex 4510** is a polypropylene nonwoven needlepunched fabric. This engineered geotextile is stabilized to resist degradation due to ultraviolet exposure. It is resistant to commonly encountered soil chemicals, mildew and insects, and is non-biodegradable. Polypropylene is stable within a pH range of 2 to 13, making it one of the most stable polymers available for geotextiles today. We wish to advise that **ProPex 4510** meets the following minimum average roll values:

Property	Test Method	Minimum Average Roll Value (English)	Minimum Average Roll Value (Metric)
Unit Weight	ASTM-D-5261	10 oz/yd <sup>2</sup>	339 g/m <sup>2</sup>
Grab Tensile	ASTM-D-4632	250 lb	1.11 kN
Grab Elongation	ASTM-D-4632	50 %	50 %
Mullen Burst	ASTM-D-3786	520 psi	3584 kPa
Puncture	ASTM-D-4833	155 lb	0.689 kN
Trapezoidal Tear	ASTM-D-4533	100 lb	0.445 kN
UV Resistance	ASTM-D-4355	70 % at 500 hrs	70 % at 500 hrs
AOS <sup>(1)</sup>	ASTM-D-4751	100 sieve	.15 mm
Permittivity	ASTM-D-4491	1.2 sec <sup>-1</sup>	1.2 sec <sup>-1</sup>
Flow Rate	ASTM-D-4491	85 gal/min/ft <sup>2</sup>	3460 L/min/m <sup>2</sup>
Coefficient of Permeability	ASTM-D-4491	0.20 cm/sec	0.20 cm/sec
Thickness	ASTM-D-5199	85 mils	2.15 mm

(1) max. average roll value

Amoco Fabrics and Fibers Company manufactures the nonwoven fabric indicated above. The values listed are a result of testing conducted in on-site laboratories. A letter certifying the minimum average roll values will be issued from the manufacturing plant by the Quality Control Manager at the time shipment is made.

**DATE ISSUED: 01/02/04**

Amoco Fabrics and Fibers Company  
 260 The Bluffs  
 Austell, GA 30168  
 PH: 770-944-4569  
 FX: 770-944-4584

#### Exclusion of Liability

Information contained in this publication is accurate to the best of the knowledge of Amoco Fabrics and Fibers Company. Any information or advice obtained from BP otherwise than by means of this publication and whether relating to BP materials or other materials, is also given in good faith. However, it remains at all times, the responsibility of the customer to ensure that BP materials are suitable for the particular purpose intended. Insofar as materials not manufactured or supplied by BP are used in conjunction with or instead of BP materials, the customer should ensure that he has received from the manufacturer or supplier all the technical data and other information relating to such materials. BP accepts no liability whatsoever (except as otherwise expressly provided by law) arising out of the use of information supplied, the application of processing of the products described herein, the use of other materials in lieu of BP materials in conjunction with such other materials.



**Attachment D**

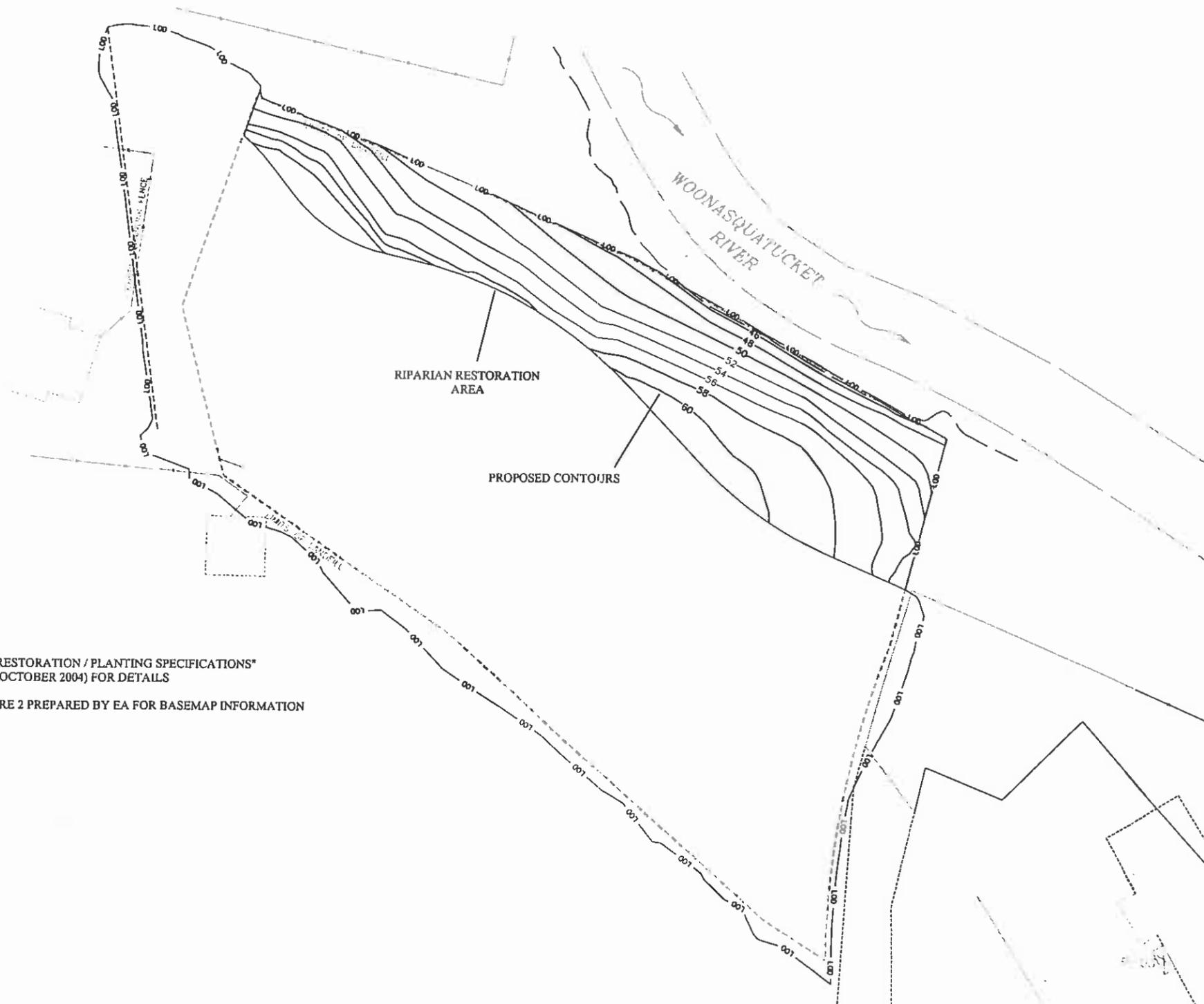
**Revised Remediation Schedule  
with Milestones for Construction Activities**

**Revised Remediation Schedule  
with Milestones for Construction Activities**

<b>Project Task</b>	<b>Approximate Start Date</b>	<b>Approximate Completion Date</b>
1. RAWP Submittal to RIDEM	14 July 2004	-
2. RIDEM Approval	-	1 December 2004
3. General Contractor Procurement	1 December 2004	1 January 2005
4. General Contractor Selection	1 February 2005	-
5. Pre-Construction Meeting	15 March 2005	-
6. Erosion Control Measures	28 May 2005	1 September 2005
7. Landfill Extent Evaluation	4 April 2005	5 April 2005
8. Debris and Surficial Waste Removal	5 April 2005	8 April 2005
9. Clearing and Grubbing	11 April 2005	15 April 2005
10. Site Grading	18 April 2005	29 April 2005
11. Geotextile Installation	25 April 2005	6 May 2005
12. Soil Cover Installation	2 May 2005	13 May 2005
13. Seeding	16 May 2005	18 May 2005
14. Riparian Buffer Restoration	16 May 2005	10 June 2005
15. Closure Report	-	29 July 2005
16. 1st Post-Remediation Inspection	-	31 August 2005

**Attachment E**

**Revised Figures 2 through 5**



LEGEND

	EXISTING FENCELINE
	EDGE OF WATER
	PROPERTY LINE
	LIMIT OF DISTURBANCE
	PROPOSED CONTOUR LINE
	100-YEAR FLOODPLAIN LIMIT

**NOTES:**

1. SEE "HABITAT RESTORATION / PLANTING SPECIFICATIONS" (KLEINSCHMIDT, OCTOBER 2004) FOR DETAILS
2. REFER TO FIGURE 2 PREPARED BY EA FOR BASEMAP INFORMATION



THE TRUST FOR PUBLIC LAND  
PONAGANSETT AVENUE REMEDIATION PROJECT  
67 MELISSA STREET  
PROVIDENCE, RHODE ISLAND

SHEET 1  
GRADING PLAN

PROJECT MGR:  
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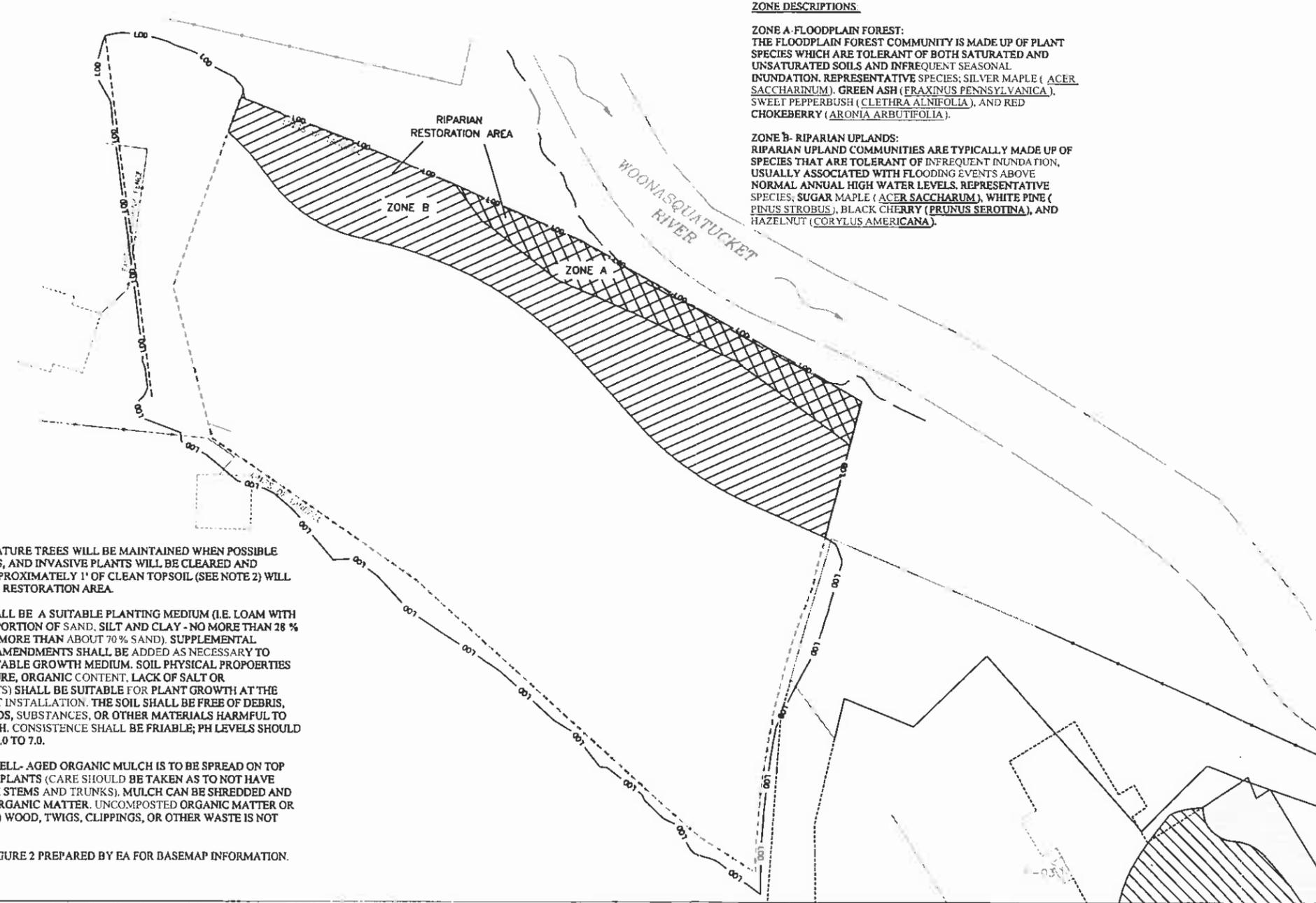
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2004

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**ZONE DESCRIPTIONS:**

**ZONE A- FLOODPLAIN FOREST:**  
 THE FLOODPLAIN FOREST COMMUNITY IS MADE UP OF PLANT SPECIES WHICH ARE TOLERANT OF BOTH SATURATED AND UNSATURATED SOILS AND INFREQUENT SEASONAL INUNDATION. REPRESENTATIVE SPECIES: SILVER MAPLE ( ACER SACCHARINUM ), GREEN ASH ( FRAXINUS PENNSYLVANICA ), SWEET PEPPERBUSH ( CLETHRA ALNIFOLIA ), AND RED CHOKEBERRY ( ARONIA ARBUTIFOLIA ).

**ZONE B- RIPARIAN UPLANDS:**  
 RIPARIAN UPLAND COMMUNITIES ARE TYPICALLY MADE UP OF SPECIES THAT ARE TOLERANT OF INFREQUENT INUNDATION, USUALLY ASSOCIATED WITH FLOODING EVENTS ABOVE NORMAL ANNUAL HIGH WATER LEVELS. REPRESENTATIVE SPECIES: SUGAR MAPLE ( ACER SACCHARUM ), WHITE PINE ( PINUS STROBUS ), BLACK CHERRY ( PRUNUS SEROTINA ), AND HAZELNUT ( CORYLUS AMERICANA ).

- NOTES:**
1. HEALTHY MATURE TREES WILL BE MAINTAINED WHEN POSSIBLE. BRUSH, DEBRIS, AND INVASIVE PLANTS WILL BE CLEARED AND REMOVED. APPROXIMATELY 1' OF CLEAN TOPSOIL (SEE NOTE 2) WILL BE APPLIED TO RESTORATION AREA.
  2. TOPSOIL SHALL BE A SUITABLE PLANTING MEDIUM (I.E. LOAM WITH PROPOER PROPORTION OF SAND, SILT AND CLAY - NO MORE THAN 28 % CLAY AND NO MORE THAN ABOUT 70 % SAND). SUPPLEMENTAL TOPSOIL AND AMENDMENTS SHALL BE ADDED AS NECESSARY TO CREATE A SUITABLE GROWTH MEDIUM. SOIL PHYSICAL PROPOERTIES (I.E. P.H. TEXTURE, ORGANIC CONTENT, LACK OF SALT OR CONTAMINANTS) SHALL BE SUITABLE FOR PLANT GROWTH AT THE TIME OF PLANT INSTALLATION. THE SOIL SHALL BE FREE OF DEBRIS, NOXIOUS WEEDS, SUBSTANCES, OR OTHER MATERIALS HARMFUL TO PLANT GROWTH. CONSISTENCE SHALL BE FRIABLE; PH LEVELS SHOULD RANGE FROM 5.0 TO 7.0.
  3. ¾ INCH OF WELL- AGED ORGANIC MULCH IS TO BE SPREAD ON TOP OF INSTALLED PLANTS (CARE SHOULD BE TAKEN AS TO NOT HAVE MULCH TOUCH STEMS AND TRUNKS). MULCH CAN BE SHREDDED AND COMPOSTED ORGANIC MATTER. UNCOMPOSTED ORGANIC MATTER OR FRESH (GREEN) WOOD, TWIGS, CLIPPINGS, OR OTHER WASTE IS NOT ACCEPTABLE.
  4. REFER TO FIGURE 2 PREPARED BY EA FOR BASEMAP INFORMATION.

**LEGEND**

	EXISTING FENCELINE
	EDGE OF WATER
	PROPERTY LINE
	LIMIT OF DISTURBANCE
	100-YEAR FLOODPLAIN LIMIT
	FLOODPLAIN FOREST
	RIPARIAN UPLANDS



THE TRUST FOR PUBLIC LAND  
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SHEET 2  
 PLANTING PLAN

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 JP

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 2004

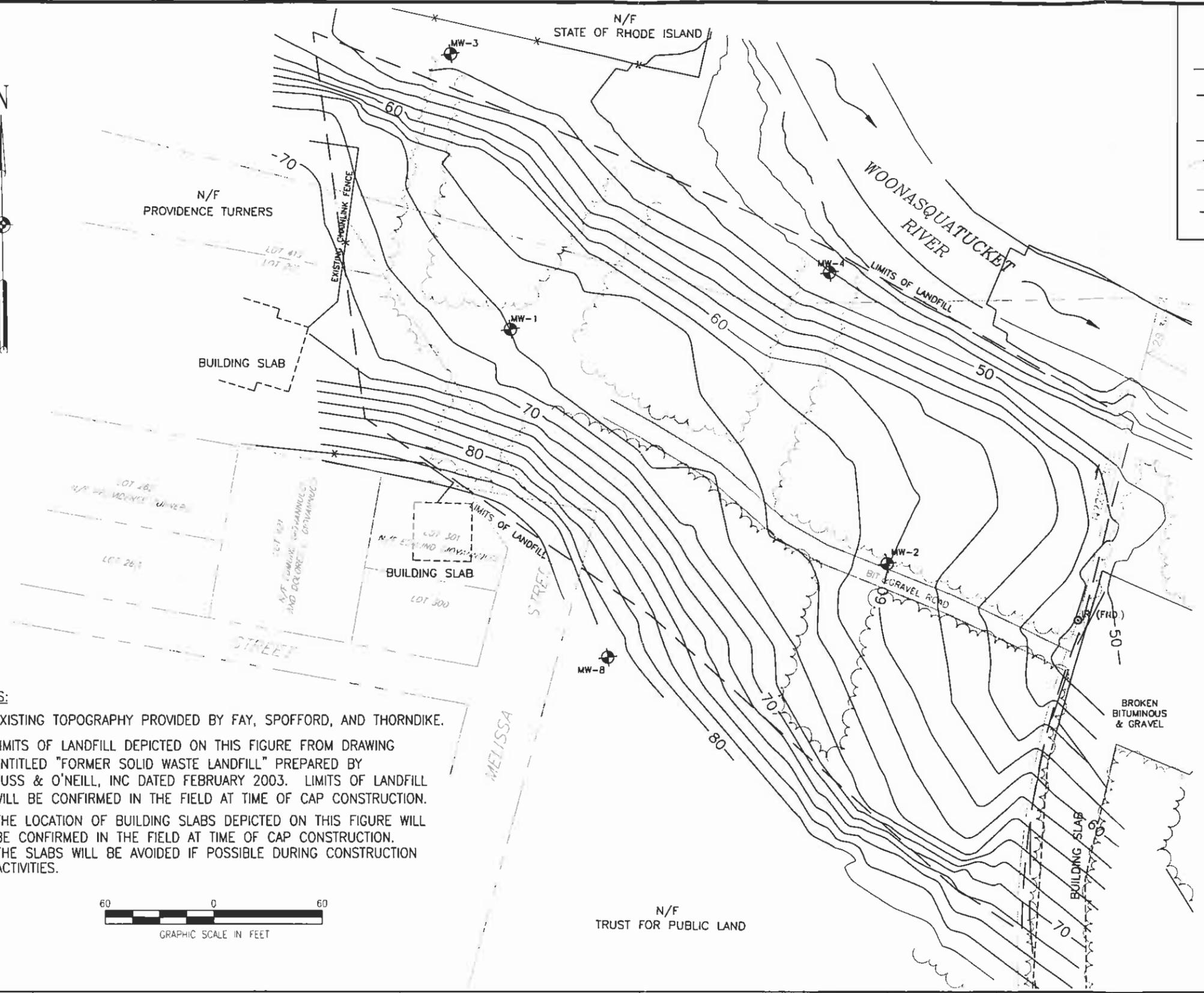
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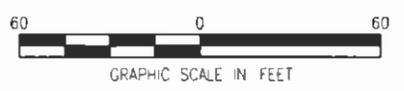


LEGEND	
—50—	EXISTING CONTOUR
—X—	EXISTING FENCELINE
◆	EXISTING MONITORING WELL
— · · · —	EDGE OF WATER
— · · · —	EXISTING TREELINE
— · · —	PROPERTY LINE
— · · · —	100-YEAR FLOODPLAIN LIMIT



**NOTES:**

1. EXISTING TOPOGRAPHY PROVIDED BY FAY, SPOFFORD, AND THORNDIKE.
2. LIMITS OF LANDFILL DEPICTED ON THIS FIGURE FROM DRAWING ENTITLED "FORMER SOLID WASTE LANDFILL" PREPARED BY FUSS & O'NEILL, INC DATED FEBRUARY 2003. LIMITS OF LANDFILL WILL BE CONFIRMED IN THE FIELD AT TIME OF CAP CONSTRUCTION.
3. THE LOCATION OF BUILDING SLABS DEPICTED ON THIS FIGURE WILL BE CONFIRMED IN THE FIELD AT TIME OF CAP CONSTRUCTION. THE SLABS WILL BE AVOIDED IF POSSIBLE DURING CONSTRUCTION ACTIVITIES.



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 PONAGANSETT AVENUE REMEDIATION PROJECT  
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FIGURE 2  
 EXISTING CONDITIONS PLAN

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 OCTOBER 2004

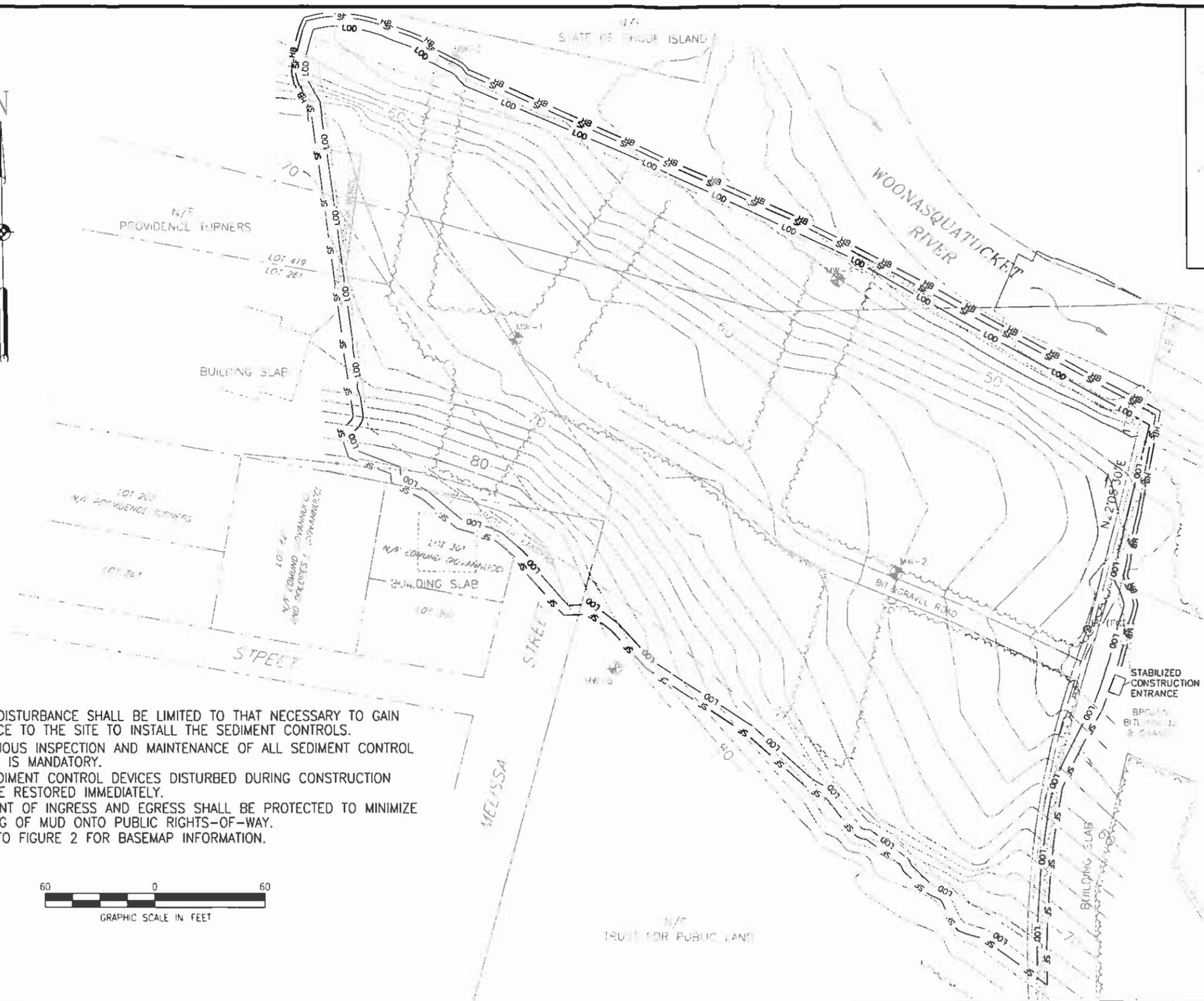
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 FIG2\_EXISTINGCOND.DWG



LEGEND	
	EXISTING CONTOUR
	EXISTING FENCELINE
	EXISTING MONITORING WELL
	EDGE OF WATER
	EXISTING TREELINE
	PROPERTY LINE
	SILT FENCE
	HAY BALES
	LIMIT OF DISTURBANCE



**NOTES**

1. INITIAL DISTURBANCE SHALL BE LIMITED TO THAT NECESSARY TO GAIN ENTRANCE TO THE SITE TO INSTALL THE SEDIMENT CONTROLS.
2. CONTINUOUS INSPECTION AND MAINTENANCE OF ALL SEDIMENT CONTROL DEVICES IS MANDATORY.
3. ANY SEDIMENT CONTROL DEVICES DISTURBED DURING CONSTRUCTION MUST BE RESTORED IMMEDIATELY.
4. ALL POINT OF INGRESS AND EGRESS SHALL BE PROTECTED TO MINIMIZE TRACKING OF MUD ONTO PUBLIC RIGHTS-OF-WAY.
5. REFER TO FIGURE 2 FOR BASEMAP INFORMATION.



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 PONAGANSETT AVENUE REMEDIATION PROJECT  
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FIGURE 3  
 EROSION AND SEDIMENT CONTROL PLAN

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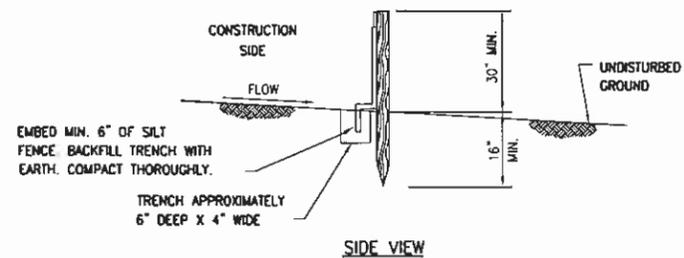
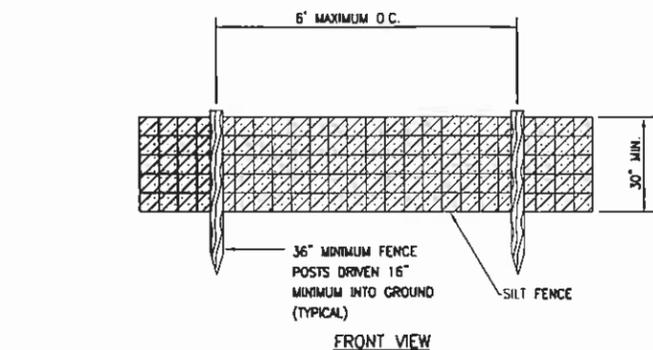
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 OCTOBER 2004

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 FIG3\_SEDIMENT.DWG

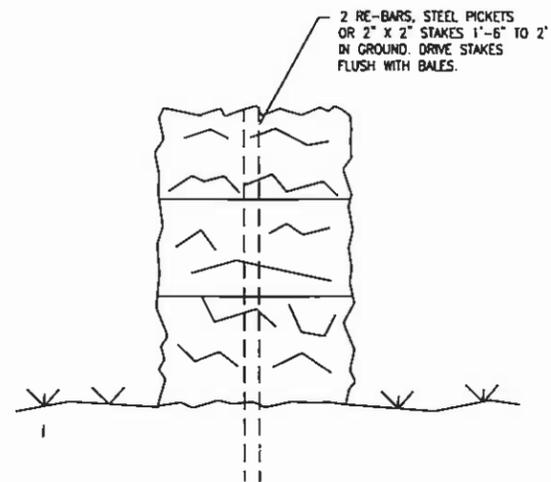


TEMPORARY SILT FENCE DETAIL (1) (3/4)

NOT TO SCALE

- NOTES:**
- PERFORM MAINTENANCE AS NEEDED IN ACCORDANCE WITH THE SWPPP.
  - REMOVE SILT FENCE AFTER FINAL GRADING IS COMPLETED AND VEGETATION IS ESTABLISHED.

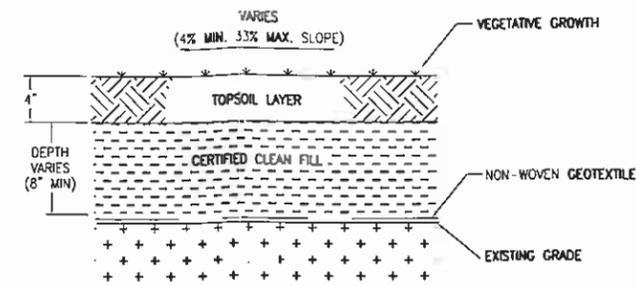
- MATERIALS:**
- POSTS:  
STEEL EITHER T OR U TYPE  
OR 2" HARDWOOD
- SILT FENCE  
AMOCO 2132 OR  
APPROVED EQUAL



TEMPORARY STRAW BALE DIKE DETAIL (2) (3/4)

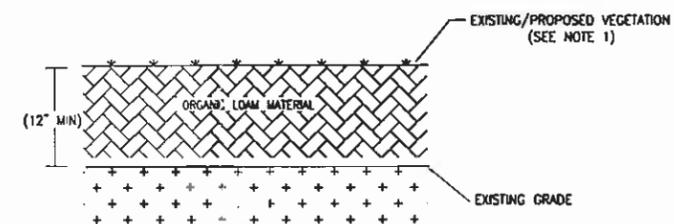
NOT TO SCALE

- NOTES:**
- BALES SHALL BE PLACED WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
  - BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
  - BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.



TYPICAL CAP SECTION DETAIL (3) (4/4)

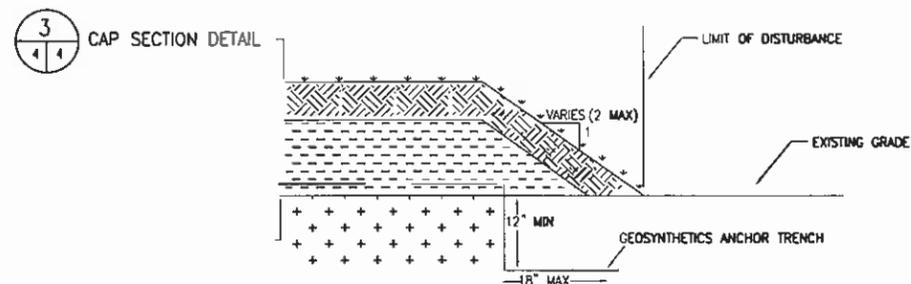
NOT TO SCALE



TYPICAL RIPARIAN RESTORATION CAP DETAIL (4) (4/4)

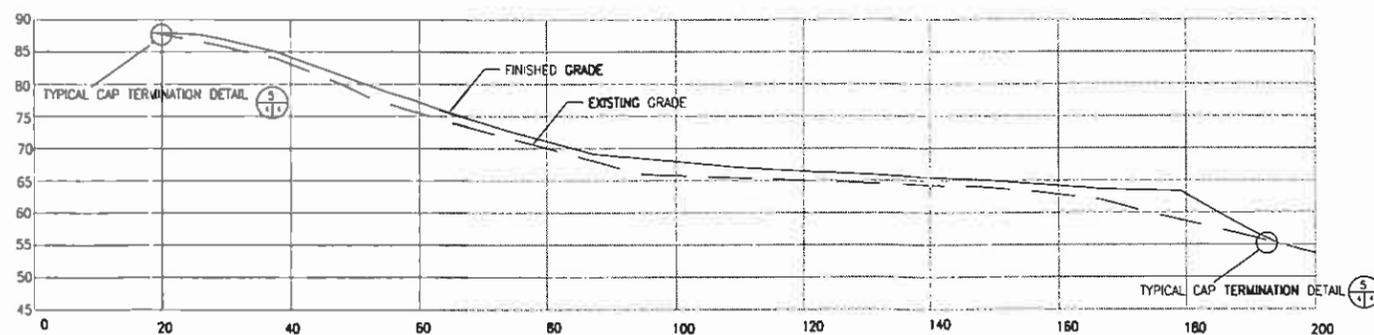
NOT TO SCALE

- NOTES:**
- HEALTHY, MATURE TREES WILL BE MAINTAINED. ADDITIONAL VEGETATION TO BE PLANTED WILL BE DETERMINED BY OTHERS.



TYPICAL CAP TERMINATION DETAIL (5) (4/4)

NOT TO SCALE



CROSS SECTION A (6) (5/4)

VERTICAL/HORIZONTAL SCALE IN FEET



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PROVIDENCE, RHODE ISLAND

FIGURE 4  
SECTION AND DETAILS

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OCTOBER 2004

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