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FINAL WETLAND RESTORATION PLAN NSY NORFOLK VA

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CENTER FOR COASTAL RESOURCE MANAGEMENT

Final
Wetland Restoration Plan

For

Norfolk Naval Shipyard

Submitted to

Shaw Environmental and Infrastructure, Inc.

By

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Introduction

Approximately half of the tidal wetlands in the Elizabeth River watershed have been lost since World War II. These wetlands have provided a number of ecological functions and values to the Elizabeth River and the Chesapeake Bay by providing primary production to support estuarine food webs, fish and wildlife habitat, water quality improvement, erosion protection and flood buffering. In an effort to reverse the loss of wetlands and preserve and enhance the value of wetlands, it has been the declared policy of both state and federal governments to achieve "no net loss" of wetlands as well as a net gain in wetland functional value.

Even under existing wetland regulation programs, however, losses of tidal wetlands in the Elizabeth River system continue to total 2-3 acres per year. Since the vast majority of these losses are not compensated for, "no net loss" remains an elusive goal as it does in most areas. Since this restoration is not associated with any attendant loss of wetlands, it will actually contribute towards the achievement of "no net loss".

This wetland restoration is entirely consistent with the goals of the Chesapeake Bay Program to restore lost wetlands within the Bay Watershed as well as the Chesapeake 2000 agreement.

Regulatory requirements for wetlands restoration projects of this nature typically involve acquiring permits from various local, state and federal agencies. These permits are designed to ensure that the benefits of a particular project outweigh the potential detriments. The Navy is responsible for the government portion of this site under the its Installation Restoration program pursuant to the requirements imposed and authority defined in the CERCLA, 42 U.S.C.S' §§9600, 9604, 10 U.S.C. §2701 et seq., and Executive Order 12580 (23 Jan 1987). All work at this project site is being coordinated with the Office of Remediation Programs, Federal Facilities Restoration Program branch of the Virginia Department of Environmental Quality (VDEQ), as well as the Environmental Protection Agency (EPA), Region III, which has lead authority under CERCLA for the AWI property. CERCLA Section 121(e) and 40 CFR Part 300.400(e) provide that no Federal, State or local permits are required for CERCLA on-site response actions performed by Federal agencies. Accordingly, the Navy is exempt by statue from obtaining any permits for the planned removal action and final remedial response when implemented; however, the Navy is required to meet the regulatory substantive requirements for this action. In this particular instance, these considerations should not be an issue.

Restoration Plan Goals

The goal of the proposed project is the restoration of approximately 1.46 acres of tidal wetlands as a part of the remediation efforts at the Norfolk Naval Shipyard, Figure H1D, as well as an area of riparian buffer adjacent to the restored wetland on the Navy's property.

The proposed wetland restoration will attempt to restore ecological functions lost when the area was filled for use as a waste lagoon. These will include estuarine food web support in the form of detritus production and providing fish and wildlife habitat in a section of the river where most of the tidal wetlands have been dredged or filled. Furthermore, a limited review historical maps and aerial photographs appear to indicate that the lagoon area was either a part of the Southern Branch proper, a small tidal wetland adjacent to the river or a combination of both. The project area remains the outlet for stormwater runoff from the adjacent watershed. This continuing connection with the watershed is an important aspect of the proposed restoration because it will provide the opportunity for water quality improvements that would not otherwise be possible. This restoration project will also provide the opportunity for the establishment of a riparian buffer around the site to further enhance water quality associated with the treatment of non-point source runoff from adjacent areas.

Wetland Design Narrative

The size of the new wetland will be approximately 1.46 acres but will depend to some degree on the final configuration of the excavated area. The new wetland is intended to encompass a complex of six different community types (Table 1). These are based primarily on the mean tide range at the site of approximately 2.8 feet and an average salinity of roughly 15 – 20 ppt. The riparian buffer area indicated in Figure H1D (approximately 1.6 acres) will be seeded in native warm season grasses and planted with a number of trees and shrubs. The trees and shrubs will be selected to maximize the value of the buffer for wildlife habitat and water quality improvement. The actual size and contour of the riparian buffer will depend upon the final configuration of the basin.

The design of each of the above communities is driven by elevation and the frequency and duration of tidal inundation. All are necessary to provide stability over all of the elevations in the wetland from the open water in the river to the adjacent upland. Each of the community types also contributes to the functional value of the wetland by providing a particular type of habitat or water quality function.

Limited structural components will also be necessary to provide velocity attenuation and dissipation as well as contribute to the water quality enhancement capabilities of the system. These would include fore bays constructed of riprap around the ditches draining into the marsh. The elevation of the riprap would be approximately mean high water, 2.8 feet MLW. Some type of riprap apron will likely be needed where the wetland channel enters the river. The elevation of this structure will be at or slightly below mean low water, 0.0'.

Table 1. Proposed plant community types

Community	**Elevation***	**Species**
Wetland channels	0 – 1.5’ MLW	Non-vegetated
Low marsh	1.5’ – 3.0’ MLW	Cord Grass (*Spartina alterniflora*)
Wetland transition	2.8’ – 3.0’ MLW	Cord Grass (*Spartina alterniflora*) Hay Grass (*Spartina patens)*
High marsh	3.0’ – 4.5’ MLW	Hay Grass (*Spartina patens)* Poverty Grass (*Distichlis spicata)*
Scrub shrub	4.5’ – 5.0’ MLW	Switch Grass (*Panicum virgatum*) High-tide Bush (*Iva frutescens*) Marsh hibiscus (*Hibiscus moscheutos*) Groundsel Tree (*Baccharis halimifolia*)
Riparian buffer	>5.0’ MLW	Trees Sycamore (*Platanus occidentalis*) Swamp white oak (*Quercus bicolor*) Black gum (*Nyssa sylvatica*) Water oak (*Quercus nigra*) Hackberry (*Celtis laevigata*) Bald cypress (*Taxodium distichum*) Pin oak (*Quercus palustris*) Green ash (*Fraxinus pennsylvanica*) Loblolly pine (*Pinus taeda*) Red cedar (*Juniperus virginiana*) Black cherry (*Prunus serotina*) Shrubs Inkberry (*Ilex glabra*) Winterberry (*Ilex verticillata*) Pepperbush (*Clethra alnifolia*) Shadbush (*Amelanchier canadensis*) Chokeberry (*Aronia arbutifolia*) Wax myrtle (*Myrica cerifera*).
*Mean Low Water (MLW)		

The area of these components will depend on actual field conditions, but will be in similar proportions to those shown in the Plan View Drawing, Figure H1C.

Construction Narrative

All excavation, backfilling and grading will be done in the “dry” with no direct connection to the river until construction is complete This should minimize any direct impacts to the river during construction.. The schedule for the site restoration is provided as an attachment to this plan.

Once the excavation has been completed, the backfill material placed in the excavated area will be compacted in lifts until the appropriate planting elevations are reached. The compaction is important because future settling of the material could lower the planned planting elevations with detrimental effects to the plants. In fact, if future settling is significant, it could result in the loss of the plants, leaving a partially vegetated tidal basin. The last lift which brings the basin up to the planting elevation does not have to be significantly compacted beyond that needed to support the grading equipment. Final grading must be smooth with positive drainage, i.e. no extensive areas of standing water at low tide. Side slopes of the basin above 3.0 MLW should be 3:1 (H:V) or flatter.

Compaction of the lower portions of the excavated areas will be accomplished as best possible under the existing construction conditions. As such groundwater, nuisance water levels in the excavation make compaction difficult to impossible in the lower portion of the excavation. Once fill is placed in the excavation to a point above the excavation water or the saturated zone, then compaction will be performed. Typically this is referred to as bridging. Above the bridged strata compaction will be conducted to 90 % minimum of ASTM D 698 in 6 to 8 –inch lifts to the correct designed elevation in accordance with this plan.

Planting will be in accordance with the species and elevations given in Table 1. All grasses will be planted on two-foot centers with a treatment of Osmocote 18-6-12 slow release fertilizer. The wetland transition zone between the low and high marsh zones will be approximately four feet wide consisting of alternating cord grass (*Spartina alterniflora*) and Hay grass (*Spartina patens*). This is to ensure coverage by the appropriate species at the correct elevation in this transitional area. When planting on two-foot centers, approximately 11,000 plants per acre. At this plant density complete coverage of the site can be expected by the end of the second growing season after planting. Specific soil amendments are not required for the growth of these plants. The scrub shrub zone will be approximately four feet wide consisting of a mixture of switch grass (*Panicum virgatum*), high-tide bush (*Iva frutescens*), marsh hibiscus (*Hibiscus moscheutos*), and groundsel tree (*Baccharis halimifolia*).

The riparian buffer zones will be constructed of backfill materials and a six-inch layer of topsoil graded to required elevations. The width of the riparian buffer will range from minimal (10 feet or less) to over 100 feet in areas and will consist of a variety of trees and shrubs listed in Table 1. All shrubs will be planted on 5 to 15 foot centers, depending upon the specific maturity size. The trees will be planted approximately of 40-foot centers.

Plant materials will be obtained from a local nursery. All grasses will be grown in cell pack 72’s or equivalent; shrubs will be 12” to 24” in containers, and trees will be 2’ to 4’ in burlap root balls or containers. The specific number of each plant will depend on the final area of each zone and the availability of each species.

Maintenance and Monitoring

During construction every effort should be made to excavate and remove any common reed (*Phragmites australis)* from the site. This is an invasive species that can jeopardize the success of the wetland planting. The elevations selected for the wetland are designed to help minimize the invasion potential, i.e. the majority of the basin is below mean high water. Even with these efforts the site will have to be monitored on a continuing basis to ensure *Phragmites* does not become established. It can be effectively controlled with herbicides and physical removal while at early colonization densities. Quarterly monitoring will be performed during the first two growing seasons when the *Spartina alterniflora* is being established.

There are also a number of Canada geese in the vicinity of the project site. They can be voracious grazers of young plants and can effectively eliminate newly planted wetlands. Following the construction of the engineered wetlands, the riparian buffer and the soil cap on the AWI property directly adjacent west of the engineered wetlands will be constructed. The soil cap construction will extend approximately one-year, the equipment used for this work will likely discourage migrating birds from visiting and consuming the young plants during the critical first growing cycle. Additional measures may be implemented to discourage the geese if they become a problem.

Pocket marshes of this type have a tendency to accumulate flotsam and jetsam, particularly in highly industrialized estuaries like the Elizabeth River. This accumulation of material can smother plants often resulting in significant losses of vegetation. The existing turbidly curtain across the inlet will remain to forestall this problem. If the flotsam problem continues, other measures such as a heavy gauge metal screen/grid will be installed across the inlet to collect this debris prior to entering the engineered wetlands.

At the conclusion of the first growing cycle, the Project Management Team will assess the success of the engineered wetlands, and evaluate the need for additional work and achieve the stated goals for this site restoration. By consensus, the Project Management Team will define any required additional work and establish a schedule in which the work will be completed.