Conceptual Design

Armacost Park
Natural Resource
Restoration and Enhancement Project

Prepared for

Borough of Avalon
3100 Dune Drive
Avalon, New Jersey 08202

Prepared by

Windward Consulting, LLC
42 Main Street, Suite 6
Clinton, NJ 08809

September 2011
Introduction

In mid-2010, Windward Consulting, LLC (Windward) and the Borough of Avalon (Borough) began formally discussing the potential of enhancing and restoring the natural resources and Site improvements available in Armacost Park. Broad goals and objectives were developed for the Armacost Park Natural Resource Restoration and Enhancement Project through a collaborative scoping process involving the Borough Administration, Borough Council public meetings, and the Avalon Environmental Commission.

Once the broad goals and objectives were identified, Windward was contracted to prepare a conceptual design for the restoration and enhancement of the park through the following tasks:

1. Investigate and present the natural and development history of the Site;
2. Recommend specific priorities, goals, and objectives for the overall project;
3. Characterize broad scale baseline conditions;
4. Recommend restoration, enhancement and management strategies for the natural resources and improvement at the Site; and
5. Identify project phasing and potential technical and funding partners.
Conceptual Design Report


In accordance with the scope of the engagement and the Borough administrations mandate that the Conceptual Design phase of the project be utilized to build community consensus on the issue, each section of the report is intended to provide the reader an appropriate degree of historical, scientific, and engineering detail to inform and enable non technical stakeholders in the decision making process to access and draw conclusions on the considerations and strategies presented.
In July 2011 Windward submitted the Conceptual Design Report to the Avalon Borough administration followed by public meeting presentations before the Environmental Commission, and Planning/Zoning Board.

During the stakeholder review process a concerned citizen group engaged Mr. Wayne R. Ferren, Jr with the Maser Consulting P.A. to complete a Site inspection and subsequent review of the Concept Design Report. In early August Mr. Ferren provided a letter report and presentation of his findings to the Environmental Commission.

To date Planning/Zoning Board and Environmental Commission resolutions and Mr. Ferren’s report indicate a consensus on the focus of the recommended restoration efforts including:

- Wetland Habitat restoration to a self sustaining and functional tidal salt marsh;
- Restoration of Upland/Transitional habitat to a natural structure via non-native vegetation removal, control of extensive growth of invasive native plants, and thinning and restoring areas inundated with vine; and
- Park access, viewing, and general visitor education and experience
Review of Conceptual Design Report

- Mr. Ferren’s report constructively expands the discussion of Armacost Parks natural resources and management/restoration in a number of important areas, including the Park’s upland and wetland flora and vegetation and the recommendation that an integrated ecosystem approach be used at the Site verses the reports management focus on wildlife habitat.

- Windward would like to take this time to acknowledge that although ecosystem structure and functions such as hydrology, topography, faunal associations and their relationship to the biology of the park are discussed in the report they are not put into the context of an ecosystem approach as suggested by Mr. Ferren. We wish to convey to the stakeholders in this project we have every intention to integrate ecosystem structure, function, and process considerations into the future design and management planning.
Conceptual Design Presentation

This presentation is intended to provide an overview of the Windward Concept Design focused on the following:

1. Pertinent natural resource and park development history from approximately 1933 through 2010;
2. A brief discussion of the consequences of past management practices on the Parks current natural resource conditions; and
3. An outline of the established Goals and Objectives and key considerations associated with their selection and successful implementation.
Park History 1933-1963

• Armacost Park originally was designated as the Avalon Community Park public area by the zoning changes of 1959 and 1962.
• At the time of the Park’s inception the Site was a typical barrier island natural area which would have consisted of upland forest to the east, a transitional area in the central portion of the Site containing a mixture of upland prairie grasses, shrubs, and wetland vegetation, and a wetland environment consisting of native salt marsh vegetation to the west and south adjoining Ocean Drive and the current location of 74th Street.
• Previous construction of Ocean Drive impacted the Site’s wetlands by limiting hydrologic connection to the bay to a large drainage ditch traveling beneath Ocean Drive.
• Between 1963 and 1970 the immediate area of the Site to the west of Ocean Drive and south well beyond what is currently 74th Street underwent significant development. Prior to this development the areas to the east and west of Ocean Drive south of the Park were salt marsh.

• Development of this area consisted of filling and eliminating the salt marsh for the construction of roadways and homes. The area of fill extended to the north of 74th Street to the entire southwest portion of the Park where approximately 80% of the Park’s original wetlands was eliminated.

• The drainage ditch connecting the Site to the bay, which provided a hydrologic connection, was also filled in for a home site.
Park History - 1973 Park Development Project

• In 1973 the Site underwent a municipal and federally funded Park Development project that focused in the newly filled southwestern portion of the Park.

• Development improvements included: a parking lot, driveway, concrete walk, boardwalks and viewing platforms, a grassed park area, construction of a 20,000 ft$^2$ freshwater lake maintained by the installation of an onsite supply well, and the introduction of approximately 2,000 individual plants composed of 13 species characteristic of freshwater wetlands.

• The freshwater lake continuously drained via an onsite constructed drainage ditch connected to a culvert running under Ocean Drive to the bay.
## SECTION 15

### Plant List

The Plants, Labor and Material shall be itemized as follows:

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Quantity</th>
<th>Name</th>
<th>Root</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>800</td>
<td><em>Ammophila breviligata</em></td>
<td>Flugs</td>
<td>2nd year</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>American Beachgrass</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>7</td>
<td><em>Amelanchier canadensis</em></td>
<td>B&amp;B</td>
<td>1½&quot;-1¾&quot;c</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Shadblow Serviceberry</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>24</td>
<td><em>Baccharis hallifolia</em></td>
<td>B&amp;B</td>
<td>15&quot;-18&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Groundsel Bush</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>19</td>
<td><em>Ilex glabra</em></td>
<td>B&amp;B</td>
<td>2'-3'</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Inkberry</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>2</td>
<td><em>Ilex opaca</em></td>
<td>B&amp;B</td>
<td>5'-6'</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>American Holly</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>1</td>
<td><em>Juniperus virginiana</em></td>
<td>B&amp;B</td>
<td>5'-6'</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>American Cedar</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>95</td>
<td><em>Myrica pensylvanica</em></td>
<td>B&amp;B</td>
<td>12&quot;-15&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Bayberry</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>11</td>
<td><em>Nyssa sylvatica</em></td>
<td>B&amp;B</td>
<td>1½&quot;-1¾&quot;c</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Sour Gum</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-1</td>
<td>18</td>
<td><em>Parthenocissus quinquefolia</em></td>
<td>Flats</td>
<td>2nd year</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Virginia Creeper</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>4</td>
<td><em>Pinus thunberg</em></td>
<td>B&amp;B</td>
<td>5'-6'</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Japanese Black Pine</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>10</td>
<td><em>Sassafras officinale</em></td>
<td>B&amp;B</td>
<td>6'-7'</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Sassafras</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>12</td>
<td><em>Vaccinium corymbosum</em></td>
<td>B&amp;B</td>
<td>18&quot;-24&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Highbush Blueberry</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>1,000</td>
<td><em>Lonicera japonica halliana</em></td>
<td>Flats</td>
<td>2nd year</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Hall's Honeysuckle</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(or suitable substitute)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Park History – 1973 – Current

Park Development Consequences

The 1973 improvements completed the transformation of the western portion of the Site from a functional naturally occurring saltwater marsh to an engineered, freshwater wetland/lake system. Creation of the engineered freshwater system, although well intended for public enjoyment, came with a number of long term, unintended consequences not limited to the following:

- Disturbance of native vegetation during construction activities and the introduction of freshwater promoted the establishment of Phragmites australis subsp australis (Phragmites). This vigorous introduced Eurasian subspecies has resulted in tall monocultures of phragmites which significantly reduce aesthetics and natural resource viewing opportunities, limit wildlife habitat, and result in the accumulation of ground litter providing significant fuel to sustain and disperse fire;
- Many of the species planted during Park development have out competed more naturally occurring species and currently dominate the natural transition areas and upland forest.
- The freshwater constructed pond is reported to have attracted large numbers of waterfowl which created seasonal nutrient loading issues in the bay in the area of the Park’s surface discharge. Maintaining the freshwater wetland with well water was terminated to address this issue and as a result Phragmites colonized the remaining disturbed areas of the Site. These constructed low lying areas of the Park now collect stagnant, standing water resulting in the establishment of excellent breeding habitat for multiple species of mosquitoes and other biting insects.
2010 Aerial Photograph
Location of Former Freshwater Pond
Northwest Portion of the Park
View of the wetland area in the northwest section of Park. Note the stagnant water and phragmites infestation.
Partial view of the wetland area in the northwest section of the Park. Note the cordgrass colonies present in the center of the photograph.
View of the transition area in the northeast section of the Park looking east. Note the heavy growth of invasive plants such as phragmites, greenbrier, and Virginia creeper.
View of the understory in the northeast section of the Park. Note the heavy growth of vines such as Virginia creeper and greenbrier.
View of upland area in the eastern section of the Park. Note deciduous trees overgrown with Virginia creeper and greenbrier.
Since the circa-1960 creation of the Park, effects from housing and Park development activities have significantly reduced the natural resource and community value of the park. The most significant effects resulted from:

1) The elimination of an adequate hydrologic connection to the surface water of the bay which is needed to sustain an saltwater wetland environment consisting of native salt marsh vegetation and associated wildlife. The reduction/elimination of saltwater inundation, combined with efforts to establish a freshwater pond and wetland system, have promoted the establishment and dominance of Phragmites which has minimal value to wildlife, virtually eliminates wildlife viewing opportunities and poses public safety and health issues;

2) The pond and associated low lying areas of the Park constructed during development now collect stagnant, standing water resulting in the establishment of excellent breeding habitat for multiple species of mosquitoes and other biting insects;

3) Many of the species planted during Park development have out competed naturally occurring species and currently dominate and threaten the survival of natural transition areas and upland forest plants.
Goals and Objectives

As stewards of Avalon’s natural resources, it is the intent of the Borough to manage Armacost Park primarily to maximize habitat for a diversity of wildlife with a secondary emphasis on providing public viewing and educational opportunities. As a result of the findings of Windward’s investigation of the Site’s history and existing broad baseline characteristics and discussions with the Borough stakeholders the following goals and objective for the Park’s restoration and enhancement have been established:

- Restore a functional saltwater marsh to maximize wildlife habitat, implement the most cost effective and manageable means of eradicating/controlling Phragmites, and to address public safety and health issues;
- Focus management efforts on creating a sanctuary for birds to provide habitat and refugia (i.e., a small, isolated area that has escaped the extreme changes undergone by the surrounding area thus providing habitat and protection for plants and animals) for a variety of resident, breeding, and migrating avian species;
- Create butterfly habitat to attract resident, breeding, and migratory butterfly species;
- Create odonate (dragonflies and damselflies) habitat to attract resident, breeding, and migratory odonates;
- Ensure appropriate and safe Site improvements including: parking, walkways and viewing platforms, and educational placarding and signage;
- Develop short-term and long-term funding strategies to ensure project completion and success;
- Develop partnering relationships to provide funding sources, project input, and permitting assistance;
- Develop a long-term management plan; and
- Develop a community educational program.
Saltwater Marsh Restoration

A primary objective of the project is the long term restoration and viable management of the Park’s wetlands. Integral to this effort is establishing the required hydrologic connection to the bay and Site topography to return the Park’s wetlands area to a healthy, naturally functional tidally influenced saltwater wetland and the resulting benefits to wildlife, public health and safety, and the effective minimization and long-term control of Phragmites. Wetland restoration considerations:

- The boundaries of a tidally influenced wetland are regulated by the tide range. The lower boundary is set by the depth and duration of flooding. The upper boundary generally extends to the limit of flooding on extreme tides, normally between mean high water and extreme high water of spring tides.

- Ensuring the appropriate water depth and duration of saltwater flooding (hydroperiod) would be the primary technique utilized to control phragmites and encourage establishment of native wetland vegetation.

- To provide the required depth and duration of saltwater inundation, an underground conduit directly to the bay of the appropriate size, and a means to control the elevation of saltwater flooding is required. The establishment of the required saltwater flooding, wetland area grading/trenching and the engineering and construction of the conduit and level control mechanism will constitute a large portion of the cost and effort to restore the saltwater marsh.
Bird Sanctuary

Focus management efforts on creating a sanctuary for birds to provide habitat and for a variety of resident, breeding, and migrating avian species.

Despite its small size, New Jersey hosts a very high number of bird species. Approximately 420 species of birds have been well documented in New Jersey. An incredible 414 species have been observed in Cape May County with more than 150 species confirmed as breeders.

The high number of species nesting in and migrating through the county is attributed to the diversity of habitat, geographic location, and proximity to the Atlantic flyway (one of four major bird flyways).

The shape of Cape May County acts as a staging area for both northbound and southbound migrants. Regardless of migration direction, migrants must pass over the Delaware Bay en route to nesting and wintering areas and as a result limited habitat to rest and re-fuel is highly sought after.
Bird Sanctuary (Continued)

The undeveloped habitat at Armacost Park has excellent potential to provide habitat for nesting, migrating, and wintering birds.

Wetland Habitat restoration to a self sustaining and functional tidal salt marsh and restoration of Upland/Transitional habitat to a natural structure will maximize the potential for the Park to benefit and be utilized by avian species.
Butterfly Habitat

- Of the approximately 143 species of butterfly detected in New Jersey a total of 107 occur in Cape May County.

- Butterfly watching has become a very popular recreational activity in recent years.

- As is the case with birds, the peninsula of Cape May County attracts rarities from both southern and northern locales.

- Managing for and attracting butterflies to Armacost Park would increase the enjoyment of visitors to the Park while contributing to the conservation of New Jersey’s migratory butterfly species.

- Attracting and managing for butterflies requires providing appropriate vegetation for each life stage.

- Proposed management will focus on low maintenance species and to minimize the visual presence of planting to “fit in” with the surrounding natural environment. Windward would identify and work with public groups (e.g., Avalon Garden Club) to foster public involvement and pride and offset garden development costs.
Odonate Habitat

- Odonata is an order of insect comprised of dragonflies and damselflies.
- Approximately 457 species of odonates occur in North America, 182 occur in New Jersey, and 94 have been detected in Cape May County.
- Observing odonates is an emerging outdoor recreational activity, and many people who enjoy birds and butterflies also enjoy odonates.

- The life history of odonates is linked closely with wetlands and involves a larval stage and an adult stage.
- They generally require clean wetlands to live in, and as a group are used as indicators of healthy ecosystems.

- Odonates are considered desirable because both life stages feed voraciously on many of the biting insects including mosquitoes, deerflies, and greenheads. Creating and maintaining a wetland system at Armacost Park is the only activity required to attract odonates.
Armacost Park provides various facilities to increase public enjoyment and utilization. Facilities currently present include parking facilities, a playground area, several viewing platforms, sidewalks, and boardwalks.

During the initial phase of the project, the current improvements would be evaluated for their beneficial contributions, need for upgrades and repairs, and safety and liability concerns. Management efforts will focus on enhancing and maximizing public access to viewing opportunities.
Project Funding

Initial project funding would be provided by the Borough. External funding and partnering opportunities for this type of project are available through federal and state agencies, and private organizations. However, agencies and private entities typically provide funding only to projects having existing dedicated funds. Funding can take the form of capital and grant contributions as well as the supply of manpower, equipment, and expertise. Developing short-term and long-term partnerships and funding strategies are vital to ensure project completion and success.