Pequannock Township
Morris County, New Jersey
FINAL DRAFT

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THE ENVIRONMENTAL COMMISSION OF PEQUANNOCK AND TOWNSHIP OF PEQUANNOCK WOULD LIKE TO THANK THE ASSOCIATION OF NEW JERSEY ENVIRONMENTAL COMMISSIONS AND THEIR SPONSORS FOR MAKING THIS PROJECT POSSIBLE THROUGH THEIR GENEROUS GRANT AND TECHNICAL SUPPORT.

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I. INTRODUCTION

The master plan for the Aquatic Park and Greenway Project provides a blueprint for the enhancement of an underutilized open space resource located in Pequannock Township. The achievement of this plan will provide a significant open space amenity, afford linkages with regional open space and recreational resources, protect and enhance critical environments and habitats, and springboard further conservation and open space efforts.

Most importantly, the actualization of this plan will inspire greater environmental awareness among park visitors. Through the transformation of a long-neglected and oft-forgotten municipal parcel into a regional open space amenity, local residents and park users are provided an outstanding opportunity to encourage the diversity and restoration of environmental resources. The park also serves as a tool to educate the public as to the natural resources and recreational opportunities located in their back yard. The intent of this project is to serve as the starting point for future conservation and open space initiatives.

Pequannock Township’s master plan seeks to actively protect existing environmental resources, expand open space and recreational opportunities, and link open space offerings to regional open space networks. As will be demonstrated throughout this plan, the proposed improvements to Aquatic Park and the riverfront will advance each of these goals and provide a valuable regional amenity. The hope is that its success will spur additional open space acquisitions, provide greater resource protection and encourage partnerships among the various groups, adjacent municipalities and counties for the benefit of the region.

II. PROJECT SUMMARY

In an effort to protect the river environment, expand Pequannock Township’s open space offerings and implement the open space and recreation goals of the Master Plan, the Township’s Environmental Commission pursued funding to develop a master plan for the area along the Pequannock River, identified as Aquatic Park. Aquatic Park is a little-known municipal property adjacent to the Pequannock River, consisting of approximately 40 acres of open space. While the assets of the area are well-acknowledged, Aquatic Park suffers from a number of barriers which have impeded the realization of its full potential. Without a formal plan and vision for the area, the “park” has languished for more than 30 years.

In accordance with the grant received from the Association of New Jersey Environmental Commissions (ANJEC), the Environmental Commission, with the support of the Township Administration, Open Space Committee and Department of Parks and Recreation, developed this master plan for Aquatic Park and riverfront to improve access for both educational and multi-purpose recreational use of this scenic area. The master plan is the result of the collaborative efforts involving multiple stakeholders and interested citizens. This plan intends to serve as a catalyst for the protection of the resources and the realization of the area as a regional open space amenity.
III. Regional Significance and Relationship to the State and Local Plans

Pequannock Township serves a critical role in the region. Situated in a plain at the base of the New Jersey Highlands, the township is strategically located at the confluence of the Pompton, Pequannock, and Ramapo Rivers. The area is environmentally significant for the flood plain and water resources it affords, as well as the extensive wetlands and wildlife habitat it provides. The community serves as an important transition area between rural Highlands communities to the west and suburban Passaic/Morris County communities to the east. The plan offers valuable linkages to the river and contains numerous opportunities for the expansion of regional greenways and linear open space features.

As stated previously, the Pequannock Aquatic Park Project is anticipated to serve as a springboard to initiate larger open space projects in the area. Although this project is seemingly small relative to the surrounding open space and its environs, its impact will be substantial. With increased use and inter-municipal access (via a bike path and the North Jersey District Water Supply Commission pipeline), the Aquatic Park plan and open space improvements will help effectuate similar projects in adjacent communities along this natural corridor.

The development of this plan, and the ensuing improvements to Aquatic Park and riverfront, will provide invaluable public awareness and exposure to this magnificent natural area. By advancing the community’s awareness, it is hoped that the stakeholders will renew public interest in the protection of existing environmental assets and features, and trigger a greater desire to expand open spaces and/or pursue access easements to help preserve them.

Moreover, it is hoped that the increased awareness and visibility will afford greater protection and policing of adjacent properties. While the area adjacent to the river is zoned for highway commercial development, the remote nature of the area makes zoning enforcement difficult and intrusions are commonplace. Aquatic Park and other properties located along the river are constrained by floodplains, the 100 year floodway and wetlands.

Potential Links to Regional Open Space Resources:

**North Jersey District Water Supply Commission Pipeline**
*Status*: No formal access to date.
*Linkages*: Approx. 2 miles between Borough of Wanaque (Passaic County) and Little Falls.
*Significance*: Link to Highlands region

**Morris County Bikeway**
*Status*: Unknown
*Significance*: Local and regional connection.

**Riverside Park**
*Location*: Wayne Township
*Significance*: Open space adjacent to river to form linear connection & massing.

**Passaic County Park**
*Location*: Wayne Township
*Significance*: Open space adjacent to river.
and objectives of the State Development and Redevelopment Plan, including the following:

- To conserve the State’s natural resources and systems;
- To protect the environment, prevent and clean up pollution; and
- To ensure sound, integrated planning and implementation statewide.

More specifically, this plan directly advances the establishment of greenways, as discussed in the State Plan. (See inset at right.)

Lastly, this plan responds to and advances the recommendations contained in the township’s 2003 reexamination report. The reexamination report speaks to the importance of the resources found in this region, and specifically states that the Township "must make it a priority to protect these areas, expand open space opportunities and provide essential linkages to Township and regional trails through improvements to Aquatic Park and along the river."

Greenways in the State Plan:

"Greenways are corridors of protected open space managed for conservation and recreation purposes. They often follow natural land and water features and link nature reserves, parks, cultural features and historic sites with each other and with populated areas.

...serve as a focus for redevelopment efforts in the state’s river towns, including restoring existing parks and acquiring additional land along the waterways."

The remnants of the feeder canal of the Morris Canal on the Pompton River at Aquatic Park. (photo courtesy of Dr. Thomas Shivy)
IV. GOALS AND OBJECTIVES

- Connect to existing and proposed open space resources in the region;
- Increase public awareness concerning the environmental assets of the area;
- Inspire environmental stewardship among park visitors, including school children;
- Provide unique recreational opportunities catering to a diverse demographic;
- Ensure the continued conservation of this sensitive area and prevent incompatible intrusions;
- Increase accessibility and visibility;
- Provide educational opportunities relating to habitats and environs;
- Provide opportunities for wildlife viewing;
- Catalyze future open space initiatives in the Township and the region;
- Examine and recommend ordinances that will support protection of the adjacent resources while addressing improved water quality and aesthetics.
V. AQUATIC PARK RECOMMENDATIONS

The master plan for Aquatic Park improves accessibility, promotes general awareness of the area, provides opportunities to explore the area's bountiful habitats, offers educational resources, and links the area to existing and proposed regional open space networks. Through physical improvements to the area and the proposed connections to regional recreational improvements, the value of the proposed plan for the Aquatic Park area extends beyond municipal borders, and reaches the entire region.

A. Improved Accessibility and Parking

The inherent assets of this area have gone unrealized due to the physical isolation of Aquatic Park from the surrounding community. Inadequate accessibility - borne out of Route 23 expansions, the railroad right-of-way and adjacent landlocked parcels - consistently proved to be the greatest impediment to the achievement of the area's opportunities. This plan outlines a design to improve vehicular, pedestrian and bicycle access to the area.

The township received permission from New Jersey Department of Transportation, (NJDOT) to maintain a gravel parking area on its property adjacent to River Drive (Lot 1 Block 256) and permit pedestrians to traverse this lot to access the adjacent lands owned by the Township. While the location of a parking area in this location greatly improves accessibility to the park, a visitor would have to walk more than a quarter-mile to reach the entrance of the parklands.

Throughout the course of this master planning process, it became evident that a more convenient parking location would greatly enhance the awareness and usability of the area, and therefore achieve an important objective of this effort. As such, an expansion of the lease agreement with NJDOT to permit access from the northbound jug handle of Route 23 to Newark Pompton Turnpike offers great benefit. This area could accommodate a new gravel parking area to be maintained by Pequannock Township.

This parking area will serve as an entrance area to the park and provide increased visibility to the general public. The gravel parking area would accommodate approximately 45 parking spaces and include a visitor
information kiosk at the lot’s southeastern terminus. Together, this area becomes a focal point and gateway to the park. The location of the proposed drive requires further review and confirmation with NJDOT to determine the appropriate engineering design to insure a safe vehicular entrance and exit.

The design and construction materials of the parking areas as well as the remainder of the park area are intended to be low impact and to incorporate environmentally responsible improvements in order to avoid further impacts to the sensitive ecosystem of this area. The parking area surfacing will be largely crushed gravel possibly incorporating recycled materials depending upon availability. All runoff for this area will be intercepted by vegetated swales to treat water quality. Hard surfaces will be confined to accessible routes and decoratively paved areas for interest. The run-off from such surfaces will be dispersed rather than concentrated in order to avoid erosion. Mechanical snow removal of these areas will be limited to the main entrance areas and de icing salts should be held to a minimum.

The cut and fill required to establish the grading for the improvements will be kept to a minimum by following the existing grades as much as possible and using the fill material from construction activities to establish landscape berms where appropriate. All grading will strive to balance the amount of cut and filling in order to avoid any impact to the floodplain environment.

These improvements will also be evaluated for proximity to wetlands and buffer areas. The intent of this design is to avoid any impacts if possible. Any required permits will be obtained if necessary.

**B. Park Gateway / Information Kiosk**

The location of the information kiosk at the southeastern section of the proposed parking area serves as a gateway element. It provides an introduction to the park, its features and its environmental assets through illustrative mapping and informational signage mounted on the kiosk. The signage illustrates the park’s three regions - meadow habitat, aquatic habitat and woodland habitat. Additional signage and illustration describes the vegetation, wildlife and ecological assets of each area.
In order to access the adjacent parklands, visitors must cross the railroad right-of-way located between the proposed parking area and the parklands. Two possibilities are currently being explored for this crossing. One option involves the restoration of an existing underpass previously used for the passage of farm animals. This option permits an unrestricted crossing of the railroad right of way. The second option, an at-grade crossing of the tracks, requires the installation of safety improvements including walkway surfacing and signage.

C. Amphitheater

Upon crossing the railroad tracks, a trail leads the visitor to a natural amphitheater and overlook area. This feature allows the visitor to become oriented with the surroundings, and offers a gathering space for meetings and instruction during school field trips. The existing grade change lends itself to the placement of this facility at this location.

To establish an informal natural setting, the proposed amphitheater design consists of stone retaining walls and crushed stone pathways. Raised planting beds will include native herbaceous and woody shrub planting. The plantings include labels for instructional purposes. A decorative wildlife pictorial inlaid within the center paver area with serve as an artistic design element and focal point. This area provides a relaxed atmosphere for environmental instruction and education for park users, including school groups and other organizations.
D. Meadow Habitat Region

Several wood chip paths proceeding from the amphitheater space lead the visitor through the meadow habitat region. The meadow habitat will include various areas with distinct grass and herbaceous plant seed mixes. The mixes will be formulated for varying heights and compositions. Details on the proposed meadow mixes are attached as Appendix B.

The meadow region will require seasonal mowing in order to maintain the intended design effect, encourage seed release and control invasive exotics and woody plant material. The mixes are formulated so as to establish attractive seasonal color and appropriate bird habitat.

The meadow habitat paths converge onto an existing trail adjacent to the Pequannock River. This trail leads the visitor into the aquatic region of the park.

E. Aquatic Habitat Region/River Trail

The aquatic habitat region features the river environment and allows for aquatic recreation such as boating and fishing. An existing riverfront trail, which connects to the sidewalk in the adjacent Passaic County park, will be enhanced and upgraded.

Three put-in/take-out areas permit recreational access for canoes and kayaks. One such area is proposed within the park itself, while two other locations (one existing/one proposed) are located at points north and south of the park area. The proposed “river trail” is detailed below.

The proposed river trail begins at an existing municipal launch area, located at the terminus of River Drive at the Pequannock River. Because this launch location only accommodates one to two vehicles, proposed signage will direct boaters to leave their cars at an existing gravel parking area on River Drive following their boat launch. Boaters using this launch may then traverse the Pequannock River southward to an intermittent ramp proposed along the banks adjacent to Aquatic Park.

Boaters could then continue southward on the Pequannock River to its confluence with the Ramapo River. At the Morris Canal feeder dam, a proposed portage trail allows the continuation of the route southward. The route would extend to the riverside frontage of the A&P Shopping Center, located on Jackson Avenue. Through an easement to the township, a proposed ramp at this location would serve as a take out area. Gravel area improvements for vehicular parking and boat retrieval complete the river trail amenities.
Trails through the aquatic habitat region connect to a series of trails extending into the area to view the surrounding woodlands and wetlands habitat.

**F. Woodland Habitat Region**

The woodland region features a forested floodplain ecosystem. A series of trails take the visitor through this region. Proposed tree identification signage provides educational information regarding the species indigenous to this area. In addition, several tent camping sites, picnic benches and fire rings allow camping activity within the park. The addition of the camping features provides a setting where everyone (young scouts to families) has an opportunity to explore the different habitats and enjoy nature. To be permitted through the Parks and Recreation Department, the camping also provides an additional level of security as the presence of campers will serve to deter vandalism and further protect the area.

The proposed woodland trails converge onto the trail traversing the North Jersey District Water Supply Company pipeline easement. This trail provides an unparalleled opportunity for a regional connection to the adjacent open space systems within the Borough of Pompton Lakes to the north and Wayne Township. This regional connection will require an engineering feasibility study of a pedestrian bridge to span the Pequannock River.

**VI. Regulatory Review Requirements**

Some of the proposed modifications will require the review and possible permitting by NJDEP. It is probable that the improvements will require analysis for proximity to wetlands and wetland transition areas as well as floodplain impacts. It is anticipated that such permitting, if required will be obtainable under NJDEP’s General Permit 15, (Habitat creation and enhancement) and 17, (trails and boardwalks).
VII. Land Use Recommendations

In addition to the design and development of the Aquatic Park, the environmental assets of the project area require additional protection in the Township’s land use planning and development regulations.

A. Zoning Regulations

As indicated previously, the project area is located in the C-3 Regional Commercial District. The permitted uses within this zone are identified below. While the permitted uses are generally considered clean uses, the remoteness of the area allows zoning violations to occur without immediate detection. It is expected that the development of the park will increase the visibility of the entire area, additional zoning ordinances to further protect the area’s resources should be explored.

Some of the permitted uses in the C-3 district include:

- Retail sales,
- Business/professional/government offices
- Churches
- Restaurants (not drive-thru),
- Bars,
- Hotels/motels,
- Clubs/lodges,
- Rail stations,
- Shopping centers/malls,
- Movie theaters,
- Tattoo/body piercing parlors

Conditional uses in the C-3 district include, but are not limited to:

- Gas stations,
- Auto repair,
- Auto sales,
- Commercial recreation,
- Nursery/garden centers

To follow is a recommended Landscaping Design Standards draft ordinance which is to be discussed by the Planning Board later this month. This ordinance is proposed to meet the goals of the plan on a number of level.

However, due to the sensitivity of the area, additional zoning regulations for the following areas should also be considered:

- Adoption of the proposed NJDEP Stormwater Regulations adopted in February of 2004 for commercial sites.
- Additional Flood Plain regulations.
- Consideration of porous pavement solutions where possible.

B. Landscape Design Standards

Additionally, the township may wish to explore the adoption of a landscape ordinance governing elements such as frontage buffers, transition buffers, landscape design, landscape plans, site protection, and street trees. These standards are suggested to establish improvements to the environment, buffer incompatible land uses and improve the visual environment.

A model ordinance is attached as Appendix A.
IX. Implementation Strategy for Aquatic Park

1. Retain expert assistance to assess the on site conditions to define the extent of wetlands and determine the permits which may be required.

2. Use the master plan for Aquatic Park and Greenway in the pursuit of grant and/or loan financing for the improvements and to complete the final environmental and design preparations.

3. Pursue approvals for the proposed parking area from the Route 23 jug handle for improved access.

4. Use this master plan to help drive the initiative to develop a regional rail trail along the railroad right of way and establish greater recreational connectivity to the region.

5. Morris Land Conservancy should continue to pursue the acquisition of land and/or access easements to provide greater resource protection, public access and awareness of the river environment.

6. Implement development guidelines concerning sound, light, and other considerations with the environmental impact assessments.
Appendix A
Model Ordinances
Landscaping Design Standards.

The purpose of the Landscaping Design Standards ordinance is:

- To improve the aesthetic appearance of the commercial zones in the township;
- To improve on-site and off-site water quality and allow additional nutrient uptake through the provision of additional landscaping materials;
- To reduce stormwater runoff and protect water resources through reduced impervious coverage.

Screening and Landscaping Requirements

A. Function and materials

1. Buffering shall provide a year-round visual screen in order to minimize adverse impacts from a site on an adjacent property or from adjacent areas. It may consist of fencing, walls, evergreens, berms, boulders, mounds, or combinations thereof to achieve the stated objectives as approved by the Planning Board.

2. Where required, buffers shall be measured from property lines and street rights-of-way. Compliance shall be determined by the Planning Board, and any approvals required pursuant to this Section shall be obtained at the time of site plan and subdivision review.

3. Irrigation shall be at least provided for planting areas around the proposed building and street frontage of the project site in a manner appropriate for the specific plant species. Irrigation shall also incorporate water conservation measures such as drip lines or low flow emitters and rain sensors and other techniques available to foster appropriate water usage within planting areas.

4. A growth guarantee of two growing seasons shall be provided and all dead or dying plants shall be replaced by the applicant, as required, to maintain the integrity of the site plan. Buffer areas shall be maintained and kept free of weeds, debris and rubbish.

B. Frontage Buffers

1. Frontage buffer areas shall be provided for all uses within all non-residential zones. Frontage buffers shall be shown on the landscape plan and planted with a mixture of deciduous and evergreen trees, shrubs, grasses and perennials. A minimum of 25% of the proposed plant material shall be native to the north east region. The proposed plant design, where appropriate, shall be incorporated in the midst of berms, boulders, mounds or combinations thereof so as to enhance the appearance of the site. The design of landscaped berms shall be of sufficient height to screen parked cars from motorists on adjacent right-of-ways. In addition to required street trees, frontage buffers shall require a minimum of 10 shrubs for every 30 feet of frontage. If a landscaped berm is provided, the berm shall be at least 2.5 feet higher than the finished elevation of the adjacent parking lot, and then the planting requirements may be reduced to 5 shrubs for every 35 feet of frontage. Frontage buffer plantings may be waived where existing natural growth is found to be sufficient for this purpose.

2. No buildings, structures, accessory structures, parking, driveways, loading areas or storage of materials shall be permitted in the frontage buffer, except as provided for herein.
3. Within any frontage buffer areas, sidewalks, underground linear utilities and site access drives shall only be permitted to cross said buffers, provided their placement is designed to minimize land disturbance within the buffer. Sidewalks shall be limited to cover no more than 25% of a frontage buffer as herein defined. Above- or below-ground storm water detention systems are not permitted within required frontage buffer areas. Access drives shall cross buffer areas at a right angle or as close to a right angle as is practical to minimize land disturbance.

4. Frontage buffers may not interfere with traffic sight distances, and shall not preclude a driver’s view of retail stores or signs on a commercial site where such view, as determined by the Planning Board, is either necessary to the legitimate economic functions of the site or where traffic safety factors are involved.

C. Transition Buffers

Transition buffers shall be required when any proposed nonresidential use abuts a residential zone or use or municipal park recreation or open space parcel as noted within the Master Plan of the township.

1. Design of transition buffers. Arrangement of plantings in buffers shall provide maximum protection to adjacent properties and avoid damage to existing plant material. Possible arrangements include planting in parallel, serpentine or broken rows. If planted berms are used, the minimum top width shall be 4 feet, and the maximum side slope shall be 2:1.

2. Transition buffer planting specifications. Plant materials shall be sufficiently large and planted in such a fashion that a screen at least 6 feet in height shall be produced. All plantings shall be installed according to accepted horticultural standards. Such strips shall be planted with evergreens and deciduous trees as follows, subject to the approval or modification of the Planning Board:
   a. The transition buffer shall be planted with masses and groupings of shade trees, ornamental trees, evergreen trees and shrubs. No less than 75 percent of the plants shall be evergreen trees with a minimum installed height of 6 feet. A fence or wall may be required within the transition buffer at the discretion of the Planning Board. Said fence shall not exceed a 6 foot height in the side or rear yard and not exceed a 4 foot height in the front yard.
   b. Unless otherwise approved by the Board, evergreens shall be spaced 5 feet from the outside property line and 8 feet apart in a row. A minimum of 2 parallel rows of staggered plants shall be required between any residential and nonresidential use. More than one type of evergreen species shall be used. Where a fence is required, plantings shall be placed along the outside perimeter of the fence but not closer than 4 feet from the outside property line.
   c. At a minimum, one deciduous tree should be planted every 40 feet within the center of the transition strip, or as approved by the Planning Board. All deciduous trees shall be of a 2 1/2 to 3 inch caliper, measured six inches from grade.
   d. Existing vegetation within the transition buffer shall be preserved, as determined appropriate. It shall be supplemented with shade tolerant naturalistic massed plantings where necessary to complete screening of adjoining land uses. Transition buffer plantings may be waived by the Planning Board where existing natural growth is found to be sufficient to provide a year-round screen of adjacent land uses.
   e. Buffer dimensional requirements. Along any street right-of-way, there shall be a frontage buffer which is 25 percent of the lot depth and not less than 25 feet. Any transition buffer shall be 10% of lot width or lot depth but not less than 15 feet.
e. No buildings, structures accessory structures, parking, driveways, loading areas or storage of materials shall be permitted within the transitional buffer. Buffer areas shall be maintained and kept free of all debris and rubbish.

D. General Landscape Design and Planting Requirements

1. Landscaping shall be provided as part of the site plan and subdivision design. It shall be conceived as a total integrated plan for the entire site, integrating the various elements of the site design, preserving the particular identity of the site and creating a pleasing site character.

2. Landscaping may include plant materials such as trees, shrubs, ground cover, perennials, annuals and other materials such as rocks, water, berms, walls, fences and paving materials.

3. Landscaping shall be provided in public areas, adjacent to buildings, in parking areas, and around the perimeter of sites.

4. Landscaping shall be provided to promote a desirable visual environment, to accentuate building design, define entranceways, screen parking and loading areas, mitigate adverse visual impacts and provide windbreaks for winter winds and summer cooling for buildings.

5. The impact of any proposed landscaping plan at various time intervals shall be considered.

6. The use of indigenous/native plant material is to be encouraged to establish sustainable landscapes that blend with the natural environment.

7. Plants and other landscaping materials shall be selected in terms of aesthetic and functional considerations. The landscape design shall create visual diversity and contrast through variation in size, shape, texture and color. The selection of plants in terms of susceptibility to disease and insect damage, wind and ice damage, native plant material, habitat (wet-site, drought, sun and shade tolerance), soil conditions, growth rate, longevity, root pattern, maintenance requirements, etc., shall be considered. Consideration shall be given to accenting site entrances and unique areas with special landscaping treatment. Seasonal flowerbed displays are encouraged.

8. Slope plantings. Landscaping areas of cuts and fills and/or terraces shall be sufficient to prevent erosion, and all roadway slopes steeper than 1 foot vertically to 3 feet horizontally shall be planted with ground covers appropriate for the purpose and soil conditions, water availability and environment.

9. Sight triangles. Landscaping within sight triangles shall not exceed a mature height of 30 inches. Shade trees shall be pruned up to a 8 foot branching height above grade.

10. In cases where natural features existing on-site duplicate the planting requirements of this Section, the landscape requirements may be waived by the Planning Board.

11. All plant materials, planting practices and specifications shall be in accordance with the "American Standards for Nursery Stock" by the American Association of Nurserymen Standards.

12. The design standards are minimum requirements. The Township may request additional development features exceeding these standards if conditions warrant.
E. Landscape Plan Content

1. A landscape plan prepared by a certified landscape architect, certified by the New Jersey State Board of Landscape Architects, or other qualified individual, shall be submitted with each major site plan or major subdivision application.

2. In addition to the major site plan or subdivision submission requirements, the landscape plan shall include and identify the following information:

   a. Existing and proposed underground and above ground utilities such as site lighting, transformers, hydrants, manholes, valve boxes, etc.

   b. Existing wooded areas, rock outcroppings and existing and proposed water bodies.

   c. Location of individual existing trees noted for preservation within the area of development and 30 feet beyond the limit of the disturbance. Trees 4 inches in diameter (measured 4 1/2 feet above the existing ground level) shall be located and identified by name and diameter unless the wooded area is shown with a specific limit line. In this case, specimen trees shall be located within thirty feet of the line.

   d. Indicate all existing vegetation to be saved or removed.

   e. Existing and proposed topography and location of all landscaped berms.

   f. Location, species and sizes of all proposed shade trees, ornamental trees, evergreen trees and shrubs and areas for lawns or any other ground cover. Different graphic symbols shall be used to show the location and spacing of shade trees, ornamental trees, evergreen trees, shrubs and ground cover. The size of the symbol must be representative of the size of the plant shown to scale.

   g. A plant schedule indicating botanical name, common name, size at time of planting (caliper, height and spread), quantity, root condition and any special remarks (spacing, substitutions, etc.) for all plant material proposed. Plants within the plant schedule shall be keyed to the landscape plan utilizing the first letter of the botanical plant name.

   h. Planting and construction details and specifications.

F. Site Protection Requirements

1. Topsoil preservation. No topsoil shall be removed from the site or used as fill. Topsoil moved during the course of construction shall be redistributed on all regraded surfaces so as to provide at least 4 inches of even cover to all disturbed areas of the development and shall be stabilized by seeding or planting. Additional topsoil shall be provided as directed by the Township Engineer. Surplus topsoil shall be removed only as directed by the Township Engineer. A soil erosion and sediment control plan shall be approved as part of the preliminary plat, in accordance with the provisions of the Township Ordinance.

2. Removal of debris. All stumps and other tree parts, litter, brush, weeds, excess or scrap building materials, or other debris shall be removed from the site and disposed of in accordance with the law. No tree stumps, portions of tree trunks or limbs shall be removed from the site if restricted by conservation easement.

Prepared by Burgis Associates

October 2004
3. Protection of existing plantings. Maximum effort should be made to save fine specimens (because of size or relative rarity). No building material, construction equipment or temporary soil deposits shall be placed within 8 feet of shrubs or the drip line of trees designated to be retained on the preliminary and/or final plat. Protective barriers or tree wells shall be shown on the drawing and installed around each plant and/or group of plants that are to remain on the site at the approved limit of disturbance. Barriers shall not be supported by the plants they are protecting, but shall be self-supporting. They shall be a minimum of four feet high and constructed of a durable material that will last until construction is completed. Snow fences and silt fences are examples of acceptable barriers. Chain link fence may be required for tree protection if warranted by site conditions and relative rarity of the plant. The grade of the land located along the drip line shall not be raised or lowered more than six inches unless compensated by welling retaining walls; and in no event shall the welling or retaining walls be less than 6 feet from the trunk of a tree. Any clearing within the drip line or within 6 feet of the trunk of a remaining tree must be done by hand.

H. Street Trees

1. Street trees shall be required for any subdivision, site plan or expansion of existing uses.

2. Street trees shall be installed within the right-of-way between the sidewalk and curb on both sides of all streets or as directed by the respective board or municipal agency. Where sidewalks are not required, street trees shall be located within the property line along a line 5 feet from and parallel to the street right-of-way line. The spacing of street trees shall be no farther than 40 feet on center. When trees are planted at predetermined intervals along streets, spacing shall depend on tree size, as follows:

<table>
<thead>
<tr>
<th>Tree Size / Type</th>
<th>Planting Interval (in feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large trees/Group A</td>
<td>40</td>
</tr>
<tr>
<td>Medium-sized trees/Group B</td>
<td>30</td>
</tr>
<tr>
<td>Small trees/Group C</td>
<td>20</td>
</tr>
</tbody>
</table>

3. The trees shall be planted so as not to interfere with utilities, roadways, sidewalks, sight easement or streetlights. Tree location, landscaping design and spacing plan shall be approved by the Planning Board as part of the site plan or subdivision process.

4. Street tree type. Tree type may vary depending on the overall effect desired. Depending upon the length of the street, more than one variety of street tree should be provided to create biodiversity and reduce the problems associated with a monoculture planting. Trees shall be planted in groupings of similar varieties. Trees of similar form, height and character along a roadway shall be used to promote uniformity and allow for a smooth visual transition between species.

5. Tree selection shall be based upon on-site conditions and tree suitability to those conditions. The following Tree List shall be used as a guide for the selection of street trees.
<table>
<thead>
<tr>
<th>Category</th>
<th>Common Name</th>
<th>Botanical Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planting</td>
<td>Green Mountain Sugar Maple</td>
<td>Acer saccharum ‘Green mountain’</td>
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<tr>
<td></td>
<td>Red Sunset Red Maple</td>
<td>Acer rubrum ‘Red Sunset’</td>
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<tr>
<td></td>
<td>Patmore Ash</td>
<td>Fraxinus lanceolata, ‘Patmore’</td>
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<tr>
<td></td>
<td>Skyline Honey Locust</td>
<td>Gleditsia trianthos, inermis ‘Skyline’</td>
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<tr>
<td></td>
<td>Greenspire Linden</td>
<td>Tilia cordata ‘Greenspire’</td>
</tr>
<tr>
<td></td>
<td>Northern Red Oak</td>
<td>Quercus rubra</td>
</tr>
<tr>
<td></td>
<td>Green Vase Zelkova</td>
<td>Zelkova serrata, ‘Green Vase’</td>
</tr>
<tr>
<td>Group B:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planting</td>
<td>Pyramidal European Hornbeam</td>
<td>Carpinus betulus ‘Fastigiata’</td>
</tr>
<tr>
<td></td>
<td>Kwanzan Cherry</td>
<td>Prunus serrulata ‘Kwanzan’</td>
</tr>
<tr>
<td></td>
<td>Redspire Pear</td>
<td>Pyrus calleryana, ‘Redspire’</td>
</tr>
<tr>
<td></td>
<td>Capital or Aristocrat Pear</td>
<td>P. calleryana, ‘Capital’ ‘Aristocrat’</td>
</tr>
<tr>
<td></td>
<td>Regent Scholar Tree</td>
<td>Sophora japonica ‘Regent’</td>
</tr>
<tr>
<td>Group C:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planting Width 30”</td>
<td>Newport Plum</td>
<td>Prunus cerasifera, ‘Newport’</td>
</tr>
<tr>
<td></td>
<td>Cumulus Shadblow</td>
<td>Amelander ‘Cumulus’</td>
</tr>
<tr>
<td></td>
<td>Amanogawa Columnar Cherry</td>
<td>Prunus serrulat ‘Amanogawa’</td>
</tr>
</tbody>
</table>
I. Planting Specifications

1. All trees shall have a minimum caliper of 2.5 to 3 inches measured 6 inches from grade in accordance with standards established by the American Association of Nurserymen. Trees shall be nursery-grown, free of disease, substantially uniform in size and shape and have straight trunks. The minimum branch height at planting shall be 6 feet, except where planting is on a sight triangle in which case no branches shall be below 8 feet.

2. Trees shall be properly planted and firmly supported with two or three guy wires attached to stakes. Pieces of rubber hose shall be used under the wires where they are attached to the trees. Wires and stakes shall be removed by the applicant after one year.

3. Where a natural growth of shade trees exists on a building lot, the Engineering Department may determine whether such natural growth satisfies the intent of this Chapter and, if so, the owner may not be required to provide any additional street trees.
Appendix B
Meadow Mixes and Maintenance Schedules
Proposed Meadow Mixes

1. Mixture "A" - Meadow 1 (3'-7' height)
   a. 30% Tall Fescue
   b. 30% Creeping Red Fescue
   c. 15% Perennial Ryegrass
   d. 10% Climax Timothy
   e. 5% Annual Ryegrass
   f. 5% White Clover
   g. 5% Wildflowers:
      i. 20% New England Aster (Aster novae-angliae) (Lavender-blue, 3'-7', Aug.-Oct.)
      ii. 20% Purple Coneflower (Echinacea purpurea) (Lavender, 3'-4', Aug.-Oct.)
      iii. 20% New York Ironweed (Vernonia noveboracensis) (Violet, 3'-7', Aug.-Oct.)
      iv. 20% Tall Goldenrod (Solidago altissima) (Yellow, 3'-6', Aug.-Nov.)
      v. 20% Queen of the Prairie (Filipendula rubra) (Deep pink, 2'-8', Jun.-Aug.)

2. Mixture "B" - Meadow 2 (1'-3' height)
   a. 25% Little Bluestem
   b. 20% Reliant II Hard Fescue
   c. 15% Indiangrass
   d. 10% Sideoats Grama
   e. 10% Blue Bluestem
   f. 5% Switchgrass
   g. 15% Wildflowers:
      i. 20% Black-eyed Susan (Rudbeckia hirta) (Yellow, 1'-3', Jun.-Sep.)
      ii. 20% Butterfly-weed (Asclepias tuberosa) (Orange, 1'-2', Jun.-Sept.)
      iii. 20% Lance-leaved Coreopsis (Coreopsis lanceolata) (Yellow, 1'-2', May-Aug.)
      iv. 15% Calico Aster (Aster lateriflorus) (White, 1'-2', Aug.-Oct.)
      v. 15% New England Blazing Star (Liatris borealis) (Rose-purple, 1'-3', Aug.-Sept.)
      vi. 10% Perennial Lupine (Lupinus perennis) (Purple, 1'-3', May-Jun.)
      vii. Dwarf Evening Primrose (Oenothera missouriensis) (Yellow, 10', Jun.-Sep.)

3. Mixture "C" - Native Shortgrass Mixture (6" - 3' height)
   a. 35% Little Bluestem
   b. 30% Reliant II Hard Fescue
   c. 15% Blue Grama
   d. 15% Sideoats Grama
   e. 5% Wildflowers:
      i. 40% Lance-leaf Coreopsis (Coreopsis lanceolata) (Yellow, 1'-2', May-Jul.)
      ii. 20% Blue Flax (Linum perenne lewisii) (Light blue, 1'-2', May-Jul.)
      iii. 20% Dense Blazing Star (Liatris spicata) (Lavender-purple)
      iv. 20% Beard Tongue (Penstemon digitalis) (White)
4. Mixture "D" - Near Streams (6'-4')
   a. 55% Pixie Tall Fescue
   b. 15% Reliant II Hard Fescue
   c. 15% Classic Kentucky Bluegrass
   d. 5% Streaker Redtop
   e. 10% Wildflowers:
      i. 25% Cardinal Flower (Lobelia cardinalis) (Brilliant red, 2'-4', Jul.-Sep.)
      ii. 25% Tickseed-sunflower (Bidsens coronata) (Yellow)
      iii. 25% Turk's-cap Lily (Lilium superbum) (Orange)
      iv. 25% Impatiens pallida (Pale Touch-me-not) (Yellow)

5. Mixture "E" (partial shade woodland edge)
   a. 20% Little Bluestem
   b. 20% Indiangrass
   c. 20% Reliant II Hard Fescue
   d. 10% Big Blue stem
   e. 10% Sideoats Grama
   f. 10% Wildflowers:
      i. 40% Joe-pye Weed (Eupatorium maculatum) (Pink, 5'-7', Jul.-Sep.)
      ii. 30% New England Aster (Aster novae-angliae) (Lavender-blue, 3'-7', Aug.-Oct.)
      iii. 10% Chickory (Cichorium intybus) (Blue, 1'-4', Jun.-Oct.)
      iv. 10% Columbine (Aquilegia caerulea) (Bi-colored, 12"-24", May-Jun.)
      v. 10% Shasta Daisy (Chrisanthemum maximum) (White, 1'-3', Jun.-Jul.)

Note: Seeding rate: 40-60 lbs/acre for grasses and 10 lbs/acre for wildflowers; optimum planting dates — April 1-June 30 for grasses and March 15-June 1 for wild flowers, also August 15-October 15(best) for wild flowers.

Establishment Schedule for Warm Season Grasses & Maintenance Recommendations

Pre-planting:

Fall
   Tree and shrub removal – Cutting, ripping
   Prepare soil test. for pH is below 5.0, apply lime to adjust the pH to 5.0-6.0
   • Do not-till into cover crop: Plant 20-40 lb/ac of barley or oats.
   • Do not-till into existing vegetation: Treat the field with Plateau or Roundup. Mow first if weeds are over 2 ft.
   • Contouring/ Grading
   • Delineation of different plant mixes areas

Spring
   All planting methods: treat the field with Plateau, Round-up. Do not use Banvel or 2,4-D when planting legumes or wild flowers with the warm season grasses.
Planting Year:

Mid-late spring  Apply P and K ONLY if soil test results indicate they are at VERY LOW level. DO NOT APPLY NITROGEN because it only encourages weed growth. Application of short-lived herbicide spray (e.g. Roundup) in early spring, immediately prior to planting. (Herbicide carryover can pose a threat to new plantings. Contact the herbicide manufacturer for specific information on persistence.)

Planting methods

- No-tilling of cover crop to reduce weed competition and erosion prevention.
- No-tilling into existing vegetation – on fallow fields treated with a herbicide. Seed in shallow seed-bed worked up among the existing dead plant material. In fallow fields, where weeds are over 2 feet tall, mow or brush hog prior to herbicide application.

Late spring-fall  Mow to control weeds. Do not let weeds get above 12 inches tall. Mow to 4-6 inches. Mow every six weeks to a height of four to six inches or just above seedling height. Do not mow seedlings.

Second Year:

Weed control

i. Monitor for weeds
ii. Spot herbicide application
iii. Manual weeding
iv. Mowing immediately after the most active growth period of the problem weed

Early spring  If cool season grasses persist and comprise more than 25% of the field, do one of the following until new growth appears on the warm season grasses: treat with an herbicide such as Round-up or Plateau OR mow or graze severely (as close to the ground as possible).

Mid-spring  If cool season grass weeds comprise less than 25% of the field, you can apply 40-60 lb/ac of nitrogen to optimize growth.

Late spring-mid summer  Continue mowing to control weeds. Mow to a height of 8 inches.

Fall  If perennial weeds comprise 25% or more of the field, do one of the following after the warm season grasses are dormant: treat with an herbicide OR mow or graze severely.

Third Year:

Early spring  If cool season grasses persist and comprise more than 25% of the field, do one of the following until new growth appears on the warm season grasses: treat with an herbicide such as Round-up or Plateau OR mow or graze severely (as close to the ground as possible).

Late spring-mid summer  Continue mowing to control weeds. Mow to a height of 8 inches.
Fall

If perennial weeds comprise 25% or more of the field, do one of the following after the warm season grasses are dormant: treat with an herbicide OR mow or graze severely.

Fourth Year and beyond:

The stand should be well established. Controlled burning, mowing or grazing may be needed every 3-4 years to rejuvenate the stand and suppress woody growth. For optimum wildlife habitat, do not burn or mow during the nesting season (April 15-August 15). Also, to ensure that some food and cover is always available, management practices should only be applied to one third of the stand at a time. Control noxious weeds as required by state law.

Mowing

- One third of the total stand should be mowed to a minimum height of 6 inches every three to four years.
- Plant litter can smother new growth and should be removed. Mowing is not an effective management practice unless the litter is removed. You can also scarify the soil surface with a harrow or similar equipment to enhance the effect of mowing.
- Mowing should be done no later than four weeks prior to the last average killing frost for the area OR after the first killing frost when plants are dormant.

Grazing

- Warm season grasses are very palatable and nutritious.
- Warm season grasses are best grazed from August.
- Initial grazing should not begin until the plants are 15-24 inches tall.
- Graze down to 6 inches, and allow to regrow to 12 inches before the next grazing.
- The final grazing height should be around 9 inches to allow sufficient recovery prior to dormancy.

Additional management techniques:

Selective cutting

- Cut meadow with blade set between 8 and 12 inches or just above meadow species
- Best if done early to mid-summer, late summer mowing may damage warm season grasses
- Excellent control of annual species during establishment
- Great way to remove flower and seed heads of weed species
- Provides suppression not total control of most species
- Timing is very important

Hand Rouging

- Treat individual plants with selective herbicide
- Non-selective a glyphosate based herbicide at between 0.5 and 2%
- A broadleaf selective herbicide, usually a better bet to avoid lateral damage, use rates according to label
- Effectiveness of both types of herbicides can be increased when mixed with surfactant, if one is not included
- Use either backpack or atv mounted sprayer
- Great control method in mixed stands, possibly the only chemical method in many cases
- Excellent selectivity
- Can be labor intensive
- Requires personnel with general plant id skills

**Boom spraying**

- Early season control often places less stress on native species
- Great coverage
- Reduced labor and training required
- Selectivity can be obtained through proper herbicide selection
- General broadleaf herbicides: dicamba, triclopyr, 24-d and a variety of mixes
- Highly selective herbicides specifically designed for warm season grasses establishment, i.e. Plateau
- The addition of non-ionic surfactant will increase the effectiveness
- Very high profile
- Limited selectivity
- High materials and equipment costs
Appendix C
Conceptual Cost Estimate
## Conceptual Cost Estimate for Aquatic Park

**10/1/04**

**Township of Pequannock Environmental Commission, NJ**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Cost</th>
<th>Amount</th>
<th>Subtotal</th>
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<td><strong>Parking Lot Improvements</strong></td>
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<tr>
<td>12</td>
<td>Gravel Pavement</td>
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<td>Topsolling (1'6&quot; deep) islands</td>
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<td><strong>Meadow and Woodland Improvements</strong></td>
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| Subtotal | $29,800.00 |
| Amount   | $94,994.00 |
| Subtotal | $57,895.00 |
| Sum Total | $218,164.00 |
| Contingency 10% | $21,816.40 |
| Total Hardcosts | $239,980 |

Prepared by Burgis Associates, Inc.  
October 2004