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ECONOMIC DEVELOPMENT ADMINISTRATION

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NATURAL AND CULTURAL RESOURCES ANALYSES
OF SELECTED INDUSTRIAL PARKS
IN THE NEW JERSEY PINELANDS

PREPARED BY THE NEW JERSEY PINELANDS COMMISSION

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This Technical Assistance Study was accomplished under contract with the Economic Development Administration. The statements, findings, conclusions, recommendations, and other data in this report are solely those of the contractor and do not necessarily reflect the views of the Economic Development Administration.

EXECUTIVE SUMMARY

This report presents the results of a natural and cultural resources analysis of five industrial parks in the New Jersey Pinelands. The purpose of the analysis is to identify environmental and cultural factors that may limit the development potential of industrial parks in the following municipalities: Hamilton Township (Atlantic County), Egg Harbor City (Atlantic County), Stafford Township (Ocean County), Woodbine Borough (Cape May County), and Chesilhurst Borough (Camden County). The ultimate objective is to facilitate the review and approval of proposed Pinelands projects which are subject to the requirements of the New Jersey Pinelands Comprehensive Management Plan. The analysis addresses soils, wetlands, endangered plant species, wildlife, cultural resources, and infrastructure.

The results indicate that the percentage of potentially developable land varies among sites. The Stafford site is least limited; the entire 53+ acre site is potentially developable on sewers. Potentially developable land at the Egg Harbor City and Hamilton Township sites is 113 acres and 192 acres, respectively. A final determination of the developability of both sites is dependent on the result of required cultural resource inventories. Chesilhurst Borough and Woodbine Borough industrial sites were assessed with the assumption that development would rely on the use of on-site wastewater disposal systems. Potentially developable land at these two sites is 26 and 85 acres, respectively.

TABLE OF CONTENTS

<u>TOPIC</u>	<u>PAGE</u>
PART I BACKGROUND	
Introduction	2
Geology	4
Hydrology	7
Ground Water	7
Surface Water	10
Soils	12
Soil Series	12
Soil Characteristics	13
Agricultural Soils	13
Depth of Water Table	14
Development Restrictions	14
Vegetation	15
Vegetation Types	15
Endangered Plant Species	18
Protection of Pinelands Vegetation	18
Wildlife	20
Mammals	20
Birds	21
Reptiles and Amphibians	21
Fish	21
Protection of Pinelands Wildlife	22
Cultural Resources	24
Infrastructure	29

PART II INDUSTRIAL PARK SITE ASSESSMENTS

PAGE

Chesilhurst Industrial Park 31

 Soils 31

 Land Cover 33

 Endangered Plant Species 33

 Wildlife 33

 Cultural Resources 34

 Infrastructure 34

 Developable Land 35

Egg Harbor City 36

 Soils 36

 Land Cover 39

 Developed Land 39

 Uplands 39

 Wetlands 40

 Endangered Plant Species 42

 Wildlife 43

 Cultural Resources 43

 Infrastructure 45

 Developable Land 45

Hamilton Township 46

 Soils 47

 Land Cover 48

 Uplands 48

 Wetlands 49

 Endangered Plant Species 50

 Wildlife 51

	<u>PAGE</u>
Cultural Resources	53
Infrastructure	55
Developable Land	56
Stafford Township	57
Soils	57
Land Cover	58
Endangered Plant Species	58
Wildlife	59
Cultural Resources	59
Infrastructure	59
Developable Land.....	60
Woodbine	61
Soils	62
Land Cover	64
Endangered Plant Species	65
Wildlife	65
Cultural Resources	66
Infrastructure	66
Developable Land	67
RECOMMENDATIONS	68
APPENDICES	

1 BACKGROUND

INTRODUCTION

In August of 1985 the Pinelands Commission received a grant from the U.S. Department of Commerce, Economic Development Administration, to prepare a natural and cultural resources analysis of five industrial parks in the New Jersey Pinelands. The analysis, considered to be a pilot project, has been completed for publicly owned industrial parks in Hamilton Township (Atlantic County), Egg Harbor City (Atlantic County), Stafford Township (Ocean County), Woodbine Borough (Cape May County), and Chesilhurst Borough (Camden County).

Development within the nearly one million acre New Jersey Pinelands Area (Figure 1) is guided by the provisions of the Pinelands Comprehensive Management Plan (CMP). This Plan, administered by the Pinelands Commission, requires that development meet minimum environmental performance standards. Among these standards are resource protection programs addressing wetlands, water quality, vegetation, endangered species, wildlife and cultural resources. A complete description of these standards is presented in Appendix 1 (Article 6).

The purpose of this assessment is to identify those factors, such as high water tables, that may limit the development potential of each of the five industrial parks. The ultimate objective is to facilitate the review and approval of proposed Pinelands projects.

In the absence of specific site plans, only general findings with regard to the development potential of a site can be made. These findings can, however, provide a "footprint" of developable areas within each site. This "footprint" will benefit both potential project

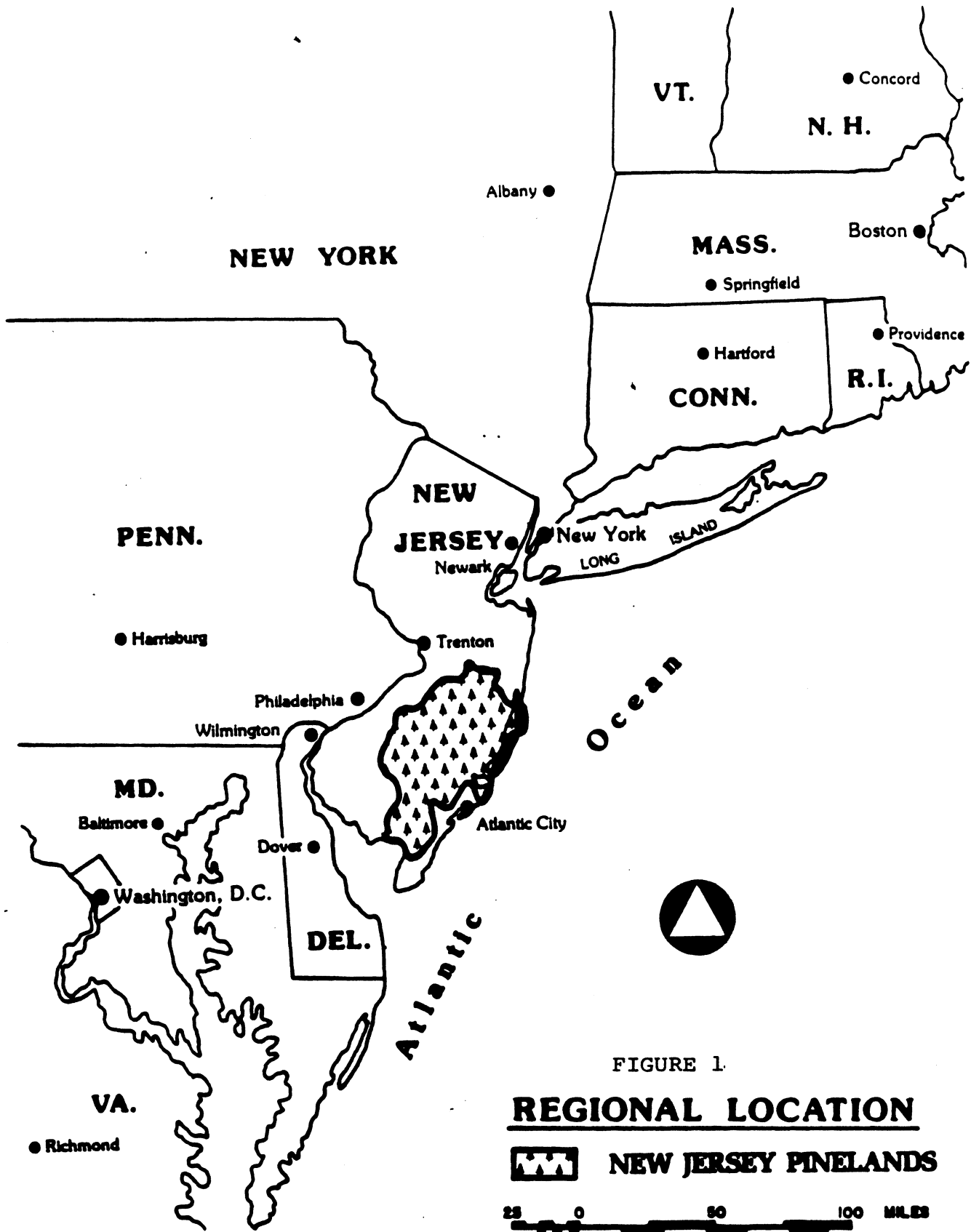


FIGURE 1.

REGIONAL LOCATION

 **NEW JERSEY PINELANDS**



applicants and various governmental agencies charged with promoting economic development in New Jersey.

This report includes a general discussion of Pinelands resources, including geology, hydrology, soils, vegetation, wetlands, wildlife, and cultural resources. A site by site description of infrastructure is also given and the specific Pinelands standards addressed in this assessment are identified. Finally, site specific information on natural and cultural resources is presented, along with a preliminary assessment of development potential. Collected data are presented on both report scale maps and detailed site plan maps. The latter are available for inspection at the Pinelands Commission office.

GEOLOGY

The Pinelands lie in the Atlantic Coastal Plain geologic formation, which has been formed over the last 170-200 million years as a result of deposition and erosion. The Atlantic Coastal Plain is characterized by gently rolling terrain; sandy, droughty soils with no rock outcrops, steep slopes, or mountain peaks. In general, it comprises a wedge shaped series of unconsolidated layers of sands, clays and marls on a gently southeastward dipping bedrock which is 1,300 to 6,000 feet below the surface. These layers extend seaward into the submerged Continental Shelf. The surficial geology of the Pinelands area is shown in Figure 2, and its geologic stratigraphy is shown in Figure 3.

The Potomac Group and Raritan-Magothy Formations which lie on the bedrock are the oldest, thickest, and most extensive units known to occur throughout the entire Pinelands portion of the Atlantic Coastal Plain. These interrelated units consist of alternating layers of clay, silt, sand and gravel. They range in combined thickness from a feather edge along their outcrop, adjacent to the Delaware River, to over 3,000 feet in the Atlantic City area.

The Englishtown Formation overlies the Merchantville Clay and Woodbury Formation. It is overlain by a thin confining layer, the Marshalltown Formation. The outcrop of the Englishtown Formation ranges in thickness from 140 feet near Raritan Bay to 50 feet at Trenton.

The Wenonah Formation and Mount Laurel Sand function hydraulically as one, with the latter unit predominating. They overlie the Marshalltown aquitard (a layer which inhibits the free movement of

water), and are overlain by the Navesink Formation, which is also an aquitard.

The Kirkwood Formation overlaps several formations, including the Piney Point, Marshalltown, Hornerstown, and Navesink, depending on location. It is overlain by the Cohansey Sand. The top of the Kirkwood ranges in elevation from over 100 feet above sea level, in its outcrop area, to over 300 feet below sea level, along the eastern edge of Cape May Peninsula. The formation is between 50 to 100 feet thick in its outcrop and thickens to over 800 feet in the Atlantic City area.

The Cohansey Sand typically consists of fine to coarse grained quartzose sand with lenses of gravel that are usually one foot thick or less. In most areas, overall clay content is less than 20 percent. Lenses of white, yellow, red, and light gray clay occur generally in the upper part of the formation and may be as much as 25 feet thick. The sand is predominantly yellow, but shades of white, red, brown, and gray also occur. Parallel bedding and cross-stratification are present in the sand.

Several deposits of Quaternary age form a discontinuous veneer lying above the Cohansey throughout much of the Pinelands. They are, from oldest to youngest, the Bridgeton, Pennsauken and Cape May Formations.

The Bridgeton and Pennsauken deposits are generally derived from erosion and redeposition of the Cohansey Sand and Beacon Hill Gravel. They cap the tops and mantle the upper slopes of most of the pronounced hills and narrow ridges, and can be as much as 20 feet thick.

The Cape May Formation in Cape May County contains four lithologic components deposited in three environments - estuarine, marine and

deltaic. Elsewhere, the thickness of this formation is 85 feet near Batsto, 112 feet at Sweetwater, and 229 feet at Atlantic City.

The most important hydrologic function of the Cape May deposits is their ability to absorb precipitation and transmit water to underlying aquifers. Because hydraulic continuity with the underlying Cohansey is excellent, they can be considered a part of the Cohansey Sand-upper Kirkwood aquifer system.

Three surficial deposits are mapped as occurring within the industrial park sites reviewed in this assessment. These are the Cape May, Bridgeton, and Cohansey formations. The Cohansey underlies all sites.

HYDROLOGY

Ground Water

The most important abiotic element of the Pinelands ecosystem is water, which is stored in the extensive sand aquifers below the surface. This ground water supports 89 percent of the flow in the Pinelands streams, discharging primarily through the swamps and marshes. It is replenished solely by precipitation, of which about 44 percent of the annual total percolates through the sandy soil surface.

Although highly permeable, the uppermost soil tends to be chemically inert with a low absorptive capacity. It is therefore incapable of filtering out wastes. In addition, the waters are susceptible to various forms of pollution because they are weakly buffered against chemical change. Groundwater contamination in the Pinelands is therefore a significant threat.

Numerous aquifer systems, aquifers and sub-aquifers occur throughout the New Jersey Coastal Plain. Only five, however, can be considered regional in nature and capable of producing substantial quantities of water. These are the Potomac-Raritan-Magothy aquifer system, Englishtown Formation, Wenonah Formation and Mount Laurel Sand, Kirkwood Formation, and Cohansey Sand. Locally, the Cohansey and Kirkwood are the most important aquifers, both ecologically and as a water supply source.

The Kirkwood Formation is the most highly developed aquifer along the shore and barrier beaches of Atlantic, Cape May and Ocean Counties. Development of the Kirkwood occurs along the coast because the shallower Cohansey is more vulnerable to salt water intrusion.

The Kirkwood Formation is recharged from precipitation, vertical leakage from the overlying Cohansey and release of water stored in the clay layers above, beneath, and within the formation. The quantity of available water and the permeability of the formation makes it an important aquifer in the coastal area.

The Cohansey Sand is the most important fresh water aquifer in the New Jersey Coastal Plain. The volume of water in the Cohansey usually controls the water table level throughout most of the Pinelands. The water table in the Cohansey is typically shallow, generally less than 10 feet below the surface over much of the area. Although the Cohansey stores a large volume of water, developing it for water supply without recharge would lower the water table. Since most of the Pinelands' unique flora are adapted to a wetlands environment, lowering the water table could disrupt this entire ecosystem. In addition, the cranberry industry, which relies on large volumes of water, would be placed in jeopardy.

Groundwater in the unconsolidated formations of the Pinelands is derived solely from precipitation over the outcrop areas. It discharges through the swamps and bogs to support 89 percent of the stream flow in the Pinelands. Typically, the average annual Pinelands stream discharges are low. Flow rates throughout the year tend to be uniform and peak discharges from storms are low. Rainfall is absorbed by the porous soil, held in storage in the large groundwater reservoirs, and gradually released throughout the year.

Ground water is generally low in dissolved solids. Due to this low concentration, it is weakly buffered against chemical change. For

example, nitrate concentrations are low in the central area, with values less than 0.1 mg/l.

Because the Pinelands ecosystem is so dependent on abundant ground water supplies, water supply development must be carefully reviewed. Any increased allocations associated with the proposed industrial parks must therefore be reviewed by the Pinelands Commission on a case by case basis.

Surface Water

A distinctive characteristic of the Pinelands is the extensive stream systems (Figure 4). Most of the region is drained by closely spaced and somewhat parallel streams flowing to barrier bays along the Atlantic Ocean or south to the Delaware Bay. The Rancocas Creek is one of the major exceptions. It flows westward from its source in the Pinelands to drain into the Delaware River.

Pinelands streams have a characteristic composition which is as important to the maintenance of the Pinelands ecosystem as are the water flows and groundwater levels. The typical, high quality Pinelands stream is slow-moving, brown but clear, and has a sandy substrate. The water is soft and the pH is low. It generally has a high level of dissolved humic matter, especially in the summer months, and may have fluctuating oxygen levels. There are low levels of nutrients and suspended and total dissolved solids. The water of characteristic Pinelands streams is very susceptible to chemical changes; this is compounded by the fact that the typical Pinelands sandy soil is inert, achieving very little renovation of polluted water. As part of this assessment, water quality data collected by the U.S. Geological Survey (USGS) and those stored on the STORET system maintained by the NJDEP were reviewed. The results of this review are presented in Part II.

The CMP includes a water quality management program. The minimum standards of this program are presented in Appendix 1. One element of this program, which relates directly to the unsewered Chesilhurst and Woodbine sites, is the requirement that on-site waste water disposal systems ensure that ground water exiting from a given parcel or entering a surface body of water not exceed 2 parts per million (ppm)

nitrate-nitrogen (Section 6-804). This provision translates into a minimum lot size for all unsewered development. Further discussion of this standard is given in the section of infrastructure.

SOILS

The soils of the Pinelands, which have developed from the sandy geologic deposits, are unusually porous and acid. The parent soil material has a greater proportion of coarse sandy particles than finer silt and clay particles. The greater the proportion of coarse particles in a soil, the less its capacity to retain both water and nutrients. Therefore, even though the Pinelands get the same amount of rainfall as surrounding areas, the water drains so rapidly through the soil that little moisture or nutrients are left. This leaching has significant implications when examining the relations between land use and water quality. It is particularly relevant when evaluating the use of chemicals on both agriculture and residential areas and the suitability of on-site disposal of wastewater with the standard septic tank.

Soil Series

Soils are classified in two ways, by series and phase. Soils with similar subsurface and morphological characteristics are classified into series. These are further refined into phases as determined by characteristics including slope, degree of erosion, stoniness, and surface texture. The Pinelands have thirteen major soils series. In order of decreasing natural drainage, they are: Lakewood, Evesboro, Woodmansie, Downer, Sassafras, Aura, Lakehurst, Klej, Hammonton, Atsion, Berryland, Pocomoke, and Muck. Leon and St. Johns are other, older soil mapping units. These soils have been incorporated into the Atsion and Berryland soils series.

Soil Characteristics

Soil characteristics have a direct influence on the land use patterns in a region. An assessment of the characteristics can provide a measure of the impact which various land uses can have on the natural environment. Mapping of soil characteristics can, therefore, offer a general guide to appropriate land use activities.

Some characteristics and interpretations are related to soil phases, while others are related to the series. For example, phases are used to classify prime agricultural soils, whereas the series are used to predict depth to seasonal high water table.

Agricultural Soils

Agriculture is an important economic activity in the Pinelands. As a land use, it is most dependent on soil characteristics. Soil phases can be classified as prime agricultural soils, unique soils, and soils of statewide or local importance.

Prime farmland is land best suited for producing food, feed, forage, fiber, and oilseed crops. Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops. Examples of such crops are citrus, cranberries, fruit and vegetables. Farmland of statewide importance is land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. A fourth category is agricultural soils that are of local importance.

Depth of Water Table

Depth to seasonal high water table is one of the most restrictive soil characteristics in the Pinelands. It represents the level to which the water table rises during the wet season, which in the Pinelands is spring. Ranges are generally given as 0-1.5 ft, 1.5-5.0 ft, and greater than 5.0 ft. These ranges are associated with very poorly to poorly drained, somewhat poorly drained to moderately well drained, and well drained to excessively well drained classes, respectively.

Development Restrictions

The development potential of an area is determined in part by the nature of its soils. Section 6-804 requires a depth to seasonal high water table of at least five feet for the installation of on-site wastewater disposal systems. Generally, only excessively drained and well drained soils meet this requirement. Moderately well drained and somewhat poorly drained soils are considered undevelopable if sewer service is unavailable. Poorly drained and very poorly drained soils are unacceptable regardless of the type of system that is proposed.

This assessment was conducted with the understanding that the Stafford Township, Egg Harbor City, and Hamilton Township industrial parks would be served by sewer systems. On-site disposal systems would be required for the Chesilhurst and Woodbine parks. Therefore, site specific soils surveys were completed by Pinelands Commission staff for the latter two parks. The results of these surveys are presented in later sections of this assessment.

VEGETATION

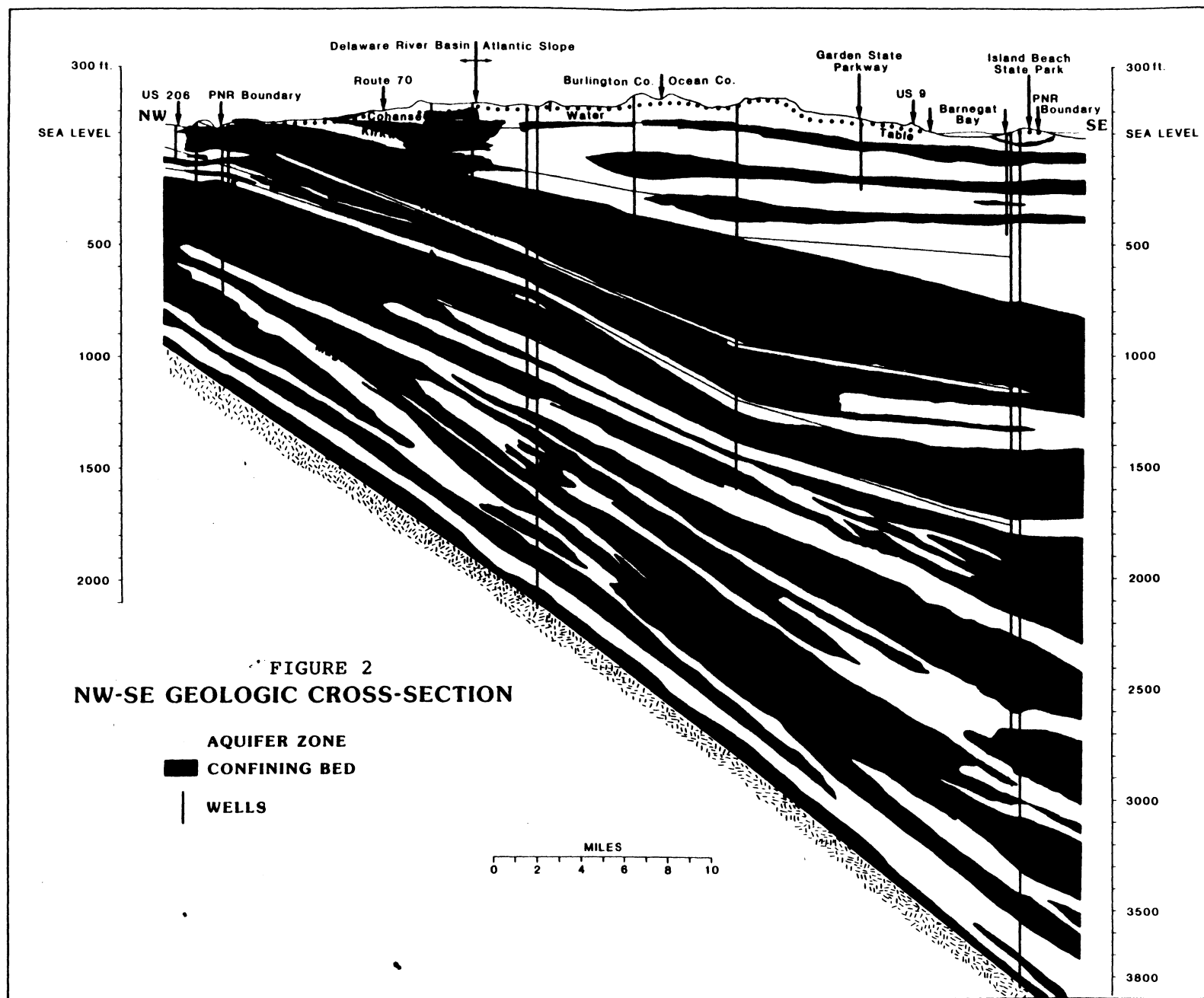
A rich diversity of plants is present in the Pinelands, numbering approximately 850 species, and including 580 native species. A large number of these native species are potentially faced with extinction in the Pinelands. More than 20 plants were first described in the Pinelands, including Hirst's panic grass (Panicum hirstii), Pine Barrens reedgrass (Calamovilfa brevipilis), and Pickering's morning glory (Brewaria pickeringii var. caesariensis).

Vegetation Types

Differences in groundwater levels result in two distinct Pinelands floristic complexes, the uplands and the lowlands (Figure 5). Lowlands (wetlands) are found on sites where water is near or above the surface during some part of the year. The upland complex occurs in the remaining area.

The uplands of the Pinelands support two major vegetation types or associations, pine-oak forests and oak-pine forests. Fire plays an important role in determining the composition of these upland forests. Differences in resistance to fire damage, shade tolerance, and reproductive strategies are responsible for the selective action of fire on the different plant species.

Pitch pine is the dominant tree of the upland pine-oak forest in the central portion of the Pinelands. This species is commonly associated with blackjack oak, black oak, chestnut oak (Quercus prinus), white oak, scarlet oak (Q. coccinea), and post oak (Q. stellata), as well as southern red oak (Q. falcata) in the southern portion of the Pinelands.



A large part of the region is covered with pine-blackjack oak, a vegetation type which characterizes the selective action of frequent, severe fire. Pine-post oak and pine-black oak associations also occur in the region but are scattered and may be limited in size. Common understory shrubs in the pine-oak forests include the shrub-form scrub oak, lowbush blueberry (Vaccinium vacillans), and black huckleberry (Gaylussacia baccata).

In the oak-pine forest, stems of the tree-form oaks are more numerous, although they are often smaller than the pines. Pitch pine is almost always present and may be mixed with shortleaf pine. Black oak is the most abundant oak north of the Mullica River, and southern red oak is prominent to the south. Chestnut, white, scarlet and post oaks are widespread. The shrubs present in the oak-pine forests are predominantly lowbush blueberry and black huckleberry. Mountain laurel (Kalmia latifolia) and other shrub species may also be present.

Lowland (wetland) vegetation types in the Pinelands include Atlantic white cedar swamps, hardwood swamps, pitch pine lowlands, bogs, and inland and coastal marshes. The cedar swamps are characterized by dense, even-aged standards of narrow-crowned Atlantic white cedar (Chamaecyparis thyoides). Cedar predominates in the canopy but pitch pine is often present. Trident red maple (Acer rubrum), blackgum (Nyssa sylvatica) and sweetbay (Magnolia virginiana) are also common in the understory. Dangleberry (Gaylussacia frondosa), highbush blueberry (Vaccinium corymbosum), swamp azalea (Rhododendron viscosum), fetterbush (Leucothoe racemosa), sweet pepperbush (Clethra alnifolia), and bayberry (Myrica pennsylvanica) are likely to occur in the shrub layer. Hardwoods and shrubs are far more numerous and can form a dense layer at

the edges of the stands or under stands that have been partially cut or are declining.

The canopy of hardwood swamp forests is predominantly trident red maple, commonly associated with blackgum and sweetbay. Sassafras (Sassafras albidum) and gray birch (Betula populifolia) also occur frequently. Sweetgum is more typical of the western boundaries of the Pinelands. Although nearly pure stands of broad-leaved hardwoods are common, in some areas pitch pine and white cedar occur in the canopy. They are often as abundant as the maple, blackgum, and sweetbay. The shrubs which occur in the cedar swamps are also present in the hardwood swamps, often forming a very dense understory. Near the coast, American holly (Ilex opaca) may be a major component of hardwood swamps.

The pitch pine lowland forest is characterized by a dense canopy composed almost entirely of pitch pine. The understory is often dense, supporting maple and blackgum as well as a variety of lowland shrubs, especially sheep laurel (Kalmia angustifolia). Black huckleberry, dangleberry, and staggerbush (Lyonia mariana) also are common. The shrub layer varies in height, from relatively low shrubs such as sheep laurel in drier areas, to tall stems of such species as highbush blueberry, pepperbush, and azalea near the swamps. In areas of frequent inundation, leatherleaf (Chamaedaphne calyculata) may form dense, low thickets. In the dryer areas, a well developed herbaceous layer occurs, composed of such species as bracken fern (Pteridium aquilinum), turkey beard (Xerophyllum asphodeloides), sedges and grasses, and teaberry (Gaultheria procumbens). Bracken fern may appear to dominate in the understory just after a fire.

Endangered and Threatened Plants

Within this century, several species of plants native to the New Jersey Pinelands have become in danger of extinction in the region. The Pinelands Commission has designated fifty four rare species, including ferns, grasses, sedges, and broad-leaved plants, as endangered. Table 1 lists these 54 plants.

Protection of Pinelands Vegetation

The Pinelands Comprehensive Management Plan includes several programs designed to protect Pinelands vegetation. Among these are a wetlands program and an endangered species protection program. These programs are described in their entirety in Appendix 1, Article 6, Part 2. All development in the Pinelands must meet the minimum requirements of these programs.

Commercial and industrial development is prohibited on all wetlands (Article 6, Part 1). Furthermore, no such development is permitted within 300 ft of any wetland unless it can be demonstrated that the proposed development will not result in a significant adverse impact on the wetland.

Each of the proposed industrial sites was visited by Pinelands Commission staff to determine whether wetlands were present. If wetlands existed on site, they were delineated on both U.S.G.S. quadrangle maps (scale of 1:24,000) and available site plan maps. A determination of an appropriate buffer was also made. A wetlands buffer delineation model, developed by C. T. Roman and R. E. Good of Rutgers University, was used to identify the required buffer.

Table 1- Threatened and Endangered Plant Species of the New Jersey Pinelands

Species	Status	Geographical †Affinity	Habitat						
			Pine-oak	Oak-pine	Pitch pine lowland	Cedar swamp	Hardwood swamp	Water, bog, or marsh	Non- forested
Sensitive-joint-vetch <i>Aeschynomene virginica</i>	T	S						•	
Red milkweed <i>Asclepias rubra</i>	T	S						•	
Silvery aster <i>Aster concolor</i>	T	S	•						
Pickering's morning glory <i>Breweria pickeringii</i>	T	S							•
Pine Barrens reedgrass <i>Calamovilfa brevipilis</i>	F T	S						•	
Barratt's sedge <i>Carex barrattii</i>	T	S						•	
Sickle-leaved golden aster <i>Chrysopsis falcata</i>	T	N							•
Spreading pogonia <i>Cleistes divaricata</i>	E	S						•	
Broom crowberry <i>Corema conradii</i>	E	N	•						
Rose-colored tickseed <i>Coreopsis rosea</i>	T	N					•	•	•
Rushfoil <i>Crotonopsis elliptica</i>	E	N/S							•
Stiff tick trefoil <i>Desmodium strictum</i>	T	S	•	•					
Knotted spike rush <i>Eleocharis equisetoides</i>	E	N/S						•	
Resinous boneset <i>Eupatorium resinosum</i>	T	S					•	•	
Pine Barrens gentian <i>Gentiana autumnalis</i>	E	S	•	•	•				•
Yellow-fringed orchid <i>Habenaria ciliaris</i>	E	N/S				•	•	•	
Crested yellow orchid <i>Habenaria cristata</i>	E	S						•	
Southern yellow orchid <i>Habenaria integra</i>	F E	S						•	
New Jersey rush <i>Juncus caesariensis</i>	F T	S				•	•	•	
Lily-leaved twayblade <i>Liparis lilifolia</i>	E	N/S							•
Loesel's twayblade <i>Liparis loeselii</i>	E	N/S	•	•	•	•	•		
Southern twayblade <i>Listera australis</i>	T	N/S				•	•	•	
Boykin's lobelia <i>Lobelia boykinii</i>	E	S						•	
Canby's lobelia <i>Lobelia canbyi</i>	T	S						•	
Hairy ludwigia <i>Ludwigia hirtella</i>	T	S						•	
Linear-leaved ludwigia <i>Ludwigia linearis</i>	E	S					•	•	
Climbing fern <i>Lygodium palmatum</i>	E	N/S					•		

Note: Swamp pink (*Helonias bullata*) has been added to the

Table 1- Threatened and Endangered Plant Species of the New Jersey Pinelands, Continued

Species	Status	Geographical †Affinity	Habitat						
			Pine-oak	Oak-pine	Pitch pine lowland	Cedar swamp	Hardwood swamp	Water, bog, or marsh	Non- forested
Torrey's muhly <i>Muhlenbergia torreyana</i>	F T	S			•		•	•	
Yellow asphodel <i>Narthecium americanum</i>	T	S						•	
Floating heart <i>Nymphoides cordata</i>	T	N/S						•	
Narrow panic grass <i>Panicum hemitomon</i>	T	S				•	•	•	
Hirst's panic grass <i>Panicum hirstii</i>	F E	S						•	
American mistletoe <i>Phoradendron flavescens</i>	T	S					•		
Maryland milkwort <i>Polygala mariana</i>	T	S						•	•
Slender rattlesnake root <i>Prenanthes autumnalis</i>	E	S	•					•	•
Awned meadow beauty <i>Rhexia aristosa</i>	E	S						•	
Capitate beakrush <i>Rhynchospora cephalantha</i>	T	S			•		•	•	
Slender beaked rush <i>Rhynchospora inundata</i>	T	S					•	•	
Knieskern's beaked rush <i>Rhynchospora knieskernii</i>	F T	S						•	
Curly grass fern <i>Schizaea pusilla</i>	F	N				•			
Chaffseed <i>Schwalbea americana</i>	E	S							•
Long's bulrush <i>Scirpus longii</i>	F	N						•	
Slender nut rush <i>Scleria minor</i>	T	S					•		•
Reticulated nut rush <i>Scleria reticularis</i>	T	N/S					•	•	
Sclerolepis <i>Sclerolepis uniflora</i>	T	N/S					•	•	
Wand-like golden rod <i>Solidago stricta</i>	E	S					•		•
Little ladies tresses <i>Spiranthes tuberosa</i>	T	N/S	•	•					•
False asphodel <i>Tofieldia racemosa</i>	E	S					•		
Humped bladderwort <i>Utricularia gibba</i>	T	N/S					•	•	
White-flowered bladderwort <i>Utricularia olivacea</i>	E	S						•	
Purple bladderwort <i>Utricularia purpurea</i>	T	N/S						•	
Reclined bladderwort <i>Utricularia resupinata</i>	E	N/S						•	
Yellow-eyed grass <i>Xyris flexuosa</i>	T	S					•	•	•

* Status codes: T = Threatened (Caiazza and Fairbrothers, 1980)
E = Endangered, (Caiazza and Fairbrothers, 1980)
†N = Northern S = Southern

F = Currently being evaluated for the federal (national) list of threatened and endangered species by the Department of the Interior.

Development is also prohibited in the vicinity of threatened and endangered plants (Section 6-204 of the CMP). No development can be carried out unless it is designed to avoid irreversible adverse impacts on the survival of plants designated as endangered by the Commission. Table 1 lists the threatened and endangered plant species of the Pinelands, along with the habitats in which they are found. As part of its assessment of the proposed industrial park sites, Pinelands Commission staff referred to Commission records as well as information provided by the NJDEP Office of Natural Lands Management, New Jersey Heritage Program (see Appendix 2), to assess the potential impact of the proposed projects on endangered plant species.

WILDLIFE

The animals of the Pinelands function as integral parts of the region's ecosystem. The existing animal communities are shaped by many environmental factors, including vegetation, fire, moisture, and water chemistry. Maintaining this environment is essential for the preservation of characteristic fish, bird, reptile, amphibian, mammal and invertebrate species.

Thirty-nine species of mammals, 299 bird species, 59 reptile and amphibian species and 91 fish species have been identified as occurring within the Pinelands. They include two species designated as endangered by the United States Department of the Interior and 34 others listed as threatened or endangered by the Pinelands Commission.

Mammals

Thirty-five species of mammals can be found in the Pinelands. Two additional native species have been extirpated here. Table 2 lists these species and their habitats. None is designated as threatened or endangered. Four additional bat species are found in the area during migration. This species total is a good representation of the 49 mammal species reported to occur in New Jersey. Although none of the Pinelands species is currently designated as threatened or endangered by New Jersey or the U.S. Fish and Wildlife Service, human influence has resulted in the regional extinction of some mammals, including the bobcat and the black bear. The beaver was eliminated through unregulated trapping, but has been reintroduced and is now considered to be common in the Pinelands.

Table 2 — Mammals of the Pinelands and Their Habitats

Species	Habitats													
	Pine-oak	Oak-pine	Pitch pine lowland	Cedar swamp	Hardwood swamp	Water	Bog	Marsh	Non-Pine Barrens	Agricultural	Urban	Non-forested	Borrow pit	Old fields
Opossum, <i>Didelphis virginiana</i>	•	•	•	•	•		•	•	•	•	•			•
Raccoon, <i>Procyon lotor</i>	•	•	•	•	•		•	•	•	•	•			•
Long-tailed weasel, <i>Mustela frenata</i>	•	•	•	•	•		•	•	•	•				•
Mink, <i>Mustela vison</i>	•	•	•	•	•		•	•	•	•				•
River otter, <i>Lutra canadensis</i>			•	•		•	•	•					•	
Striped skunk, <i>Mephitis mephitis</i>	•	•	•	•	•		•	•	•	•	•			•
Red fox, <i>Vulpes fulva</i>	•	•			•				•	•				•
Gray fox, <i>Urocyon cinereoargenteus</i>	•	•	•		•									•
Black bear†, <i>Ursus americanus</i> Extirpated	•	•	•		•				•					•
Bobcat†, <i>Lynx rufus</i> Extirpated	•	•	•		•				•					
Eastern coyote, <i>Canis latrans</i> Peripheral	•	•	•		•				•	•	•			•
Gray squirrel <i>Sciurus carolinensis</i>		•			•					•	•			
Red squirrel, <i>Tamiasciurus hudsonicus</i>	•	•												
Woodchuck, <i>Marmota monax</i>					•				•	•				•
Beaver, <i>Castor canadensis</i>			•	•	•	•	•		•					
Muskrat, <i>Ondatra zibethica</i>			•	•		•	•	•		•				
Eastern cottontail, <i>Sylvilagus floridanus</i>	•	•	•						•	•				•
White-tailed deer, <i>Odocoileus virginianus</i>	•	•	•	•					•	•	•			•
Masked shrew, <i>Sorex cinereus</i>	•	•			•		•		•					•
Short-tailed shrew, <i>Blarina brevicauda</i>	•	•	•		•		•							•
Least shrew, <i>Cryptotis parva</i>							•	•						•
Eastern mole, <i>Scalopus aquaticus</i>							•			•	•			•
Star-nosed mole, <i>Condylura cristata</i>			•	•	•		•	•		•				
Little brown bat, <i>Myotis lucifugus</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Eastern pipistrelle, <i>Pipistrellus subflavus</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Big brown bat, <i>Eptesicus fuscus</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Eastern chipmunk, <i>Tamias striatus</i>	•	•	•		•				•	•	•			•
Flying squirrel, <i>Glaucomys volans</i>	•	•	•		•					•				
Rice rat, <i>Oryzomys palustris</i>								•						
White-footed mouse, <i>Peromyscus leucopus</i>	•	•			•					•				•
Red-backed vole, <i>Clethrionomys gapperi</i>	•	•	•	•	•									
Meadow vole, <i>Microtus pennsylvanicus</i>			•	•	•		•			•				
Pine vole, <i>Pitymys pinetorum</i>	•	•	•	•	•		•							
Southern bog lemming, <i>Synaptomys cooperi</i>				•	•		•							
Norway rat, <i>Rattus norvegicus</i>										•	•			•
House mouse, <i>Mus musculus</i>										•	•			•
Meadow jumping mouse, <i>Zapus hudsonius</i>			•	•	•		•							•

Birds

Although the variety of bird species found in the Pinelands is not considered to be unusually rich, a total of 299 species and three subspecies that occur regularly in the area have been identified. Included in this total are two birds designated as endangered by the federal government and all bird species which are present on New Jersey's official list of endangered and threatened species. These species and their habitats are listed in Table 3.

Reptiles and Amphibians

As a group, amphibians and reptiles contribute to the uniqueness of the Pinelands fauna. The total number of amphibian and reptile species in the Pinelands is relatively large for an area with a northern climate. Some species are not found elsewhere in New Jersey. Many of these species are now threatened with extinction.

Nine Pinelands herptile species are listed by New Jersey as endangered or threatened (Table 4). The endangered species are the Pine Barrens treefrog, the timber rattlesnake, the bog turtle, the southern gray (Cope's) treefrog, the corn snake and the tiger salamander. Threatened species include the northern pine snake, the wood turtle, and the mud salamander.

Fish

Pinelands streams, including both interior and estuarine segments, support at least 91 species of fish. The 15 species listed in Table 5 are thought to be characteristic of acid Pinelands streams. Those listed in Group B are widely distributed throughout New Jersey and the

Table 3 Threatened and Endangered Bird Species of the Pinelands and Their Habitats

SPECIES		Pine-oak	Oak-pine	Pitch pine lowland	Cedar swamp	Hardwood swamp	Water	Bog	Inland marsh	Coastal marsh	Agricultural	Bay	Urban	Non-forested	Non-pine barrens	Old fields	Barrier beach	Island
Bald eagle* <i>Haliaeetus leucocephalus</i>	E			•			•	•	•	•		•						
Peregrine falcon* <i>Falco peregrinus</i>	E							•	•	•						•	•	
Osprey <i>Pandion halliaetus</i>	T						•	•	•	•		•					•	•
Cooper's hawk <i>Accipiter cooperii</i>	E	•	•	•	•	•		•					•		•	•	•	
Least tern <i>Sterna albigrons</i>	E									•		•			•	•	•	•
Black skimmer <i>Rhynchops niger</i>	E									•		•					•	•
Pied-billed grebe <i>Podilymus podiceps</i>	E						•	•	•	•		•						
Red-shouldered hawk <i>Buteo lineus</i>	T	•	•	•	•	•		•							•			
Great blue heron <i>Ardea herodias</i>	T					•	•	•	•	•		•						•
Merlin <i>Falco columbarius</i>	T							•	•	•								•
Upland sandpiper <i>Bartramia longicauda</i>	E										•			•				
Roseate tern <i>Sterna dougallii</i>	E									•		•						•
Barred owl <i>Strix varia</i>	T	•	•	•	•	•									•			
Short-eared owl <i>Asio flammeus</i>	E								•	•				•		•	•	•
Red-headed woodpecker <i>Melanerpes erythrocephalus</i>	T	•	•												•			•
Cliff swallow <i>Petrochelidon pyrrhonota</i>	E						•	•	•	•	•	•						•
Short-billed marsh wren (Sedge wren) <i>Cistothorus platensis</i>	E							•	•	•								
Bobolink <i>Dolichonyx oryzivorus</i>	T								•	•	•			•				
Savannah sparrow <i>Passerculus sandwichensis</i>	T								•	•	•			•		•	•	
Ipswich sparrow <i>Passerculus sandwichensis princeps</i>	T																	•
Grasshopper sparrow <i>Ammodramus savannarum</i>	T									•	•			•		•	•	
Henslow's sparrow <i>Ammodramus henslowii</i>	E							•	•	•								•
Vesper sparrow <i>Pooecetes gramineus</i>	E										•			•		•		
Northern harrier <i>Circus cyaneus</i>	E							•	•	•	•			•		•	•	•

*Listed as endangered by U.S. Department of the Interior.
All others listed as endangered or threatened by New Jersey.

Both the Yellow crowned night heron (T) and the Piping plover (E) are included on the N.J. list, however, neither is currently on the Pinelands Commission list..

Table 4 -Selected Reptiles and Amphibians of the Pinelands and Their Habitats

Species	Status*	Pine-oak	Oak-pine	Pitch pine lowland	Cedar	Hardwood	Water	Bog	Marsh	Non pine barrens	Agricultural	Urban	Non-forested	Borrow pit	Old fields
Eastern hognose snake <i>Heterodon platyrhinos</i>		•	•							•			•		•
Eastern worm snake <i>Carphophis a. amoenus</i>		•	•	•						•			•	•	•
Northern black racer <i>Coluber c. constrictor</i>		•	•	•	•	•			•		•	•	•	•	•
Rough green snake <i>Ophiodrys aestivus</i>	—	•	•	•				•			•		•	•	•
Corn snake <i>Elaphe g. guttata</i>	E	•	•	•						•	•		•		•
Black rat snake <i>Elaphe o. obsoleta</i>		•	•							•	•		•		•
Northern pine snake <i>Pituophis m. melanoleucus</i>	T	•	•		•	•							•	•	•
Eastern king snake <i>Lampropeltis g. getulus</i>		•	•		•	•	•	•	•						•
Northern scarlet snake <i>Cemophora coccinea copei</i>		•	•											•	•
Timber rattlesnake <i>Crotalus horridus</i>	E	•	•	•	•	•							•		•
Spotted salamander <i>Ambystoma maculatum</i>		•	•	•			•			•					
Marbled salamander <i>Ambystoma opacum</i>		•	•	•			•								
Eastern tiger salamander <i>Ambystoma t. tigrinum</i>	E						•						•	•	•
Four-toed salamander <i>Hemidactylium scutatum</i>					•	•	•	•							
Eastern mud salamander <i>Pseudotriton m. montanus</i>	T				•	•	•	•	•						
Northern red salamander <i>Pseudotriton r. ruber</i>					•	•	•	•	•						•
Eastern spadefoot toad <i>Scaphiopus h. holbrookii</i>		•	•	•			•								
Northern cricket frog <i>Acris c. crepitans</i>				•	•	•	•	•	•					•	•
Pine Barrens treefrog <i>Hyla andersoni</i>	E	•	•	•	•	•	•	•	•					•	•
Southern (Cope's) gray treefrog <i>Hyla chrysoscells</i>	E			•	•	•	•	•	•	•	•			•	•
Carpenter frog <i>Rana virgatipes</i>					•	•	•	•	•						
Spotted turtle <i>Clemmys guttata</i>				•	•	•	•	•	•	•					
Wood turtle <i>Clemmys insculpta</i>	T			•			•			•					
Bog turtle <i>Clemmys muhlenbergi</i>	E				•	•	•	•	•						
Map turtle <i>Graptemys geographica</i>							•		•						
Red-bellied turtle <i>Chrysemys rubriventris</i>					•	•	•	•	•						
Ground skink <i>Scincella lateralis</i>		•	•							•	•				
Five-lined skink <i>Eumeces fasciatus</i>		•	•							•		•	•		
Queen snake <i>Natrix septemvittata</i>							•			•					
Northern red-bellied snake <i>Storeria o. occipitamaculata</i>	—	•	•	•	•	•	•	•							

Atlantic Coastal Plain, but nevertheless are considered characteristic of the Pinelands because they have been collected here in substantial numbers.

Protection of Pinelands Wildlife

Many of the protection programs included in the CMP afford a level of protection of the region's wildlife resources. The wetlands and water quality management programs are among these. One program, however, specifically addresses the protection of wildlife species. Section 6-302 of the CMP requires that all development be designed to avoid irreversible adverse impacts on habitats that are critical to the survival of populations of designated threatened or endangered animal species. Additionally, development must be carried out in a manner which avoids disturbance of fish and wildlife habitats that are essential to the continued nesting, resting, breeding and feeding of significant populations of fish and wildlife in the Pinelands (Section 6-303). Information has been received from the New Jersey Division of Fish, Game and Wildlife on the wildlife resources of areas within and adjacent to each of the proposed industrial sites, along with comments on the potential impact of the proposed developments on these resources (see Appendix 3). This information is summarized in Part II.

Table 5. - Characteristic Pinelands Fish

<u>Group A</u> <u>Restricted Distribution</u>		<u>Group B</u> <u>Widespread Distribution</u>	
Common Name	Scientific Name	Common Name	Scientific Name
Ironcolor shiner	<u>Notropis chalybaeus</u>	American eel	<u>Anguilla rostrata</u>
Yellow bullhead	<u>Ictalurus natalis</u>	Eastern Mudminnow	<u>Umbra pygmaea</u>
Pirate perch	<u>Aphredoderus sayanus</u>	Redfin pickerel	<u>Esox americanus</u>
Mud sunfish	<u>Acantharchus pomotis</u>	Chain pickerel	<u>Esox niger</u>
Blackbanded sunfish	<u>Enneacanthus chaetodon</u>	Creek chubsucker	<u>Erimyzon oblongus</u>
Banded sunfish	<u>Enneacanthus obesus</u>	Tadpole madtom	<u>Noturus gyrinus</u>
Swamp darter	<u>Etheostoma fusiforme</u>	Bluespotted sunfish	<u>Enneacanthus gloriosus</u>
		Tessellated darter	<u>Etheostoma olmstedii</u>

CULTURAL RESOURCES

Historic resources are defined in Article 2 of the Pinelands Comprehensive Management Plan as "any site, building, area, structure or object significant in American history, architecture, archaeology and culture at the national, state, county, local or regional level." Historic resources constitute the complete body of material evidence relating to human occupation of the Pinelands over the past 10000-12000 years. As such they include not only the remnant of historic period habitation of the region, beginning with the arrival of the Dutch in the early 17th century, but also the entire 8-10 millenia during which the American Indians roamed the land. Whether or not any individual site is significant is determined by criteria contained in the Pinelands Cultural Resource Management Plan. These criteria, three in number, reflect those used to assess eligibility for the National Register of Historic Places and include the following:

1. association with historic events or people of importance to the cultural evolution of the Pinelands;
2. buildings and structures that are of high artistic value or are the work of a master, or that characterize a specific type, period or method of construction, or that represent a significant and distinguishable entity whose components may lack individual distinction;
3. the potential to yield information significant to the cultural evolution of the Pinelands.

These resources range from extant architecture - including examples of celebrated high styles as well as modest, three bay "South Jersey houses" - to nearly invisible scatters of prehistoric stone tools. A broad spectrum of sites, places and objects jointly comprise this cultural data base for the Pinelands, such as engineering resources indicative of historical technology; archaeological remains of 18th and 19th century rural

industries and their associated housing and support facilities; and areas of commemorative value, like battlefields and the homes of prominent individuals.

Essentially any locus of prior human activity constitutes a resource, but not all resources are of equal significance. The Pinelands are unique, however, in providing for some form of treatment for virtually any evidence of historic occupation. The Commission requires that all applications for major development, and any minor development application in a Pinelands Town or Village, be reviewed for their potential impact upon cultural resources. In addition, any site designated as historic by the Commission or by a local municipality according to Section 6, Part 14, of the CMP cannot be altered in exterior appearance without the issuance of a Certificate of Appropriateness.

The Commission's cultural resource survey requirement must be satisfied before a development application can be deemed complete. However, in a majority of cases the requirement is waived because an initial review of the application by the Commission staff indicates a low likelihood of historic site occurrence. The Commission has recently adopted a cultural resource management plan (CRMP) which explains the criteria for a waiver of the survey. The staff reviews the project specifications, checks the existing cultural resource inventories and conducts a thorough site inspection, including a pedestrian reconnaissance. The inventories consulted are those on file with the Commission. They were compiled as preliminary studies for the CMP and include both a prehistoric and an historic sites inventory.

Should this review fail to uncover evidence of a cultural activity according to any of the following criteria, the survey requirement is not invoked:

1. there is insufficient evidence of cultural activity on the project site;
2. the evidence of cultural activity on the site lacks importance because further recording of the available data will not contribute to a more comprehensive understanding of Pinelands culture; or
3. the evidence of cultural activity lacks significance because it clearly fails to meet any of the criteria for eligibility for Pinelands Designation.

Within the context of these criteria, the most difficult type of decision to make is the need for a survey of archaeological sites. These generally attain significance through the final designation criterion, "the potential to yield information." Many valuable sites, including virtually all those of the Amerindian periods, have left no historical record and are not easily detected by a surface inspection. Hence, it is often difficult to decide if a survey to determine the existence of such a site is necessary. In these cases, a survey is required under following circumstances:

- Confirmed sites: the presence of known historic or prehistoric sites within the project area.
- Proximate sites: the presence of a series of prehistoric sites in the same general environs as the project area.
- Massive disturbance: a development project that will cause ground disturbance over a large areal extent.
- Surficial alterations: alterations to the natural environment, caused by historic period cultural activity, of a type that cannot be dismissed as historically insignificant or unworthy of archaeological investigation.
- Topographic indications: the presence of topographic features (pingoes, cuestas, surface water course, etc.) commonly associated with prehistoric site occurrence.

In towns which are certified as being in conformance with the CMP, the local permitting authority may perform this preliminary assessment and waive the survey if circumstances allow. However, should the Commission disagree with this determination, the application may be called up and the survey requirement reimposed.

If a significant cultural presence is observed or judged likely during the initial review, the applicant must conduct a full cultural resource survey according to guidelines established by the Commission. These guidelines are adapted from state survey requirements and are detailed in an appendix to the CRMP. The survey must be performed by an individual who meets the professional qualifications published by the Department of the Interior and includes generally background research into the natural and cultural environment, field reconnaissance, subsurface testing and a determination as to the eligibility of the site for Pinelands Designation.

Should a survey uncover evidence of a significant cultural presence, the CRMP provides detailed guidelines for treatment of the resource. Intact preservation of the site in place, if this is feasible and if it can be protected and maintained in its current state, is the preferred treatment and the first option which must be considered. If preservation in place cannot be accomplished, the applicant must explore the possibility of relocating the resource or, failing that, the resource must be fully recorded. These treatment prescriptions apply only to resources that have been evaluated as "significant" according to the standards for Pinelands Designation. Sites which are of lesser significance, but still reflective of historical patterns of land use, require minimum recording procedures, including submission of photographs, a state inventory form and a site

plan. This ensures that basic information regarding the site's cultural affinities is acquired.

INFRASTRUCTURE

The five industrial park sites have different infrastructure opportunities. The critical limitation from the CMP's standpoint is the presence of wastewater facilities. This is also a practical consideration for the developer. The water quality standards of the CMP (Section 6-804) require that where on-site wastewater systems are used, a 2 ppm nitrate-nitrogen standard be met. To meet this requirement with standard septic systems, commercial or industrial development cannot exceed 1,000 square feet per acre and warehouse development cannot exceed 2,000 sq ft per acre. For intensive commercial and industrial facilities this would require a rather large land area. As will be discussed in detail in later sections, three of the five industrial sites have, or have access to, public wastewater facilities.

The less limiting factors, which include water, natural gas, electric and solid waste, have been inventoried by Commission staff. All sites have electric and some sites have access to high voltage distribution lines. Natural gas is accessible at all sites. At the Stafford Township site, the existing gas main ends approximately 1/4 mile to the east on Route 72. Public water is available at the Woodbine, Egg Harbor City and Hamilton industrial sites. A solid waste transfer station is in operation in Egg Harbor City. A regional landfill is within 1/2 mile of the Woodbine site, while Hamilton Township operates its own municipal landfill. Chesilhurst and Stafford dispose of their solid waste through private haulers.

In assessing the presence and adequacy of sewer, water, gas, electric and solid waste disposal facilities, the various utility companies were contacted. In some cases letters were received from the utility companies generally describing the adequacy of their respective facilities. As the

ultimate use of the industrial parks is speculative, the responses which were received are general. Contact persons are identified in the correspondence included in Appexdix 4.

PART II INDUSTRIAL PARK SITE
ASSESSMENTS

CHESILHURST INDUSTRIAL PARK

The Chesilhurst Industrial Park is a 26 acre rectangular parcel located on Route 30 in Chesilhurst (Figure 6). The area is within the Clark Branch and Wildcat Branch watersheds (tributaries of the Sleeper Branch), however, there are no surface waters on or directly adjacent to the parcel. Limited water quality data are available for Wildcat Branch. These indicate periods of both low and high pH and nutrient levels. No data are available for the Clark Branch. The entire parcel is underlain by the Cohansey Formation.

Soils

The USDA Soil Conservation Service (SCS) identifies three soils types as occurring within the boundaries of the Chesilhurst Industrial Park (Figure 7). These are Downer-Aura Complex, Lakeland, and Matawan soils. Drainage characteristics, depth to seasonal high water table (DSHWT), and agricultural suitability as classified by the USDA Soil Conservation Service, Pinelands wetlands and septic suitability classification, and total acreage for each soil are given in Table 6.

Downer-Aura Complex soils are mapped as occurring along the northern section of the park, located along Center Avenue. Lakeland soils form a diagonal band running northwest to southeast. Matawan sandy loam is mapped as occurring along the southern boundary of the industrial park.

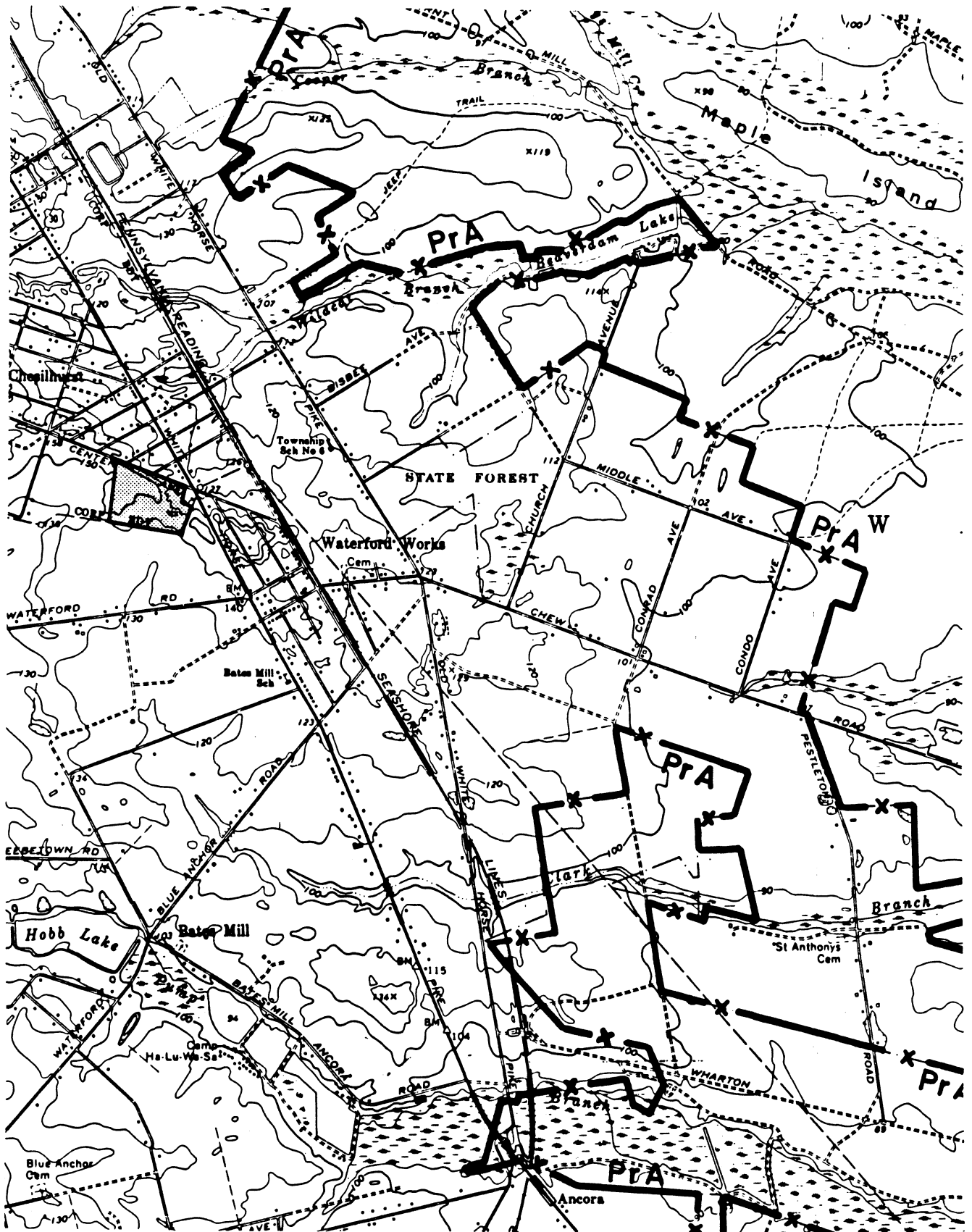


Figure 6. Chesilhurst Industrial Park - Location

Table 6. Soils mapped by SCS as occurring within the Chesilhurst Industrial Park.

Soil Type	Area (Acres)	Drainage Class	DSHWT (ft.)	Agricul. Class.	Wetlands Class.	Septic Suitability
Downer-Aura 5-10% slopes (DxC)	9	well drained	5-10	statewide importance	upland	suitable
Lakeland fine sand, firm substratum, 0-5% slopes (LcB)	10	excessively drained	10 or more	local importance	upland	suitable
Matawan sandy loam, 0-2% slopes (MnA)	7	well drained-moderately well drained	2-4 or more	prime farm-land	upland	potentially suitable depending on actual DSHWT

Sewer service is currently not available to the industrial park. Until such time as service becomes available, on-site wastewater disposal systems must be used. Parcels proposed for development must therefore have a minimum of 5 ft to the seasonal high water table. A soil survey was completed by Pinelands Commission staff to assess actual on-site conditions. This assessment indicated that the seasonal high water table is greater than 5 ft throughout the industrial park area. The survey did, however, reveal that a large area along Center Avenue, whose southern boundary extends from the northwestern corner of the project area to midway along the eastern boundary, is underlain by clay. This may require excavation and placement of select fill in areas where septic disposal beds are to be installed.

The land area required under Pinelands regulations for dilution of wastewater using on-site septic systems is variable depending upon the type and extent of the industrial use proposed. As a guideline, however, approximately one acre of land will be required for every 1,000 sq. ft of active commercial or industrial space, and for every 2,000 sq. ft of warehouse space.

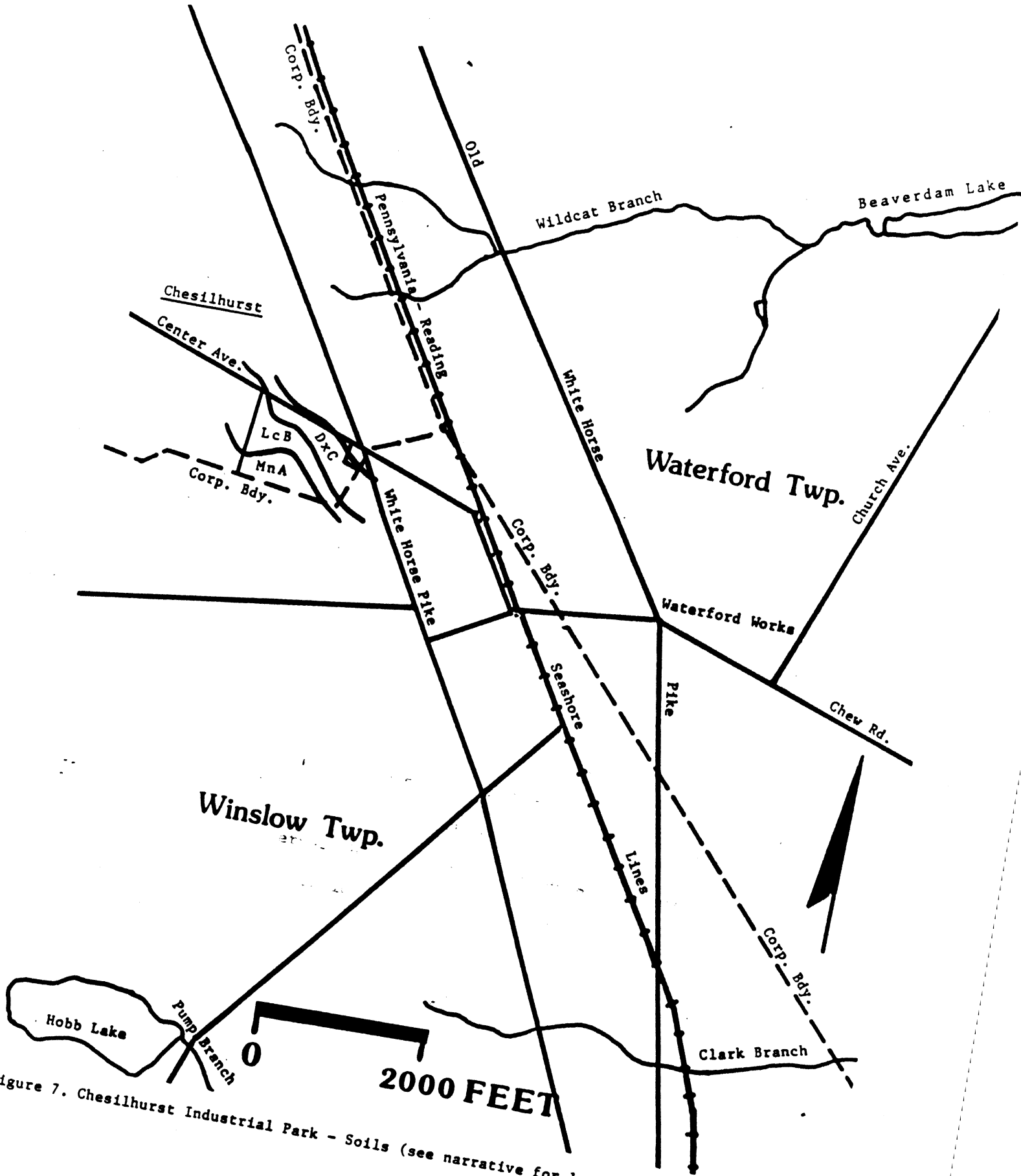


Figure 7. Chesilhurst Industrial Park - Soils (see narrative for legend)

Land Cover

The industrial park is part of an isolated woodlot that is surrounded by development and both active and fallow agricultural fields. The entire project area is undeveloped, and is dominated by a young oak stand whose composition is similar to the type description given in the introductory section of this report. There are no wetlands on or directly adjacent to (within 300 ft.) the site.

Endangered Species

There are no surveys or reports suggesting that threatened or endangered species are present at Chesilhurst Industrial Park.

New Jersey Division of Fish, Game, and Wildlife records (Appendix 3) indicate that pine snakes (threatened) and Pine Barrens treefrogs (endangered) have been documented in the general area of the Chesilhurst industrial park. However, neither of these species has been sighted at or adjacent to the industrial park site.

Canada geese nest on Hobb Lake, located approximately 1.5 miles from the industrial park. Beaver and otter are present in ~~the area of~~ Four Fingers, Wildcat Branch and Beaver Dam Lake. These sites are located off-site.

Cultural Resources

The Pinelands inventories have no record of any historic or prehistoric sites within the Chesilhurst project area. The nearest prehistoric sites are about 5 miles to the east where some flakes were found. The nearest historic sites are stations along the Pennsylvania Seashore Railroad (Chesilhurst Station and Waterford Station) about 1,000 feet east of the site. The settlement of Waterford Works, about 1/3 mile east of the project area, was a major glassmaking center through most of the 19th century. Some of the workers' housing is still extant.

Field inspection of the project area uncovered no evidence of a cultural presence, either historic or prehistoric. A waiver of the cultural resource survey requirement for the Chesilhurst site should be allowed. This determination is based on a development application for the area submitted in 1982 (Pinelands Application #82-3513).

Infrastructure

The single limitation of the Chesilhurst Industrial Park is the absence of public sewers. Natural gas and electric are available (Figure 8). A number of proposals have been discussed which would provide public sewerage to the borough and the park. These proposals are tied into the expansion of Waterford Township's treatment plant. Chesilhurst could be serviced by the Township in the event that the Township's treatment plant is permitted to operate at full capacity once water quality permit conditions are met. Solid waste disposal is handled by a private firm.

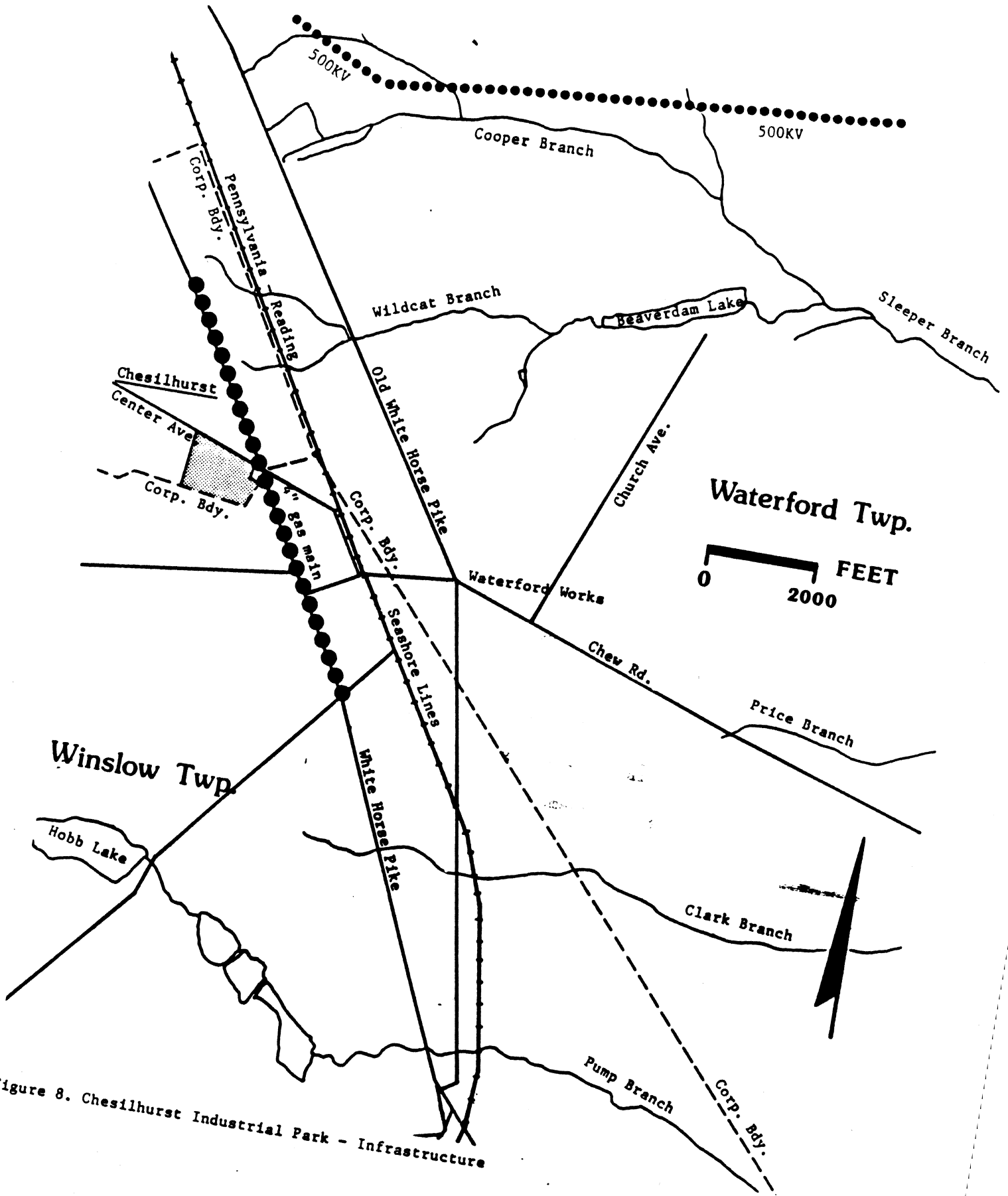
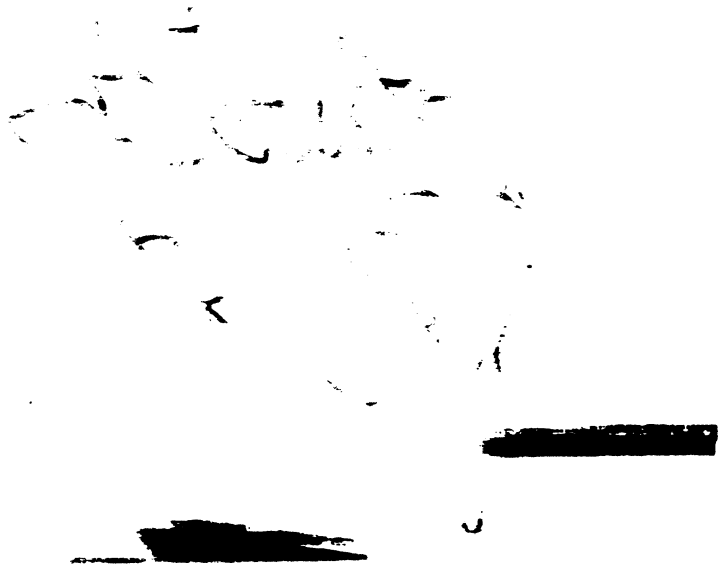


Figure 8. Chesilhurst Industrial Park - Infrastructure

Developable Land

The results of this assessment indicate that the entire Chesilhurst site is potentially developable both on septic system and sewer. However, as previously noted, excavation and placement of select fill may be required in areas if septic systems are to be used.



EGG HARBOR CITY

The Egg Harbor City Industrial Park is located in the central portion of the city, along the border of Galloway Township (Figure 9). It is a rectangular, 235 acres plot bordered by Duerer Street, Bremen Avenue, Moss Mill Road and Havana Avenue. An unpaved road, Antwerp Avenue, bisects the parcel.

The area is drained by two unnamed tributaries of Union Creek. Union Creek is a major tributary of Landing Creek which flows to the Mullica River. No data are available from the New Jersey Department of Environmental Protection or the United States Geological Survey on the water quality of the Union Creek system. The site is underlain by the Cohansey Formation and, possibly, deposits of the Bridgeton Formation.

Soils

Ten soil types are mapped by the USDA Soil Conservation Service (SCS) as occurring within the study area (Figure 10). Each is listed in Table 7 along with drainage characteristics, depth to seasonal high water table (DSHWT), and agricultural suitability as classified by the USDA Soil Conservation Service, Pinelands wetlands and septic suitability classification, and total acreage.

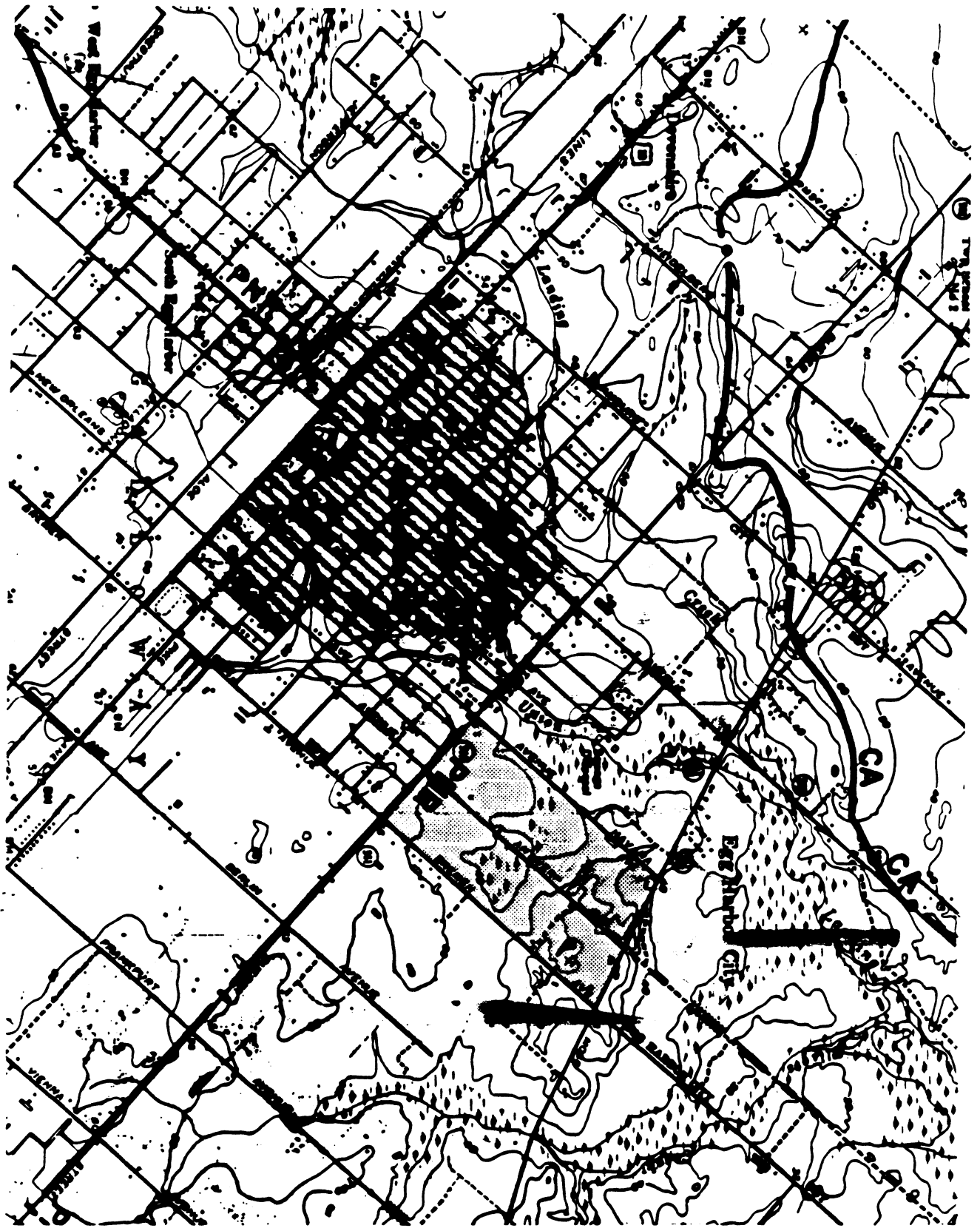


Figure 9. Egg Harbor City Industrial Park - Location

Table 7. Soils mapped by SCS within the Egg Harbor City Industrial Park study area.

Soil	Area Acres	Drainage Class	DSHWT (ft.)	Agricul. Class.	Wetlands Class.	Septic Suitability
Downer loamy sand, 0-5% (DoA)	28.2	well drained	5	statewide importance	upland	suitable
Aura sandy loam, 0-2% slopes (ArB)	48.0	excessively drained	5	prime farmland	upland	suitable
Lakewood sand, 0-5% slopes (LeB)	6.8	excessively drained	5	-	upland	suitable
Made Land (M.L.)*	27.7	variable	variable	-	variable	variable
Hammonton loamy sand, 0-3% slopes (HaA)	39.2	moderately well drained to somewhat poorly drained	1.5-4	statewide importance	upland	unsuitable
Klej loamy sand 0-3% slopes (KmA)	47.0	moderately well drained to somewhat poorly drained	1.5-4	statewide importance	upland	unsuitable
Atsion sand (Ac)	4.7	poorly drained	0-1	unique farmland	wetland	unsuitable
Berryland sand (Bp)	20.9	very poorly drained	0	unique farmland	wetland	unsuitable
Pocomoke sandy loamy (Po)	9.4	very poorly drained	0	statewide importance	wetland	unsuitable
Muck (MU)	3.1	very poorly drained	0	unique farmland	wetland	unsuitable

* currently approximately 35 acres

As mapped, well drained and excessively drained soils occupy 35% of the study area. With the exception of one area of Downer, these soils are found in the northern section of the park. Here, Downer, Aura and Lakewood soils occur along all existing roads. Each of these soils meets Pinelands wetland and septic suitability standards. Any development proposed using on-site wastewater disposal systems would require on-site verification.

Made land, as mapped by the USDA Soil Conservation Service, occupies 27.7 acres. The majority of this area represents Egg Harbor City landfill areas. Since 1978, when the soil survey was published, made land has increased to about 35 acres. Almost all of this expansion has occurred on Klej soils.

As mapped, Hammonton and Klej soils, both of which are moderately well drained to somewhat poorly drained series with seasonal high water tables of 1.5-4 ft., occur over 37% of the study area. Although classified as upland soils, large areas of Hammonton and Klej within the study area are marginal, representing transitional upland/wetland zones. These areas are not suitable for development using on-site waste water disposal systems.

Wetlands soils occupy 16% of the study area. Among these are Atsion, Berryland, Pocomoke and Muck. These soils are associated with the two Union Creek tributaries which traverse the study areas. Development is prohibited on these soils.

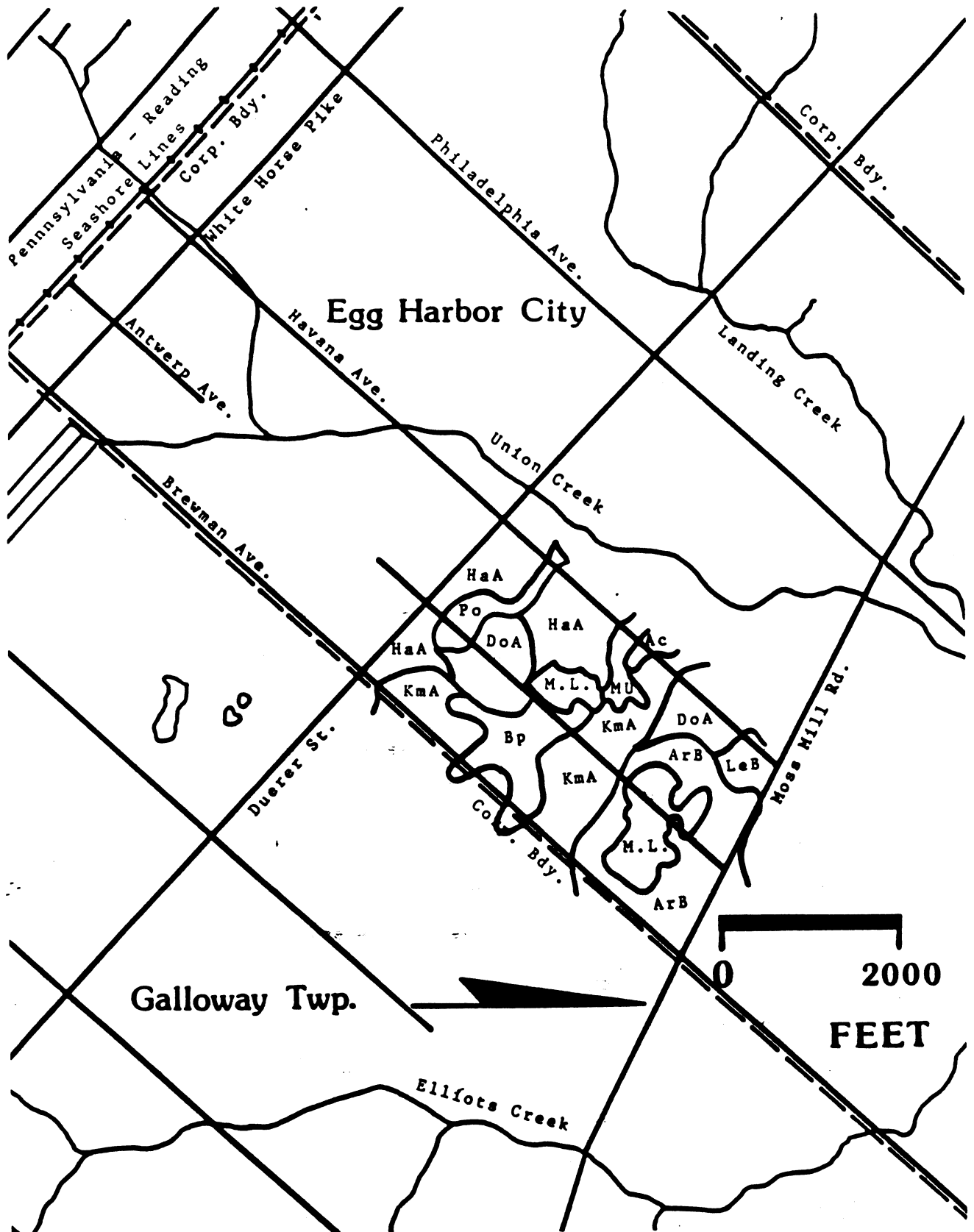


Figure 10. Egg Harbor City Industrial Park-Soils (see narrative for legend)

Land Cover

Land cover within the park is diverse. It includes developed land, filled land, a mix of upland habitats and extensive wetlands. The distribution of these cover types is shown in Figure 11.

Developed Land (D)

Improved property within the study area is limited to parcels which are not municipally owned. Included within this group are private residences, commercial property, and an Atlantic County facility. These uses are included within the non-forested (N) category which occupies a total of 44.8 acres. More than three quarters of this area is associated with Egg Harbor City landfill sites. Developed land is designated as D in Figure 11.

Upland

Wooded uplands occupy 142 acres within the study area. Included within this category are old fields (OF), oak pine forests (O), and pine oak (P) forests.

Old field vegetation found within the study area occupies 7.6 acres and includes pitch pine, red cedar, black cherry, sassafras, and poplar. Dominant herbaceous species are little bluestem, panic grass and sweetfern. Black oak and white oak are also present.

Oak pine stands are typical of those found throughout the Pine-lands. These stand cover 70.9 acres. Species occurring within the study area are black oak, white oak, pitch pine, sassafras, scrub oak, mountain laurel, black huckleberry, and low bush blueberry.

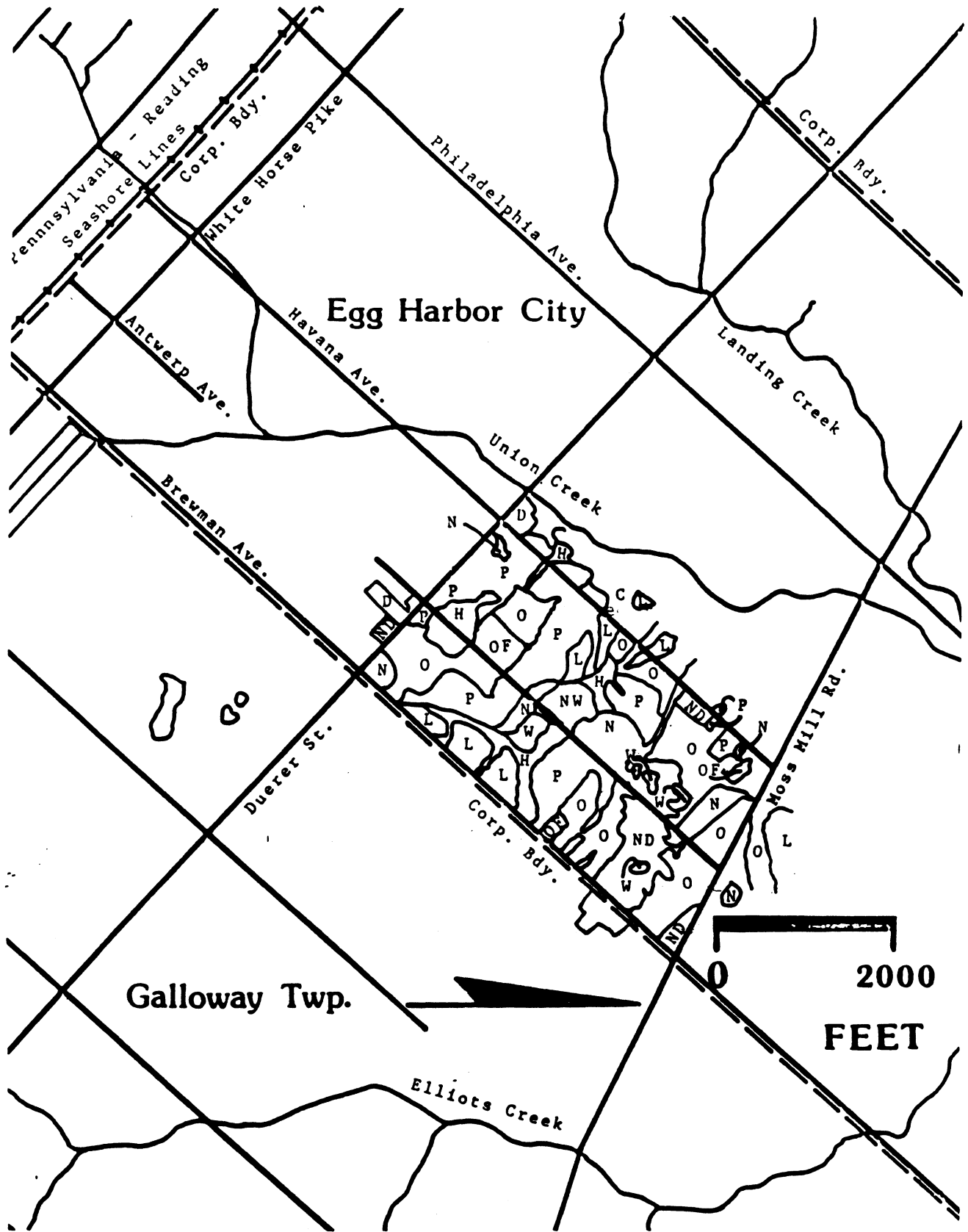


Figure 11. Egg Harbor City Industrial Park-Land Cover (see narrative for legend)

Pine oak forests, which cover 65.7 acres, are represented by both clearly defined upland areas and transitional areas which suggest the presence of a relatively high water table. The latter, which approach wetland conditions, comprise a majority of the pine oak type. In these areas, pitch pine is the dominant species. Associated species vary among sites, and include white oak, sassafras, poplar, black cherry, grey birch, and blackgum. Shrub species include mountain laurel, highbush blueberry, sweet pepperbush, sheep laurel, and inkberry. Scrub oak is generally common at these sites, indicating their transitional nature. Two transitional sites are dominated by red maple. Pitch pine, American holly, red cedar, sassafras, black cherry, grey birch, and high bush blueberry are also found here. Soil borings made at several representative sites indicated that these transitional areas are found on Klej and Hammonton soils, which are both non-wetland series with water tables ranging between 1.5 and 4 ft.

Wetlands

Four wetlands types are found within the study area. These are pitch pine lowland (L, 16.3 acres), hardwood swamps (H, 18.4 acres), cedar swamps (C, 1.5 acres), and open water (W, 4.6 acres). One additional sub-type, a filled wetland (NW 5.2 acres), was also identified.

Pitch pine lowlands found within the study area are similar to the type description given for the Pinelands. Pitch pine is the dominant species. Associated tree species include red maple, black gum, grey birch, and Atlantic white cedar. Shrub species found in the understory

are sweet pepperbush, inkberry, highbush blueberry, dangleberry, and fetterbush. Greenbrier is common to abundant in these areas.

Areas classified as hardwood swamp are dominated by red maple. Sweetbay and pitch pine are the principal associates, while highbush blueberry is common in the understory.

The cedar swamp found within the study area is located along Havana Avenue and is part of a much larger cedar swamp extending to the northwest. Atlantic white cedar dominates here. Associated species include pitch pine, red maple, sweetbay, American holly, and blackgum. Among the shrub species found within this swamp are mountain laurel and highbush blueberry. Greenbrier is also present.

Open water is represented by a pond located along the northernmost tributary of Union Creek. The impoundment is bordered by hardwood swamp to the northeast and by Antwerp Avenue on its western border. Several small, water filled depressions are found within the landfill area. The non-forested fill area is located within the wetland corridor bordering the northern tributary of Union Creek.

Using the Roman and Good wetlands buffer model, Pinelands Commission staff determined that the following buffer distances will ensure that a significant adverse impact to wetlands would not occur. A 300 ft buffer has been assigned to both the on-site cedar swamp and the cedar swamp located west of Havana Avenue. A 240 ft buffer is required for all other wetlands, located both on-site and off-site.

Endangered Plant Species

The N.J. Natural Heritage Program has records for climbing fern (Lygodium palmatum, 1952) along Union Creek, outside the study area. Knieskern's beaked rush (Rhynkospora knieskerni) has recently (1985) been documented within 1.5 miles of the site. There is also a historic record for resinous boneset (Eupatorium resinosum, 1896) in the vicinity of the industrial park area. Each of these species is principally associated with wetland habitats. Protection of on-site wetlands and the placement of an appropriate upland buffer will provide adequate protection to populations of these species that may occur within the industrial park.

Commission staff completed a floral inventory of the study area to determine if endangered species occur outside lands protected as wetlands or upland buffers to wetlands. A total of 113 plant species were identified as occurring within the study area. Included among these was Spiranthes tuberosa, a plant designated as endangered by the Pinelands Commission. Twenty eight plants, representing a sizable and important population, were found in an old field located along Antwerp Avenue (see Figure 11). The plants were distributed throughout the field. No other endangered species were found in the study area.

Critical habitat for Spiranthes tuberosa is associated with the area designated as old field. This area should be preserved along with a minimum 50 ft forested buffer surrounding it to avoid irreversible adverse impacts on the survival of the population.

Wildlife

Information on wildlife found within or adjacent to the Egg Harbor City industrial park has been provided by the New Jersey Division of Fish, Game, and Wildlife (Appendix 3). No site specific records are available. The Division reports, however, that there are documented sightings of pine snakes (a threatened species) from 1953 in the Egg Harbor City area. The endangered Pine Barrens treefrog has been reported from several sites in the vicinity of the industrial park. Sighting locations are: 1) Route 563 near Landing Creek (1980); 2) southwest of Clarks Landing (1981); and 3) Egg Harbor City Lake (1981). If present in the study area, Pine Barrens treefrogs would be protected by the prohibition of development on wetlands and adjacent upland buffers. Historically, dense muskrat populations have been supported by Indian Cabin Creek and Elliotts Creek. The Bureau also notes that the Landing Creek and Elliotts Creek drainage systems are part of the Mullica River/Wading River complex which is an important wintering area for waterfowl.

Commission staff visited the study area with the specific objective of determining if pine snakes were present. The assessment included walking all paths and trails in the area and overturning boards, logs, and rubble in wooded areas and fields located within potentially developable areas. No pine snakes were found during a total of five man days spend on the site.

Cultural Resources

The Pinelands inventories do not list any historic or prehistoric sites within the Egg Harbor City industrial park boundaries. However, prehistoric site occurrence in the immediate vicinity is attested.

There are two sites straddling Elliots Creek a half mile to the east along Moss Mill Road. Both sites contained fire-cracked rock and one also yielded ceramics indicating Woodland period occupation. There is also evidence of an historic period site in a portion of the park west of Antwerp St. and north of the paper street designated "Egmont".

A "phase I" survey should be undertaken to determine the extent of prehistoric occupation of the project area and to assess the significance of the historic site in the southern half of the tract. Any other historic period resources which will be removed by project operations should be recorded according to Pinelands Commission guidelines. The archaeological testing pattern should include all the fast land south of the paper street designated "Follen", except for most of the buffer area, the locations of endangered plant species and the developed parcel at the corner of Duerer St. and Bremen Avenue. The tests should be in a grid pattern at 100' intervals, as shown in Figure 12 (contained in the rear pocket). Since endangered plants have been identified in the vicinity of the historic period site, this area will not be developed and testing can be omitted.

If the cultural resource survey is not completed prior to the beginning of the park's development, archaeological testing will have to be done piecemeal and at greater overall cost as individual applications are submitted.

Infrastructure

The Egg Harbor City MUA has recently extended a 15" water main along Duerer Street in front of the entrance to the industrial park (Figure 13). The sewer line is at the intersection of Duerer Street and Route 563 which is in close proximity to the industrial park. The city is also in the process of working out the details for the construction of a tie-in to the existing pump station located in the South Egg Harbor portion of Galloway Township. Natural gas and electric are available (Figure 14). The city operates its own solid waste collection system.

Developable Land

Potentially developable lands include lands located outside wetlands, wetland buffers, and critical plant habitat (refer to Figure 28 in the rear pocket for a mapped "footprint" of these lands). This area totals 113 acres (northern section - 90± acres, southern section - 23± acres). A final determination of development suitability, the results of the required cultural resource inventory and the availability of sewer service.

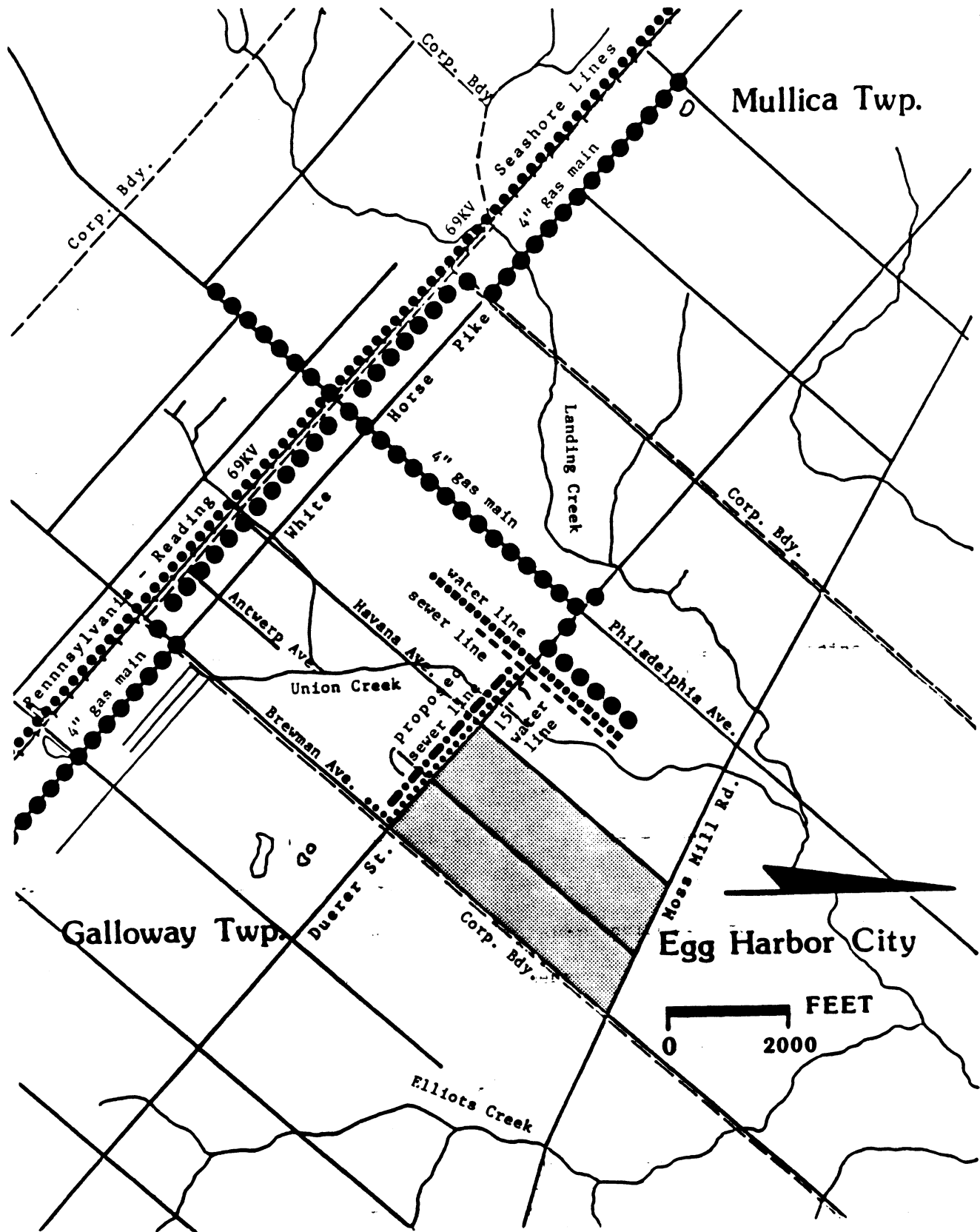


Figure 13. Egg Harbor City Industrial Park - Infrastructure

HAMILTON TOWNSHIP

The 300+ acre Hamilton Industrial Park is located directly southeast of Mays landing (Figure 14). It is a triangular area bounded on the north by the abandoned Penn Central right-of-way (now a utility r.o.w.) and on the south by Route 559. The southeastern boundary is approximately parallel with Gravelly Run.

The park project comprises four phases. Phase I, located in the central portion of the project area, previously received Pinelands Commission development approval. The majority of this area is composed of upland soils. Wetland delineations for Phase II have been submitted to the Pinelands Commission by the township, and the Commission has issued a letter of interpretation that recognizes the accuracy of the delineation (Appendix 5). Further discussion on soils and wetland areas will be limited to Phases III and IV, located in the eastern section of the park. These two areas are divided by Babcock Road.

The industrial park is underlain by Cohansey sand and Bridgeton gravels. It is drained by Gravelly Run and Babcock Creek. However, the only surface waters actually found on site are unnamed, intermittent tributaries of Gravelly Run. These occur within Phase IV of the park. No water quality data are available from either the New Jersey Department of Environmental Protection or the United States Geological Survey for Gravelly Run. NJDEP STORET data indicate that Babcock Creek surface waters are relatively high quality.

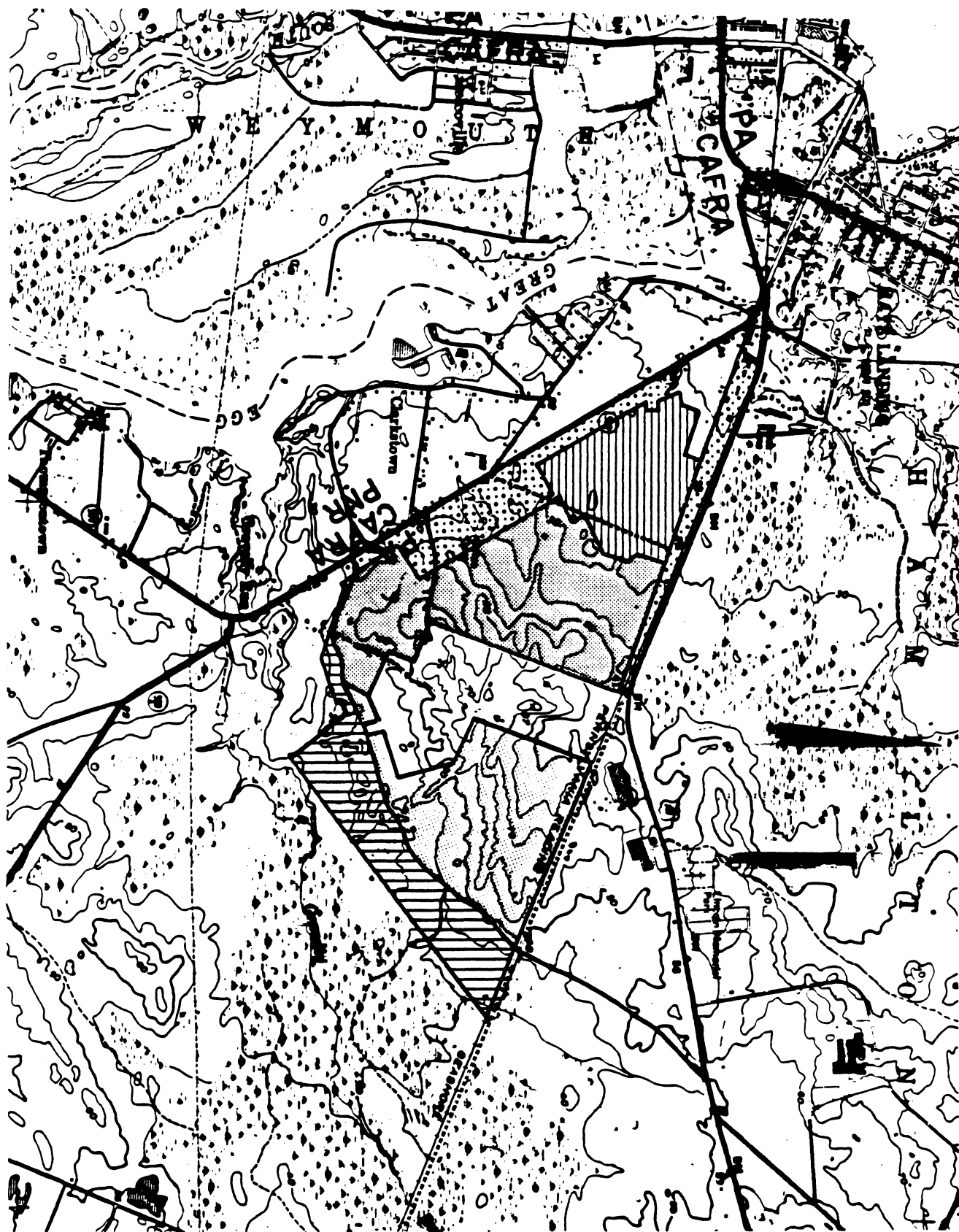


Figure 14. Hamilton Township Industrial Park - Location

Soils

Seven soil types are mapped by the USDA Soil Conservation Service (SCS) as occurring within the 300+ acre Hamilton Industrial Park (Phases III and IV; Figure 15). Each of these soils is listed in Table 8 along with drainage characteristics, depth to seasonal high water table (DSHWT), agricultural suitability as classified by the USDA Soil Conservation Service, Pinelands wetlands and septic suitability classification, and total acreage.

Table 8. Soils mapped by SCS within the Hamilton Industrial Park (Phase III and IV).

Soil	Area (Acres)*	Drainage Class	DSHWT (ft.)	Agricul. Class.	Wetlands Class.	Septic Suitability
Evesboro sand, 0-5% slopes (EvB)	24, 40	excessively drained	gr. 5	--	upland	suitable
Aura loamy sand, 0-5% slopes (AmB)	10, -	excessively drained	gr. 5	prime farmland	upland	suitable
Downer loamy sand 0-5% slopes (DoA)	101, 35	well drained	gr. 5	statewide importance	upland	suitable
Sassafras sandy loam, 0-2% slopes (SaA)	22, -	well drained	gr. 5	prime farmland	upland	suitable
Klej loamy sand, 0-3% slopes (KmA)	13, 19	mod. well drained to somewhat poorly drained	1.5-4	statewide importance	upland	unsuitable
Pocomoke sandy loamy (Po)	-, 29	very poorly drained	0	--	wetland	unsuitable
Muck (MU)	-, 7	very poorly drained	0	--	wetland	unsuitable

* first value is Phase III acreage; second value is Phase IV acreage value

Corp.
South River

Weymouth Twp.

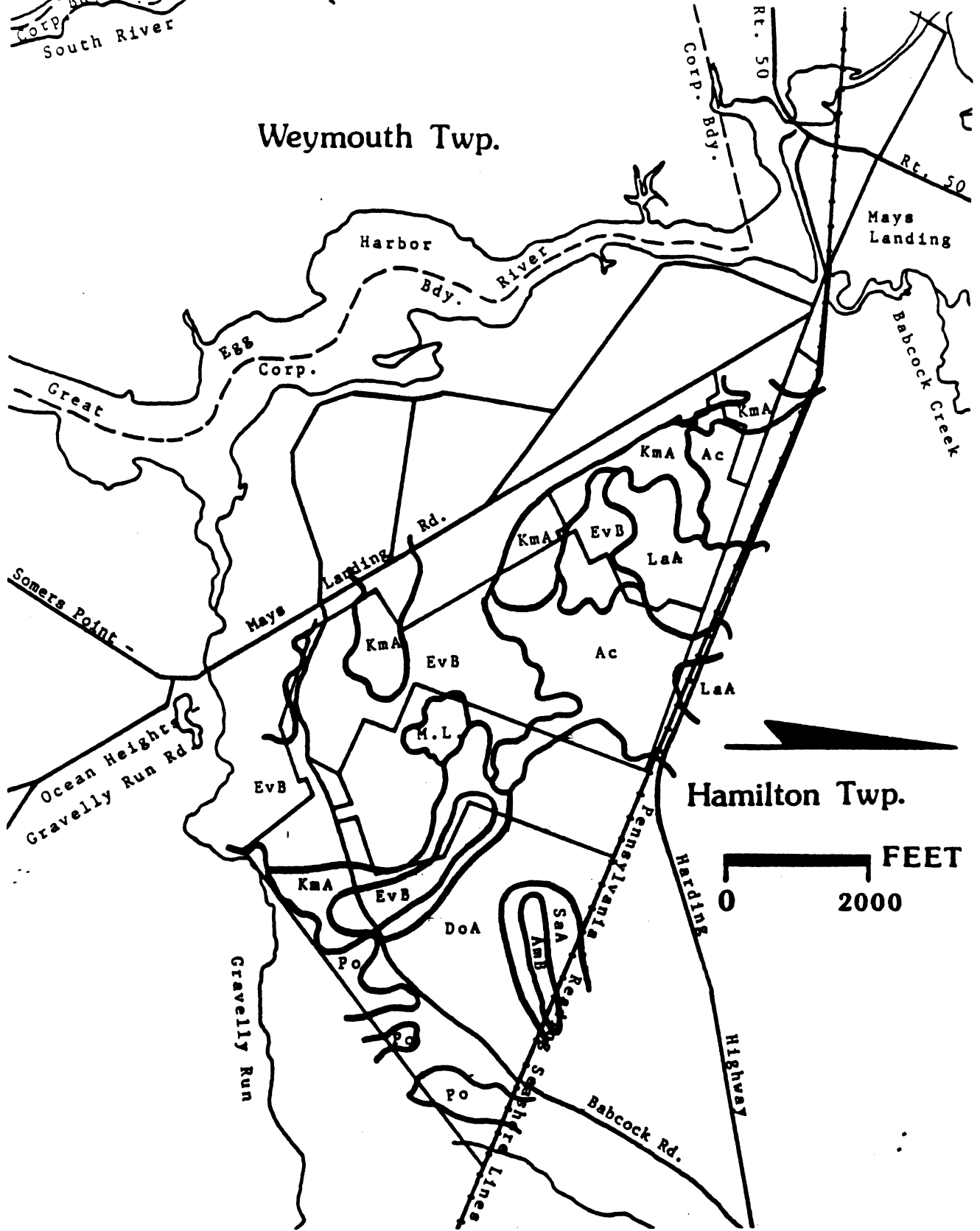


Figure 15. Hamilton Township Industrial Park - Soils (see narrative for legend)

Phase III is dominated by excessively drained (Evesboro and Aura) and well drained (Downer and Sassafras) soils. These soils, which comprise 52% of the Phase III area, meet Pinelands wetland and septic suitability standards. Klej loamy sand, which covers less than five percent of the area, is not suitable for on-site wastewater disposal systems. These areas are, however, classified as uplands. None of the soils mapped by SCS as occurring within Phase III is classified as wetlands.

Phase IV is also dominated by excessively drained (Evesboro) and well drained (Downer) soils. Klej loamy sand (15% of the total area) is also found here. Wetlands soils comprise a significant proportion of the Phase IV area. These soils, which include Pocomoke sandy loam and Muck, are associated with Gravelly Run and are found along the southeastern boundary of this area. Their distribution generally coincides with those areas mapped as wetlands vegetation.

Land Cover

All land within Phases III and IV are undeveloped. Both areas are dominated by oak-pine forest (O). Pine-oak (P) stands also occur within the project sites. Lowland vegetation types includes pitch pine lowland (L) and hardwood swamp (H). Development is prohibited within these wetlands and adjacent buffer areas. Land cover is shown in Figure 16.

Upland

Oak-pine forest comprise 88% percent of Phase III and 68% of Phase IV. These stands are typical of those found throughout the Pinelands. White oak is the dominant species. Pine-oak stands occurring in the

area are also typical. These stands cover 9% of the study area. In Phase IV, the pine-oak stand is transitional in nature. Vegetation found here includes pitch pine, white oak, scrub oak, red maple, sheep laurel, pepperbush, fetterbush, American holly, inkberry, and highbush blueberry.

Wetlands

There is only one small (0.1 acres) wetlands area located within Phase III. This small finger is an extension of an extensive wetland complex found within Phase IV. This complex, which extends off-site, includes pitch pine lowland (34 acres) and hardwood swamp (approximately 1.5 acres).

Pitch pine lowland vegetation on the site includes pitch pine, red maple, blackgum, grey birch, American holly, and sweetbay. Shrub species are highbush blueberry, fetterbush, sweet pepperbush, black huckleberry, maleberry, staggerbush, inkberry, mountain laurel, and sheep laurel. Sphagnum moss is also present along with varying abundance of greenbrier.

One shrubby hardwood swamp area is found along Babcock Road. This area consists principally of low growth hardwood species (red maple and sweetbay) and scattered pitch pine. Shrub species found here include dangleberry, fetterbush, and highbush blueberry; greenbrier is abundant. Sphagnum is found along the forest floor.

A smaller hardwood swamp area is part of a larger swamp found along the extreme southeastern border of Phase IV. Tree species found in this swamp include red maple, Atlantic white cedar, American holly, and pitch pine. The shrub layer supports highbush blueberry, mountain laurel,

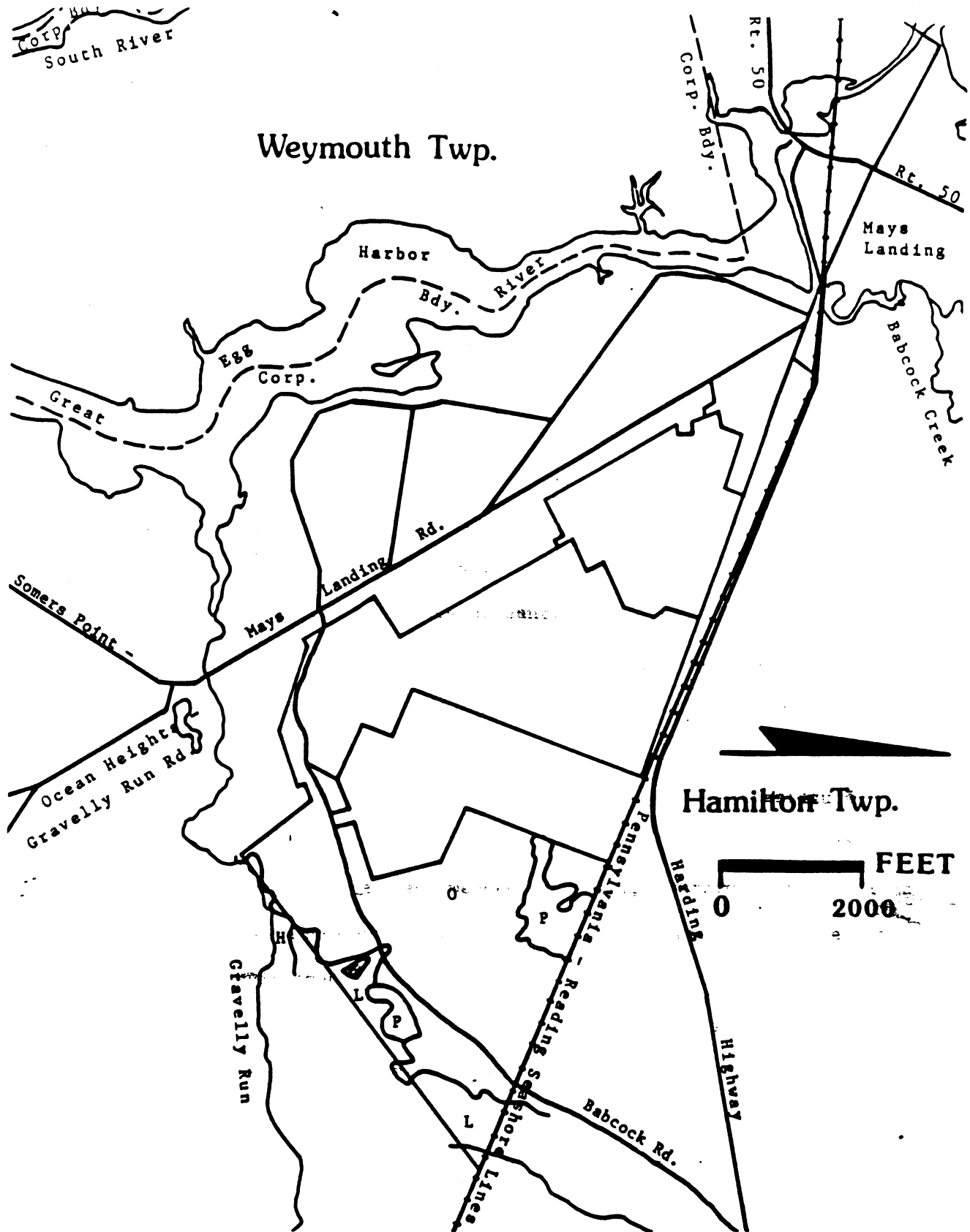


Figure 16. Hamilton Township Industrial Park - Land Cover (see narrative for legend)

azalea, leatherleaf, bayberry, sweet pepperbush, fatterbush, and cranberry. Smilax is abundant in some areas.

Pinelands Commission staff used the Roman and Good buffer model to determine the buffer width required to prevent a significant adverse impact to wetlands located within and adjacent to the Hamilton industrial park. Because of the high quality of the wetlands associated with Gravelly Run, the known and potential occurrence of endangered species within the drainage area, and the intensity of the proposed land use, it was concluded that a 300 ft buffer to all wetlands located within and adjacent to Phases III and IV be required.

Endangered Plant Species

The N.J. Heritage Program (Appendix 2) reports that the Hamilton Township area has a high concentration of rare plants. Pine Barrens gentian (Gentiana autumnalis, 1888) has been recorded along the railroad in Mays Landing, and resinous boneset (Eupatorium resinosum, 1893) has been recorded from wetlands in Mays Landing. The Heritage Program reports that because of recent records collected in the vicinity of the industrial park, there is a high probability for the occurrence of several Pinelands designated species. These include Pine Barrens reedgrass (Calamovilfa brevipilis), Barratt's sedge (Carex barrattii), resinous boneset (Eupatorium resinosum), ~~slender~~ snakesnake root (Prenanthes autumnalis) and Knieskern's beaked rush (Rhynchospora knieskernii). Two other species of special interest, Rhynchospora microcephala and R. pallida, are also found in the vicinity.

Pinelands Commission records also include a 1981 record for crested yellow orchid (Habenaria cristata), a plant that was found in the vicinity of the industrial park, and a 1981 record for Pine Barrens gentian. The latter species was found along the northern boundary of the study area at Babcock Road.

Potential on-site habitats for these rare plant species are limited principally to wetland areas and adjacent transitional areas. Protection will, therefore, be afforded through wetlands preservation and the establishment of upland/wetland buffers.

Commission staff completed a floral inventory of the study area to determine if endangered species occur outside lands protected as wetlands or upland buffers. None were found during a total of three man days spent on the site during August 1986.

Wildlife

The New Jersey Division of Fish, Game, and Wildlife has provided information on the wildlife resources of the Hamilton Township Industrial Park and adjacent areas (Appendix 3). Pine Barrens treefrogs (endangered) have been documented from Gravelly Run, between Route 40 and Route 559, 0.25 miles south of the abandoned Penn Central r.o.w. The Division also reports that Pine snakes (threatened) have been documented in the general area. Harvest and historical records indicate that both beaver and otter are found in both the Great Egg Harbor River and in Gravelly Run near the industrial park.

Upland areas located within the developable portions of the study area were visited in August to determine if northern pine snake are present on the site. In addition to walking along all trails, upland

areas were traversed at 0.1 mile intervals. Logs, boards, and rubble were overturned, including all railroad ties located along the abandoned r.o.w. No pine snakes were found during three man days spent on the site during August, 1986.



Cultural Resources

Historic period sites of some consequence are common in the vicinity of the park site, since this portion of the Great Egg Harbor River drainage has been occupied from at least the first half of the 18th century. Closest of these is the settlement at Gravelly Run, a small village that once included two mill seats, a tavern, a store, a church, several homes and, later, a cranberry packing house. Gravelly Run grew along what is now Route 559 southeast of Clarkstown and some of the outlying structures originally on the northeastern fringes of the settlement may overlap with phase IV. In the southwestern portion of phase IV there is some indication of an historic agricultural use, including one building site and a broad, low lying clearing further to the west, mostly outside the project area. The building site, as well as the western portion of phase IV generally, should be examined further before any development occurs here.

Other than trash dumps and sand roads, the remainder of the park site shows little evidence of historic period occupation. Although ringed by settlements in the 19th century, phases II and III appear never to have been significantly developed. Neither the fairly extensive documentary record for the area, including historic maps and several recent inventories, nor the field reconnaissance yielded evidence of an historic remnant worthy of further attention.

The probability of encountering significant resources of the prehistoric period is again highest in the phase IV area, though there is also a reasonable possibility of such sites occurring in phase III. Amerindian sites are very common in this part of Hamilton Township but, as is the case generally throughout the Pinelands, the known sites are found most often near surface water courses. Phase IV, which is mostly wetlands that form part of the Gravelly Run drainage, and phase III, a rolling upland terrace rising above the wetland to the east, comprise the land forms and topographic sequence that are most likely to yield prehistoric resources.

An archaeological testing strategy has been devised for phase III which should be at least minimally adequate to examine the range of soils and environmental settings present. Phase IV is not being tested at this time since there are no plans to develop this parcel in the near future. If phase IV is eventually considered for development, a cultural resource survey of the area will have to be undertaken beforehand. The testing pattern for phase III does not provide 100% coverage of the area, nor is it the technique most often favored for large area survey. The recommended strategy, in form of stratified random sampling, involves imposition of a grid pattern over the study area. Micro-environmental settings are identified (using a selection of criteria such as soils, vegetation, slope and watersheds) within the grid and squares are randomly chosen for testing, ensuring that all of the environmental settings are represented.

The alternative strategy proposed here avoids the costs associated with the fairly extensive surveying that would be required to locate the grid squares and test pit locations. The testing pattern is depicted in

Figure 17 (located in the rear pocket), and includes a series of approximately 126 tests, including about fifty at 100' intervals along Babcock Road (the portion of phase III nearest to and roughly paralleling the wetland) and about 76 more, again at 100' intervals, in three rows at 45° angles to each other and to the Babcock Road tests. The row tests will radiate out from the wetland finger that extends into phase III, thereby ensuring that the heaviest concentration of tests will be in the area where the empirical evidence indicates the highest likelihood of site occurrence. This test pattern will also allow for examination of all the topographic profiles and all the soil types (Downer, Evesboro, Klej, Sassafras and Aura) in roughly the same proportions as they occur on site.

This survey method should be sufficient to determine the likelihood of aboriginal site occurrence throughout phase III. A waiver of the CMP survey requirement should be allowed for phase II. As mentioned above, given the presence of historic remnants on site and in the immediate vicinity and the relatively high probability of prehistoric sites, a full survey should be completed according to Commission guidelines before any development takes place in phase IV.

Infrastructure

The Hamilton Township Industrial Park has public water, sewer, natural gas and electric. The location of ~~the facilities~~ is shown in Figure 18. The municipal landfill is within the industrial park. Phase I of the industrial park is improved. Extension of utilities to Phase II of the industrial park is not presently contemplated. The cost of extending infrastructure is borne by the township.

The potential limitation for industrial development is the adequacy of the municipally operated sewage treatment plant. The design capacity of the treatment plant is 1.5 million gallons per day (mgd). The present average daily flow is .74 mgd. The Hamilton Township Municipal Utilities Authority has adopted an allocation system which gives priority to development which has received Pinelands approval as well as municipal approval. Phase I of the Hamilton Township Industrial Park is allocated .045 mgd. Township officials indicate that there is sufficient capacity in the treatment plant to accommodate development in the park pending the construction of the Mays Landing to Pleasantville interceptor.

Developable Land

Potentially developable land in Phases III and IV of the Hamilton Township Industrial Park totals 192 acres (Phase III - 146±, Phase IV - 46±). Figure 29 (located in the rear pocket) shows a "footprint" of these areas. A final determination of development potential is dependent on the results of the required cultural resource inventory.

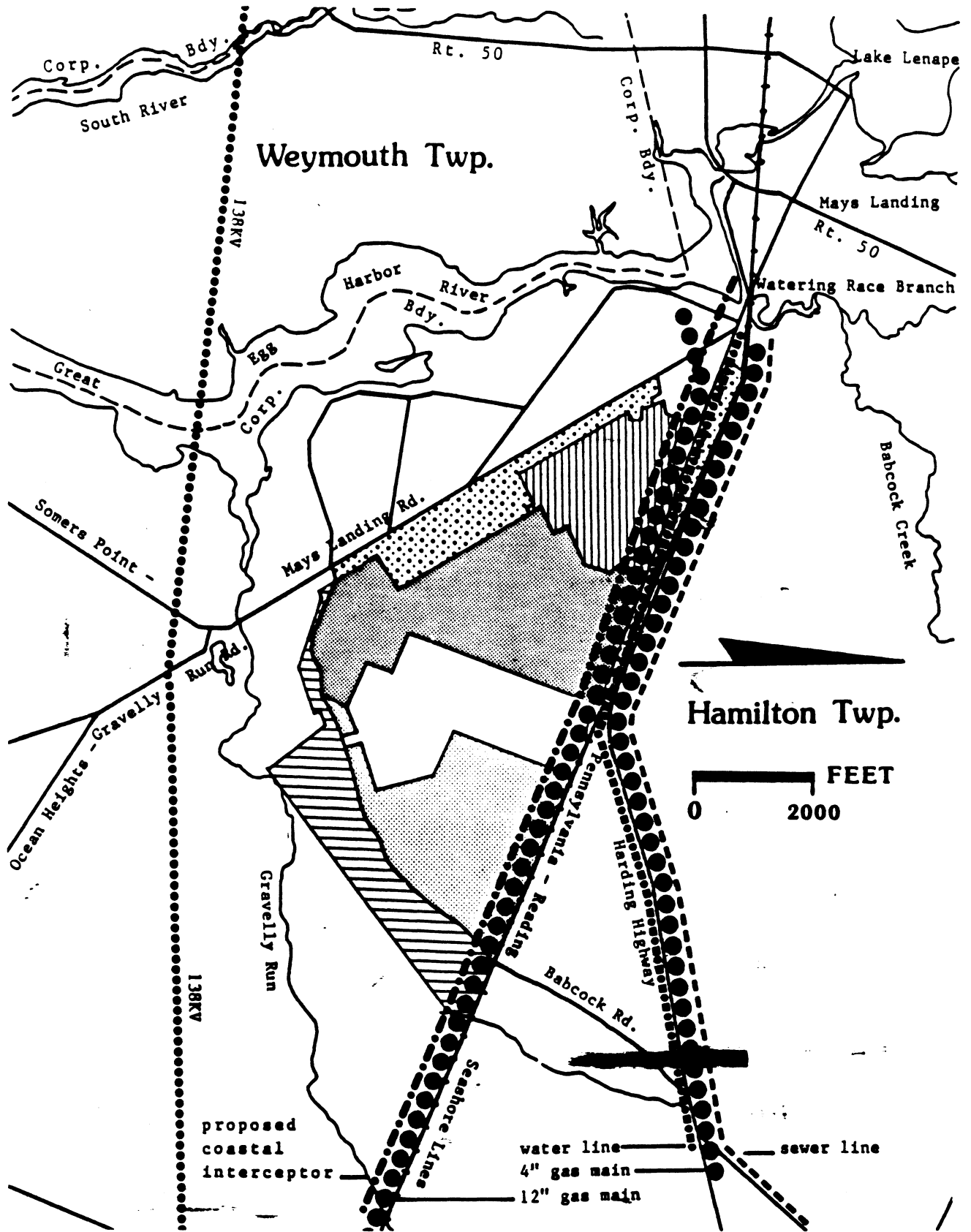


Figure 18. Hamilton Township Industrial Park - Infrastructure

STAFFORD TOWNSHIP

The Stafford Township industrial park site is an irregularly shaped 53+ acre tract of land located south of Route 72 and west of the Garden State Parkway (Figure 19). It is adjacent to the township landfill which was closed in 1984. The area is within the Mill Creek watershed, however, there are no surface waters within or directly adjacent to the site. Mill Creek is between 1400-1800 ft from the northern site boundary. Available STORET data collected from Mill Creek at Route 72 indicate that the stream displays moderate pH levels and low nutrient levels. The entire site is underlain by the Cohansey Formation.

Soils

Three soil series (including two phases of Woodmansie) are mapped by the USDA Soil Conservation Service (SCS) as occurring within the 53+ acre Stafford Township Industrial Park (Figure 20). Each is listed in Table 9 along with drainage characteristics, depth to seasonal high water table (DSHWT), and agricultural suitability as classified by SCS, Pinelands wetlands and septic suitability classification, and total acreage.

Excavated areas dominate the study area, representing nearly one half of the total acreage. Downer and Woodmansie soils, both well drained upland series, account for the remaining acreage. Both series are suitable for on-site wastewater disposal systems. Use of excavated areas is dependent on specific on-site conditions. However, since it is assumed that the industrial park will be served by a regional sewer system, this factor will not affect the area's development potential.

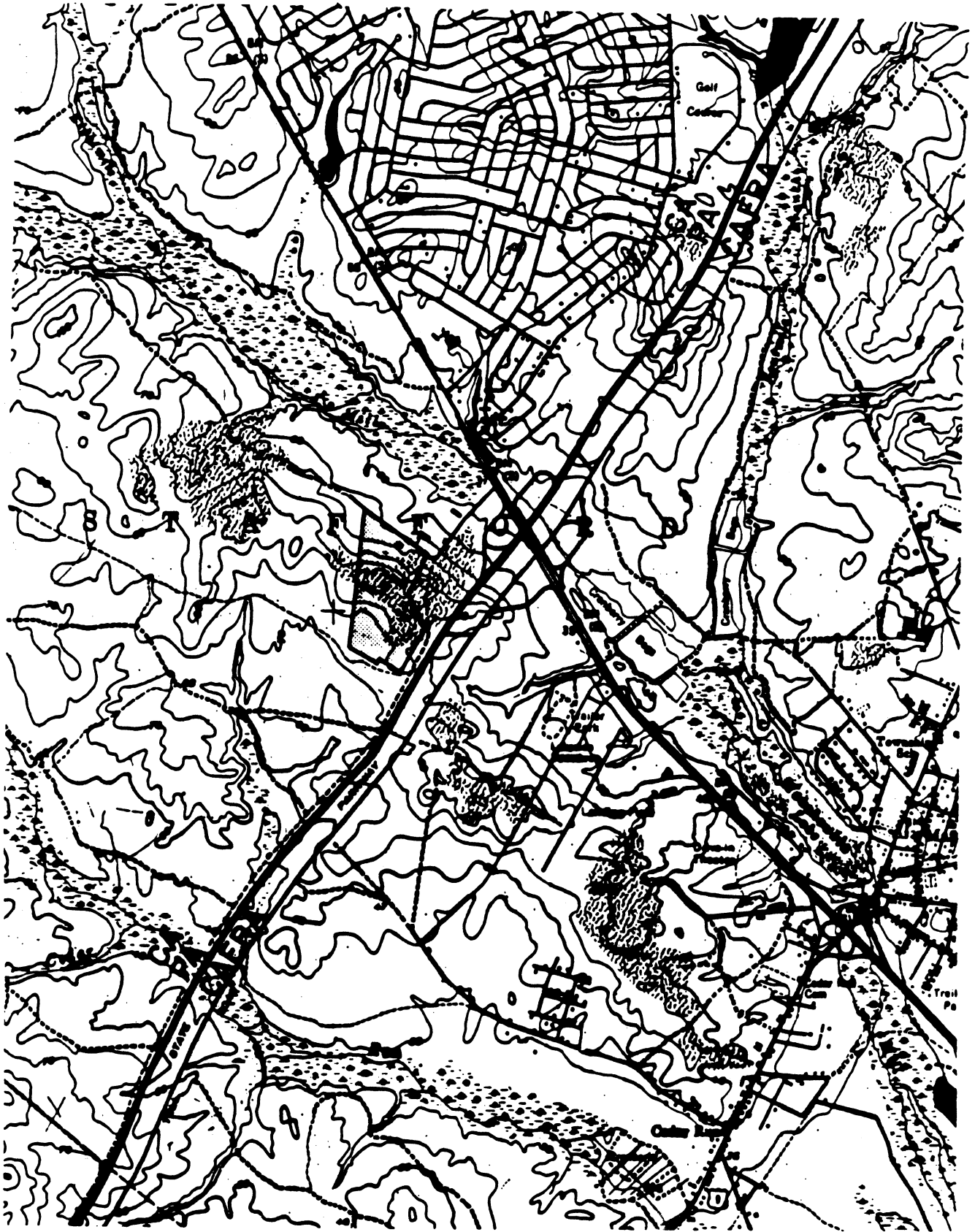


Figure 19. Stafford Township Industrial Park - Location

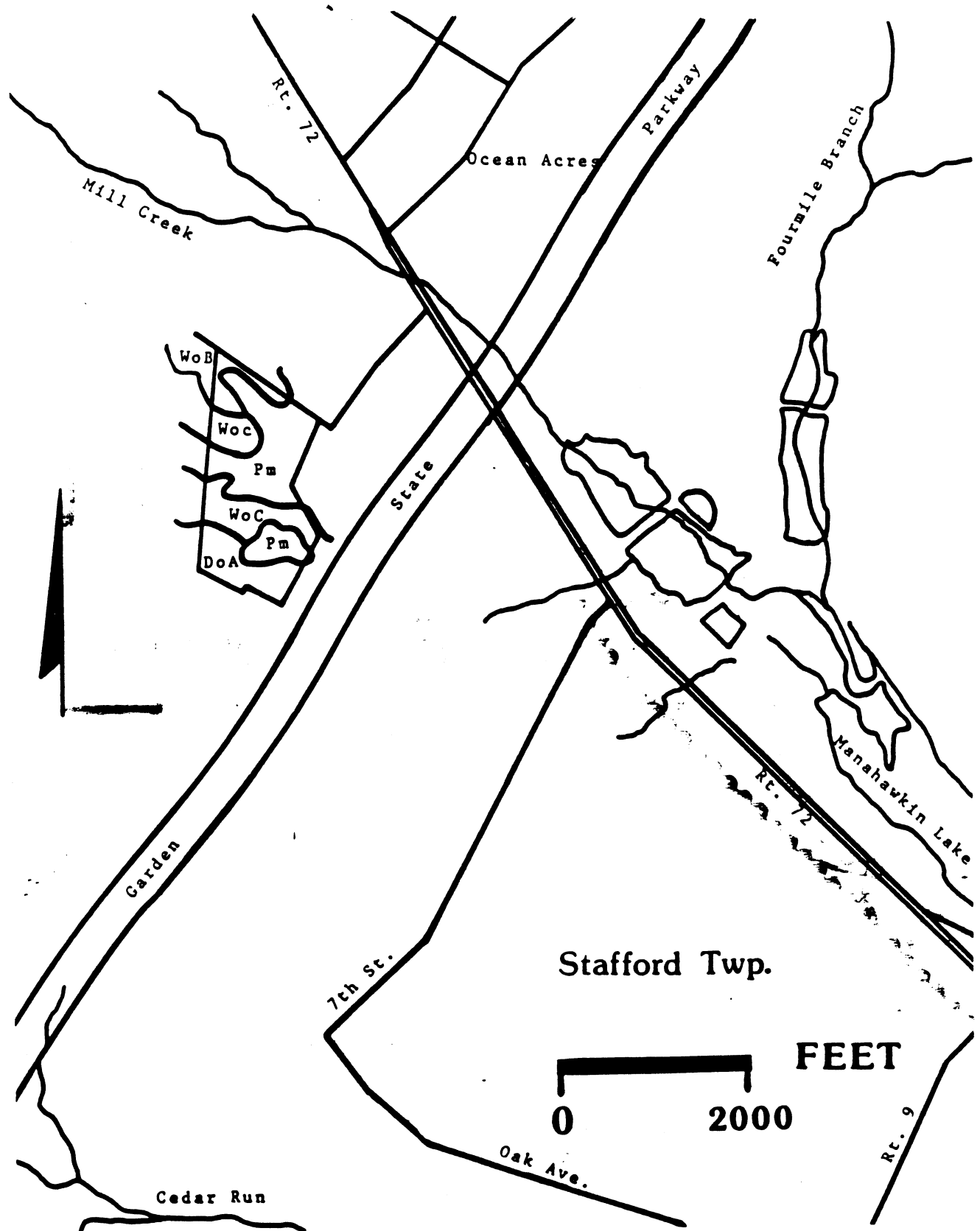


Figure 20. Stafford Township Industrial Park - Soils (see narrative for legend)

Table 9. Soils mapped by SCS as occurring within the Stafford Township Industrial Park.

Soil Type	Area (Acres)	Drainage Class	DSHWT (ft.)	Agricul. Class.	Wetlands Class.	Septic Suitability
Downer loamy sand, 0-5% slopes (DoA)	10.5	well drained	gr. 6	statewide importance	upland	suitable
Woodmansie sand, 0-5% slopes (WoB)	2.0	well drained	gr. 6	--	upland	suitable
Woodmansie sand, 5-10% slopes (WoC)	15.0	well drained	gr. 6	--	upland	suitable
Pits, sand and gravel	26.0	variable	variable	--	upland	variable

Land Cover

A significant portion of the industrial park is disturbed land (Figure 21). Twenty four and one half acres are non-forested (N), and are composed of barren ground (ungraded sand and gravel pit) with areas of sparse grass cover. Three acres are developed (D) while 26 acres are covered by upland pine-oak forest (P) with a composition that is typical of the central Pinelands. There are no wetlands on the site or within 300 feet of its boundaries.

Endangered Plant Species

The potential for finding endangered plant species at the Stafford Township site is very low. One species, swamp pink (Helonias bullata, 1985) has been reported by the N.J. Heritage Program as occurring in wetlands along Mill Creek, northeast and southeast of the study area (Appendix 2). The study area is far removed from the wetland corridor, and development of the study area should not impact endangered plant populations found within wetlands located along the Mill Creek.

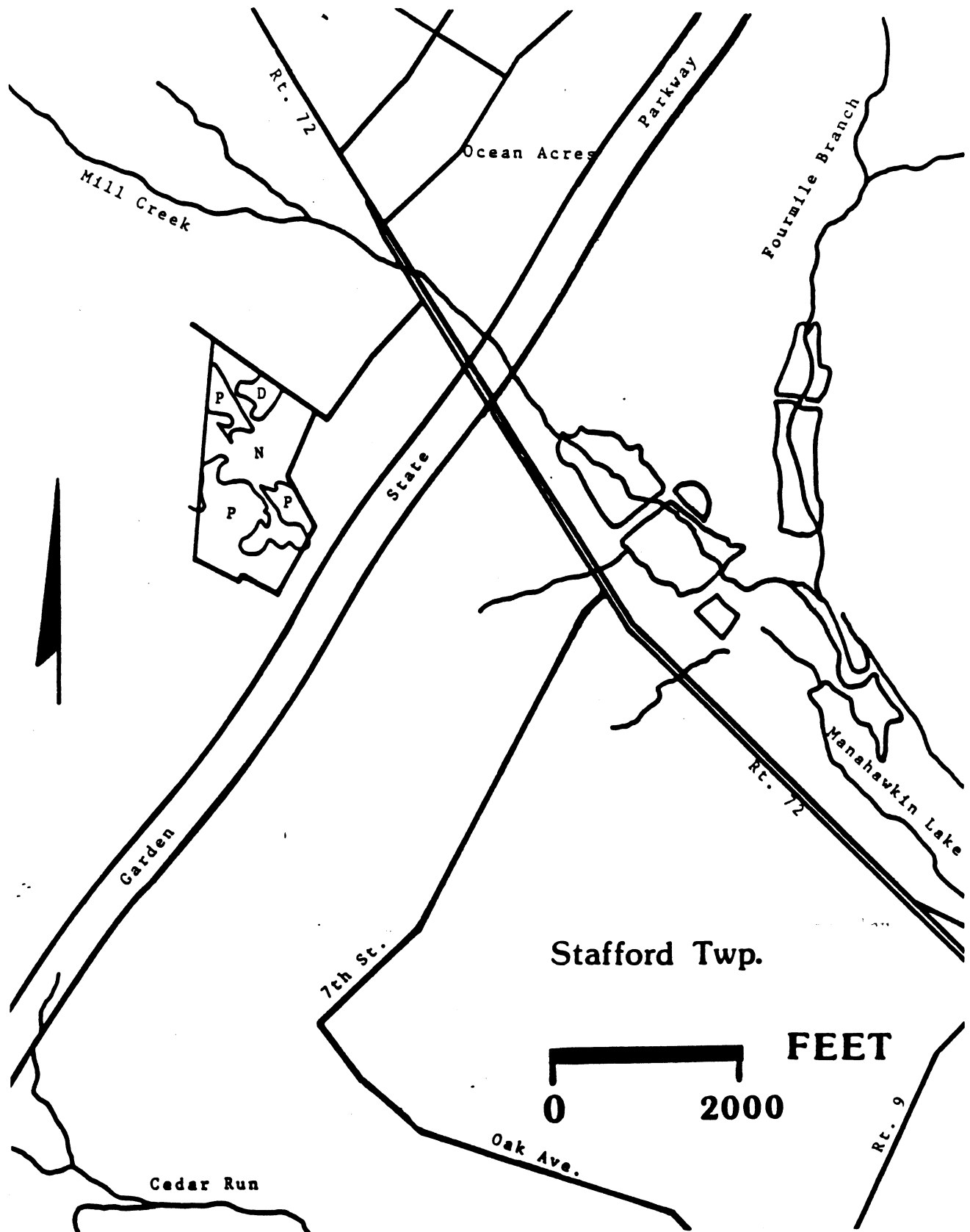


Figure 21. Stafford Township Industrial Park - Land Cover (see narrative for legend)

Wildlife

The Division of Fish, Game and Wildlife has reported on the occurrence of wildlife species found within or adjacent to the Stafford Township industrial park (Appendix 3). Otter are known to occur in Mill Creek and Cedar Run, an adjacent stream system. Wood duck breeding habitat exists in the headwater areas of Mill Creek. No species are reported as occurring on-site or directly adjacent to it.

Cultural Resources

Known historic or prehistoric sites are entirely absent from the area, according to the Pinelands inventories, and there are no prehistoric sites in the vicinity. Furthermore, the industrial park site occupies a highly disturbed area fairly distant from stream courses where such sites are more common. Therefore, a waiver of the cultural resource survey requirement of the CMP should be allowed.

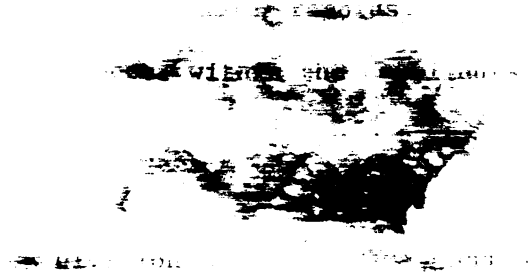
Infrastructure

As a result of the need to sewer residential development west of the Garden State Parkway, public sewerage was extended past the entrance of the industrial park in 1981. At present, however, sewer lines have not been extended into the industrial park. The Pinelands Infrastructure Bond Act, which has been discussed earlier in this report, will provide money for county and municipal infrastructure improvements. It is possible that ~~Stafford Township~~ will be the recipient of funds which can be used to extend infrastructure into the industrial park. The initial allocation of funds will be made in early 1987. The existing industrial uses have on-site wells. Electric is available

within the park and there is a higher voltage distribution line in close proximity to the park which can provide for the demands of more intense industrial use (Figure 23). As mentioned previously, a 6" high pressure natural gas main is within 1/4 mile of the site (Figure 22). Solid waste disposal is handled by a private firm.

Developable Land

The results of this assessment indicate that the entire Stafford Township industrial site is ~~potentially~~ developable.



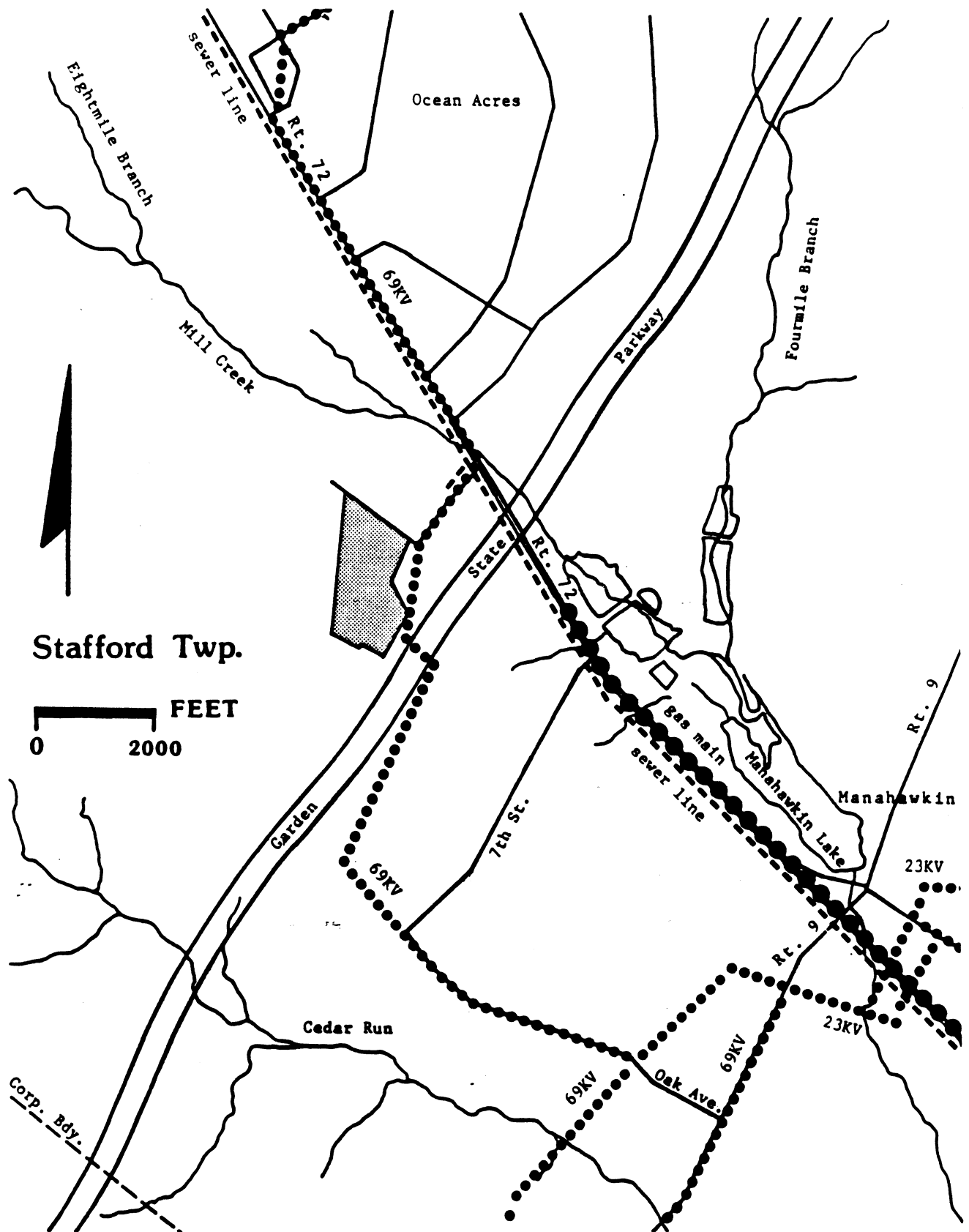


Figure 22. Stafford Township Industrial Park - Infrastructure

WOODBINE INDUSTRIAL PARK

The Woodbine industrial park site is composed of two noncontiguous parcels located within the Woodbine Municipal Airport (Figure 23). The northernmost parcel (Section A) borders Route 550. The second parcel (Section B) is located in the southwestern portion of the airport, and borders the Pennsylvania-Reading Seashore Lines right-of-way. The northern parcel is an irregular rectangle of approximately 145 acres, while the southwestern parcel is a wedge shaped 135 acre tract of land.

Both areas are within the Dennis Creek watershed, draining through Great Cedar Swamp which is located to the west of the airport. With the exception of a minor tributary which encroaches slightly on the far southern portion of Section B and minor depressions located in this section, surface waters are absent within the park. No data are available from the New Jersey Department of Environmental Protection or the United States Geological Survey on the water quality of receiving waters. Both sites are underlain by Cape May Formation deposits.

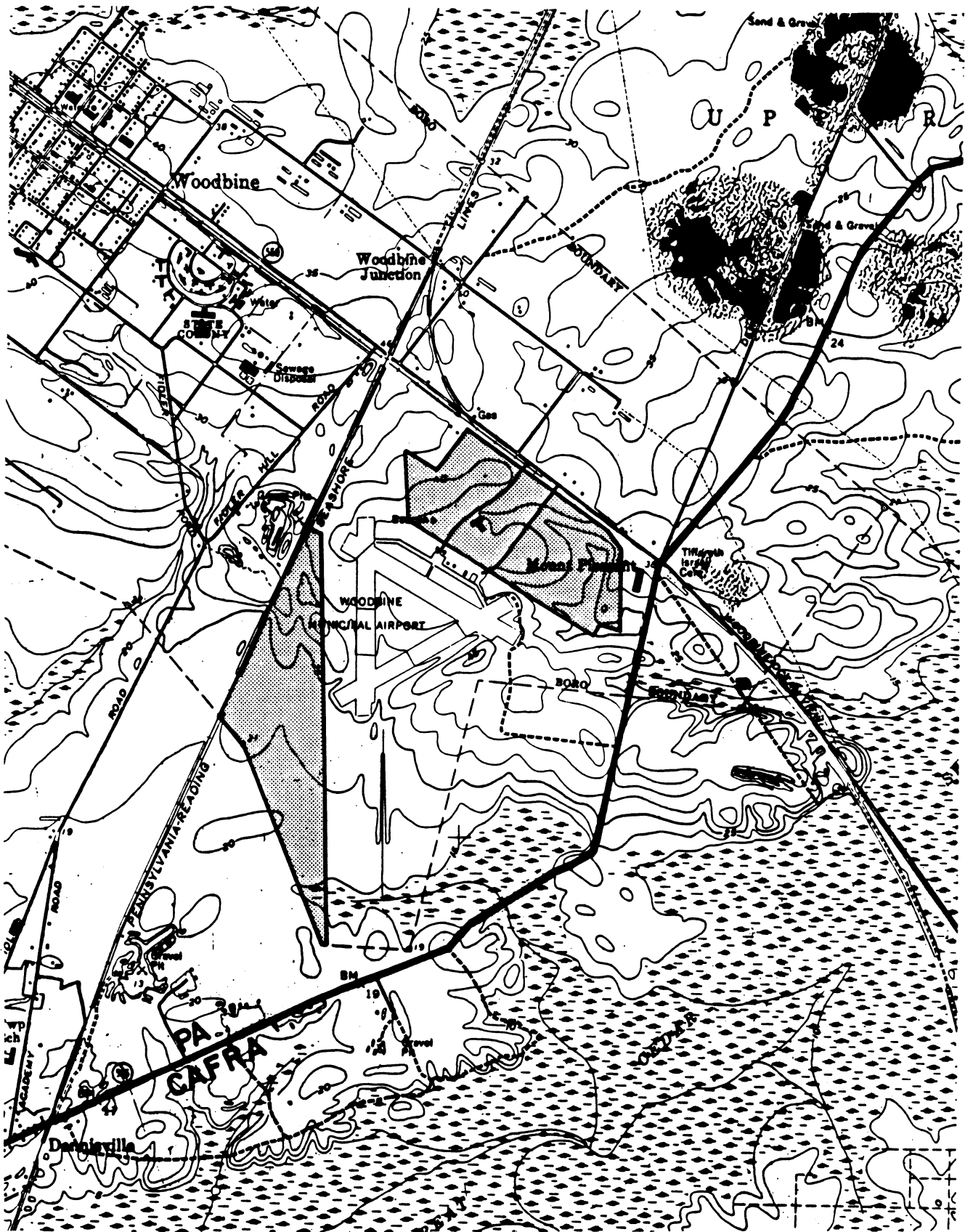


Figure 23. Woodbine Industrial Park - Location

Soils

The USDA Soil Conservation Service (SCS) identifies four soil series as occurring within the boundaries of the Woodbine Industrial Park (Figure 24). These are Downer (two phases), Sassafras (two phases), Woodstown, and Hammonton soils. Drainage characteristics, depth to seasonal high water table (DSHWT), and agricultural suitability as classified by SCS, Pinelands wetlands and septic suitability classification, and total acreage for each soil are given in Table 10.

Table 10. Soils mapped by SCS within the Woodbine Industrial Park.

Soil	Area (Acres)	Drainage Class	DSHWT (ft.)	Agricul. Class.	Wetlands Class.	Septic Suitability
Downer sandy loam, 0-2% slopes (DrA)	38,-	well drained	gr. 5	prime farmland	upland	suitable
Downer sandy loam, gravelly substratum, 0-5% slopes (DsB)	-,13	well drained	gr. 5	statewide importance	upland	suitable
Sassafras sandy loam, 0-2% slopes (SaA)	-,13	well drained	gr. 5	prime farmland	upland	suitable
Sassafras sandy loam, 2-5% slopes (SaB)	,4	well drained	gr. 5	prime	upland	suitable
Hammonton loamy sand, 0-3% slopes (HaA)	1,-	mod. well drained to somewhat poorly drained	1.5-4	statewide importance	upland	suitable
Hammonton sandy loam, 0-3% slopes (HbA)	-,52	mod. well drained to somewhat poorly drained	1.5-4		upland	suitable
Woodstown sandy loam, 0-2% slopes (WmA)	-,53	moderately	1.5-2.5		upland	unsuitable

* first value is Section A acreage; second value is Section B acreage

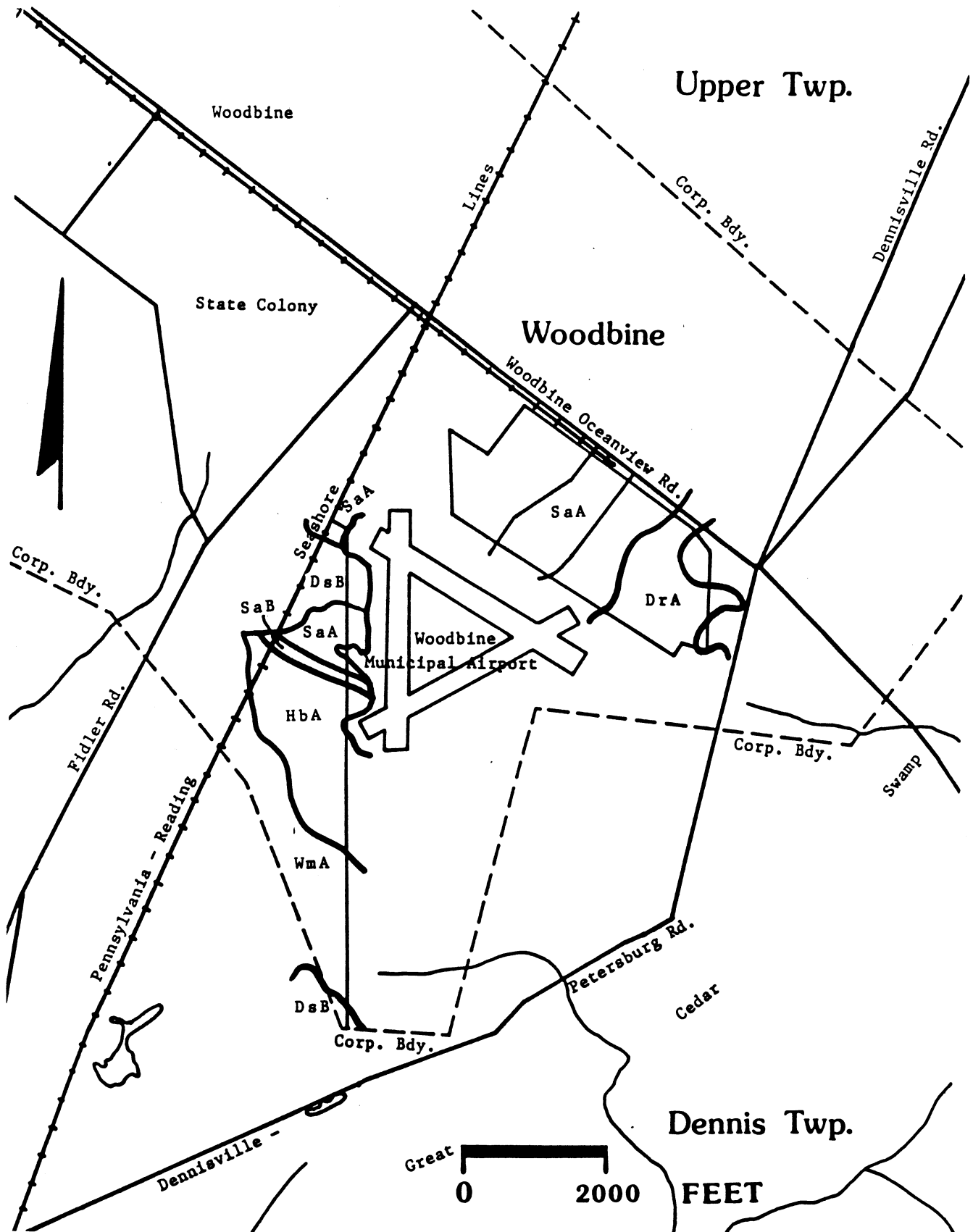


Figure 24. Woodbine Industrial Park - Soils (see narrative for legend)

Sassafras soils are the dominant soil in Section A of the industrial park. Downer sandy loam is also mapped as occurring here. Downer sandy loam, gravelly substratum and sassafras soils are also found within Section B. However, the majority of this area, including all of the southern portion, is dominated by Hammonton and Woodstown soils.

Because sewer service is not currently available at the industrial park, soil borings were made at more than 30 selected sites throughout the park to assess the general development suitability of the area. For development to be served by on-site wastewater disposal systems, a minimum of 5 ft to the seasonal high water table is required. The soil assessment was limited to those areas mapped by the Soil Conservation Service as being dominated by soils that meet this requirement. Those areas mapped as Hammonton and Woodstown were excluded from consideration.

The depth to the seasonal high water table was identified by determining the depth at which distinct mottling (mottling is a soil characteristic which generally indicates poor aeration and impeded drainage) was observed. Based on this assessment, each of the cells designated on the Airport Layout Plan (Figure 25) was assigned to one of three development suitability classes. Class I includes those areas which have a seasonal high water table that is greater than 5 ft. Class II includes those areas where the seasonal high water table was estimated to be slightly less than 5 ft but greater than 4.5 ft. These areas are potentially suitable for development, and, based on additional field reconnaissance with specific development plans, may present development

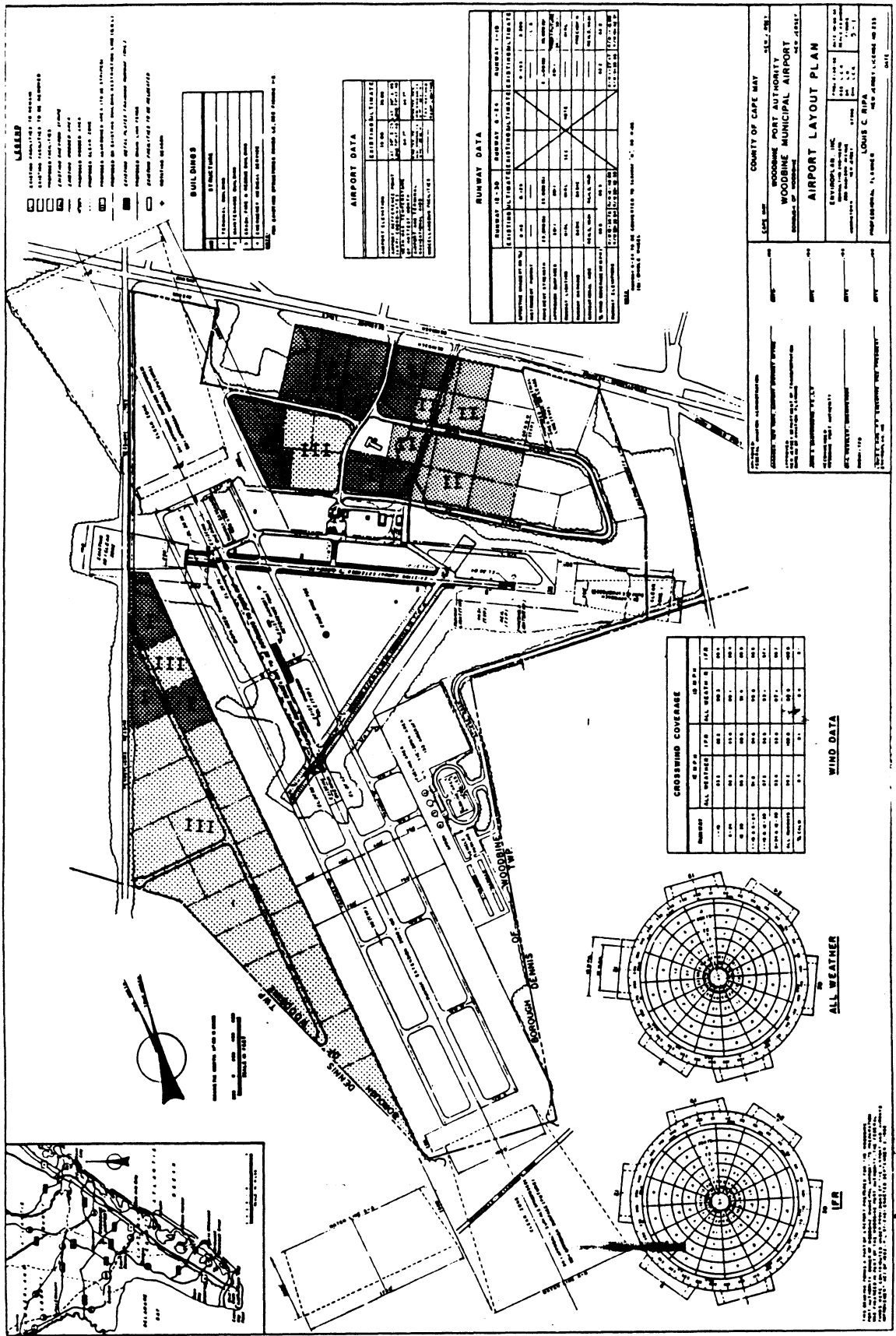


Figure 25. Woodbine Industrial Park-Septic Suitability/Development Potential

opportunities. Class III includes those cells where the seasonal high water table was estimated to be less than 4.5 ft. The potential for on-site wastewater disposal is minimal in these areas.

Because the soils within the study area were variable and the survey was completed in the absence of specific development plans and objectives, this assessment must be viewed only as a means of identifying those areas where development efforts should be concentrated. As shown in Figure 25, areas determined to be most suitable for development are located within Section A, west of the unnamed secondary sand road, and the northern section of Section B.

Land Cover

The majority of the industrial park is undeveloped pine and oak (P&O) dominated forest (Figure 26). Section A is entirely upland. The dominant tree species are oaks and pitch pine. Associated species are sassafras and southern red oak. Poplar is abundant in areas. The understory includes scrub oak, low bush blueberry, and black huckleberry. Grey birch, black gum, inkberry, staggerbush, and highbush blueberry are also found as scattered individuals or, in some areas, as common species. This suggests mesic conditions or the presence of seasonal high water table in these areas. There are no wetlands in this section.

The vegetation is similar in the upland areas of Section B located along the railroad right of way. The southern portion of this section grades into transitional pine forest and pitch pine lowland (L). Although wetlands are present in this section, they are buffered by a wide band (greater than 300 ft) of undevelopable land (seasonal high

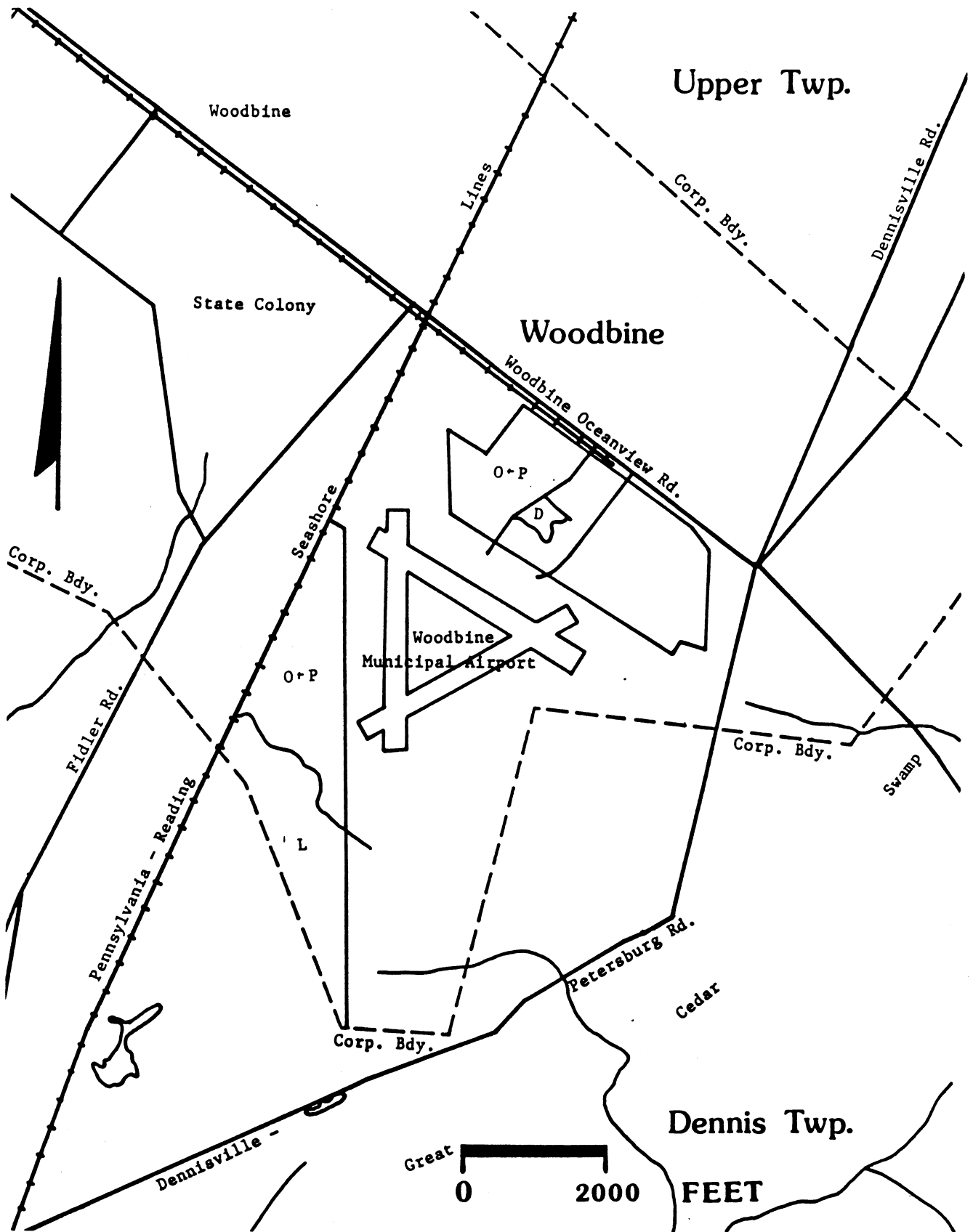


Figure 26. Woodbine Industrial Park - Land Cover (see narrative for legend)

water table that is less than 5 ft), and do not affect the development potential of areas suitable for the installation of on-site wastewater disposal systems.

Endangered Plants Species

The N.J. Heritage Program has records of several endangered species in the vicinity of the Woodbine Industrial Park (Appendix 2). Pine Barrens reedgrass (Calamovilfa brevipilis, 1936) and Pine Barrens gentian (Gentiana autumnalis, 1924) have been recorded along the railroad west of Mt. Pleasant. Resinous boneset (Eupatorium resinosum, 1920) has been documented in the vicinity of the study area. Protection of wetland areas and somewhat poorly drained areas on-site should afford protection to any populations of these plant species that may exist within the industrial park.

Wildlife

The New Jersey Division of Fish, Game and Wildlife reports that Woodbine Airport supported upland sandpipers (endangered) in 1977. This species inhabits open fields and meadows, habitats found adjacent to, but not in, the industrial park area. Projects proposed for areas located directly adjacent to these habitats should be reviewed on a site specific basis to determine if upland sandpiper will be impacted.

The Division notes that the Great Cedar Swamp, located to the south and southeast of the industrial park area (Figure 23), is used as a beaver relocation site. Otter are also found throughout the Woodbine area. Additional information on other off-site wildlife resources is given in Appendix 3.

Cultural Resources

Both of the Woodbine sites are fairly typical of their environs. The area between the settlements of Woodbine and Dennisville is mostly wooded wetlands and uplands with some cleared farmland.

A review of the Pinelands cultural resource inventories indicates that there are no known historic or prehistoric sites located in either parcel. Most of the project area is also away from surface water sources and there are relatively few prehistoric sites recorded in the vicinity. Those sites that are known are located along the periphery of the Great Cedar Swamp. Three such sites, which yielded undiagnosed surface finds including points, woodworking tools and flakes are recorded near Dennisville, one to one-and-a-half miles to the southwest.

The southern end of Section B is crossed by a wetland that drains into the Great Cedar Swamp. There is a reasonable likelihood of Amerindian site occurrence in this area. However, since the area has been determined to be undevelopable, a cultural resource survey is unnecessary.

Infrastructure

The infrastructural need of the Woodbine site is public sewerage. A 10 inch water line has been extended along DeHirsch Avenue to the intersection with County Route 610 (Figure 27). The water line, at present, does not extend into the park. The present users of the Woodbine Industrial Park have on-site wells.

A number of proposals have been made for the sewerage of Woodbine. The most recent proposal comes from the Cape May County Utilities Authority. Their proposal, which has not yet been adopted, is to extend

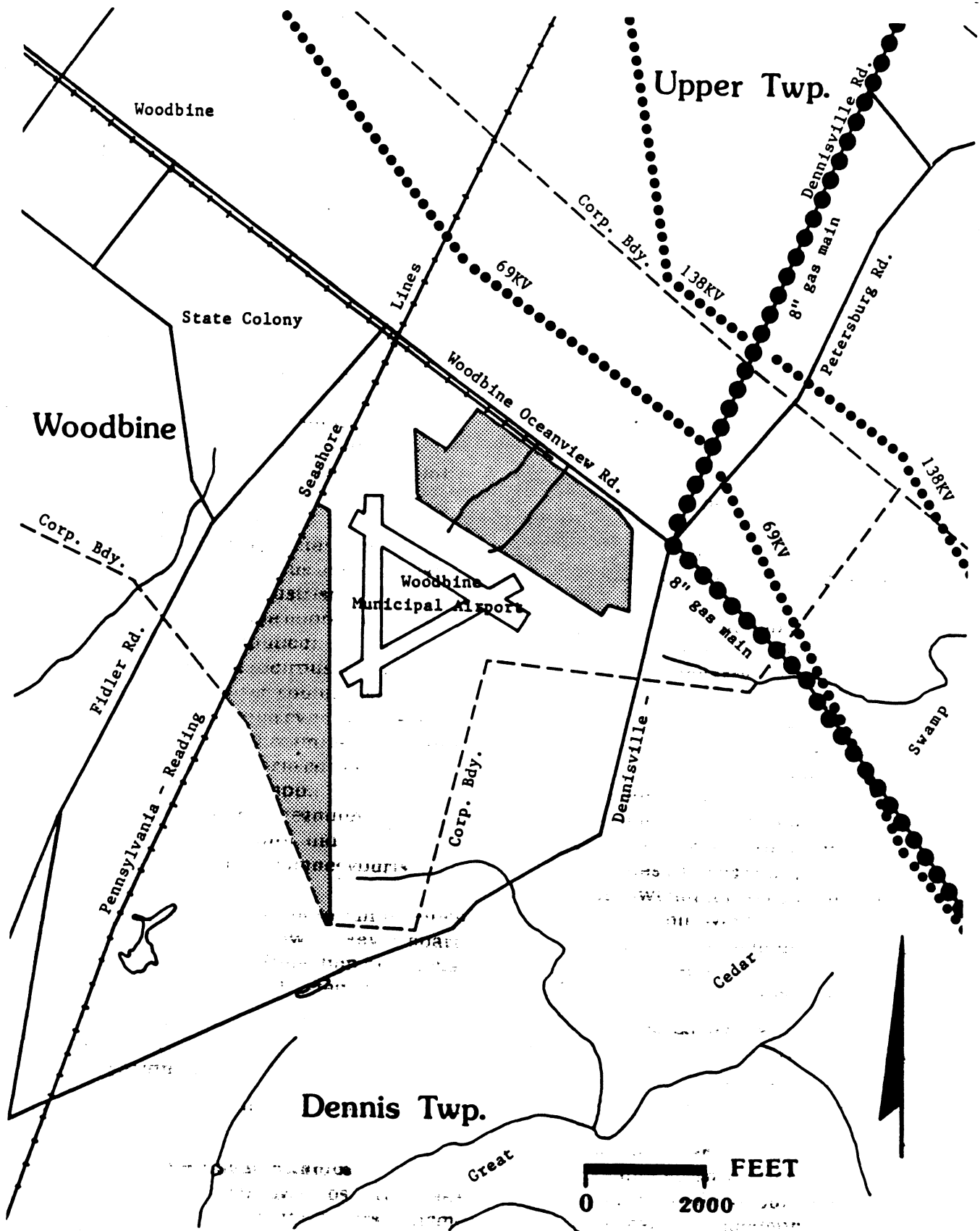


Figure 27. Woodbine Industrial Park - Infrastructure

a force main to the Cape May County Regional Landfill, a portion of which is in Woodbine just north of the industrial park. At present commercial or industrial will be limited to that which can be constructed with on-site septic systems. As mentioned, approximately 1,000 square feet of commercial space per acre will meet the CMP's water quality standards.

Developable Land

The results of this assessment indicate that potentially developable land is limited to those areas of class I and class II lands shown in Figure 25. These lands total 85 acres. Class I lands have a seasonal high water table that is greater than 5 ft, and are therefore suitable for on-site wastewater disposal systems. Class II lands have a water table which appears to be less than 5 ft, but is greater than 4.5 ft. Based on additional field reconnaissance with specific development plans, Class II lands may present development opportunities. As noted in the wildlife section, projects located directly adjacent to open grassy areas should be reviewed on a site specific basis to determine if the upland sandpiper will be impacted.

RECOMMENDATIONS

The information contained in this report should be used by the affected municipalities and counties in the planning and design of the five industrial parks studied, and should also be used in the preparation of applications for development. The Chesilhurst and Stafford sites have been found to possess no environmental limitations to development, except that development using on-site wastewater disposal systems on the Chesilhurst site must meet the minimum lot size requirements of the Pinelands Comprehensive Management Plan and may require select fill in certain locations. In Woodbine, the class I lands shown in Figure 25 can be considered developable using on-site wastewater disposal systems, subject to minimum lot size requirements and site-specific determinations of impacts on endangered species. Class II lands in Woodbine may also be developable, although more detailed field testing of the soils in these areas will be required to determine the developability of individual sites. In the Egg Harbor City and Hamilton industrial parks, the detailed "footprints" of developable lands shown in Figures 28 and 29, respectively, should be used to determine the extent and location of future development on these sites, subject to archaeological testing requirements.

APPENDIX 1
ARTICLE 6 OF THE CMP

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ARTICLE 6

Management Programs and Minimum Standards

INTRODUCTION

This article establishes management programs and minimum standards governing development and land use in the Pinelands. In addition, guidelines for county and municipal preparation of management programs for scenic, energy conservation and recreation are provided. All the programs are intended to be implemented by the administration of municipal and county master plans and land use ordinances through the development review procedures established in Article 4 of

this Plan [DEVELOPMENT REVIEW]. Prior to certification of county or municipal master plans and land use ordinances, the standards and guidelines of these programs will be implemented and enforced by the Pinelands Commission. The standards set forth in this Article are minimum requirements and a municipality or county may adopt more restrictive regulations, provided that such regulations are compatible with the goals and objectives of this Plan.

PART 1—WETLANDS

Section 6-101.

Purpose

Coastal and inland wetlands constitute a vital element of the ecological character of the Pinelands. They are critical habitats for many threatened and endangered plant and animal species and play many other important roles including the maintenance of surface and ground water quality. This program is deemed to be the minimum standards necessary to protect the long-term integrity of wetlands.

Section 6-102.

Wetlands Management Program

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan or land use ordinance must provide for the protection of the integrity of

wetlands. It is not necessary that the municipal program incorporate the literal terms of the program set out in this Part; rather, a municipality may adopt alternative and additional techniques, which will achieve equivalent protection of the wetlands defined in this Part, as would be achieved under the provisions of this Part.

Section 6-103.

Wetlands

Wetlands are those lands which are inundated or saturated by water at a magnitude, duration and frequency sufficient to support the growth of hydrophytes. Wetlands include lands with poorly drained or very poorly drained soils as designated by the National Cooperative Soils Survey of the Soil Conservation Service of the United States Department of Agriculture. Wetlands include coastal wetlands and inland wetlands, including submerged lands.

Section 6-104.

Coastal Wetlands

Coastal wetlands are banks, low-lying marshes, swamps, meadows, flats, and other lowlands subject to tidal inundation which support or are capable of supporting one or more of the following plants:

salt meadow grass (*Spartina patens*),
spike grass (*Distichlis spicata*),
black grass (*Juncus gerardi*),
saltmarsh grass (*Spartina alterniflora*),
saltworts (*Salicornia europaea* and *Salicornia bigelovii*),
sea lavender (*Limonium carolinianum*),
saltmarsh bulrushes (*Scirpus robustus* and *Scirpus paludosus* var. *atlanticus*),
sand spurrey (*Spergularia marina*),
switch grass (*Panicum virgatum*),
tall cordgrass (*Spartina pectinata*),
hightide bush (*Iva frutescens* var. *oraria*),
cattails (*Typha angustifolia* and *Typha latifolia*),
spike rush (*Eleocharis rostellata*),
chairmaker's rush (*Scirpus americanus*),
bent grass (*Argostis palustris*),
sweet grass (*Hierochloa odorata*),
wild rice (*Zizania aquatica*),
Olney's threesquare (*Scirpus olneyi*),
marsh mallow (*Hibiscus palustris*),
salt reed grass (*Spartina cynosuroides*),
common reed grass (*Phragmites communis*),
pickerel grass (*Pontederice cordata*),
arrowheads (*Sagittaria* spp.),
spatterdock (*Nuphar variegatum*),
red maple (*Acer rubrum*), and
Atlantic white cedar (*Chamaecyparis thyoides*).

Coastal wetlands include those lands which are delineated by the New Jersey Department of Environmental Protection on official maps at a scale of 1:2,400 listed in N.J.A.C. 7:7A-1.13.

Section 6-105.

Inland Wetlands

Inland wetlands include, but are not limited to:

A. Atlantic White Cedar Swamps.

Atlantic white cedar swamps are areas dominated by Atlantic white cedars (*Chamaecyparis thyoides*) and supporting one or more of the following hydrophytic plants:

red maple (*Acer rubrum*),
sweetbay (*Magnolia virginiana*),
blackgum (*Nyssa sylvatica*),
dangleberry (*Gaylussacia frondosa*),
highbush blueberry (*Vaccinium corymbosum*),
swamp azalea (*Rhododendron viscosum*),
fetterbush (*Leucothoe racemosa*),
sweet pepperbush (*Clethra alnifolia*),
inkberry (*Ilex glabra*),
pitcher plant (*Sarracenia purpurea*),
sundew (*Drosera* spp.),
cinnamon fern (*Osmunda cinnamomea*),
royal fern (*Osmunda regalis*),
and sphagnum moss (*Sphagnum* spp.).

B. Hardwood Swamps.

Hardwood swamps are areas dominated by red maple (*Acer rubrum*), blackgum (*Nyssa sylvatica*) and/or sweetbay (*Magnolia virginiana*) and supporting one or more of the following hydrophytic plants:

gray birch (*Betula populifolia*),
pitch pine (*Pinus rigida*),
Atlantic white cedar (*Chamaecyparis thyoides*),
sweet gum (*Liquidambar styraciflua*),
sweet pepperbush (*Clethra alnifolia*),
highbush blueberry (*Vaccinium corymbosum*),
swamp azalea (*Rhododendron viscosum*),
fetterbush (*Leucothoe racemosa*),
leatherleaf (*Chamaedaphne calyculata*),
dangleberry (*Gaylussacia frondosa*),
cinnamon fern (*Osmunda cinnamomea*),
chain fern (*Woodwardia* spp.),
and rushes (*Juncus* spp.);

or other lowland forests dominated by one or more of the following plants:

sweetgum (*Liquidambar styraciflua*),
pin oak (*Quercus palustris*),
and willow oak (*Quercus phellos*).

C. Pitch Pine Lowlands.

Pitch pine lowlands are areas dominated by pitch pine (*Pinus rigida*) and supporting one or more of the following hydrophytic plants:

red maple (*Acer rubrum*),
blackgum (*Nyssa sylvatica*),
gray birch (*Betula populifolia*),
leatherleaf (*Chamaedaphne calyculata*),
dangleberry (*Gaylussacia frondosa*),
sheep laurel (*Kalmia angustifolia*).

highbush blueberry (*Vaccinium corymbosum*), sweet pepperbush (*Clethra alnifolia*), and wintergreen (*Gaultheria procumbens*).

D. Bogs.

Bogs are areas dominated by hydrophytic, shrubby vegetation including:

cranberry (*Vaccinium macrocarpon*), leatherleaf (*Chamaedaphne calyculata*), sheep laurel (*Kalmia angustifolia*), highbush blueberry (*Vaccinium corymbosum*), swamp azalea (*Rhododendron viscosum*), sweet pepperbush (*Clethra alnifolia*), dangleberry (*Gaylussacia frondosa*), or staggerbush (*Lyonia mariana*).

Sphagnum moss (*Sphagnum* spp.), pitcher plant (*Sarracenia purpurea*), sundew (*Drosera* spp.), and sedges (*Carex* spp.) are among the herbaceous plants which are found in bogs. Active cranberry bogs and shrub thickets dominated by leatherleaf (*Chamaedaphne calyculata*) are included in this category.

E. Inland Marshes.

Inland marshes are areas which are dominated by hydrophytic grasses (*Gramineae*) and sedges (*Carex* spp.) and which include one or more of the following plants: pick-erelweed (*Pontederia cordata*), arrow arum (*Peltandra virginica*), cattail (*Typhus* spp.), and rushes (*Juncus* spp.).

F. Lakes and Ponds.

Lakes and ponds are seasonal or permanent standing bodies of water.

G. Rivers and Streams.

Rivers and streams are bodies of water which periodically or continuously contain moving water or which form a link between two bodies of standing water.

Section 6-106.

Development Prohibited

Development shall be prohibited in all wetlands in the Pinelands except as specifically authorized in this Part.

Section 6-107.

Significant Adverse Impact

A significant adverse impact shall be de-

emed to exist where it is determined that one or more of the following modifications of a wetland will have an irreversible effect on the ecological integrity of the wetland and its biotic components:

1. An increase in surface water runoff discharging into a wetland;
2. A change in the normal seasonal flow patterns in the wetland;
3. An alteration of the water table in the wetland;
4. An increase in erosion resulting in increased sedimentation in the wetland;
5. A change in the natural chemistry of the ground or surface water in the wetland;
6. A loss of wetland habitat;
7. A reduction in wetland habitat diversity;
8. A change in wetlands species composition; or
9. A significant disturbance of areas used by indigenous and migratory wildlife for breeding, nesting, or feeding.

Section 6-108

Agriculture and Horticulture

Horticulture of native Pinelands species and berry agriculture shall be permitted in all wetlands subject to the requirements of Part 5 [AGRICULTURE] of this Article. Beekeeping shall be permitted in all wetlands.

Section 6-109.

Forestry

Forestry shall be permitted in all wetlands subject to the requirements of Part 4 [FORESTRY] of this Article.

Section 6-110.

Fish and Wildlife Management

Fish and wildlife management activities shall be permitted in all wetlands subject to the minimum standards of all other parts of this Article; provided that the management activity does not have a significant adverse impact, as set forth in Section 6-107, on the wetland in which the activity is carried out; and provided that the activity conforms to all

state and federal regulations. On a case by case basis, fish and wildlife management proposals shall be evaluated relative to the scientific research value of the proposal.

Section 6-111.

Low Intensity Uses

Hunting, fishing, trapping, hiking, boating, swimming and other similar low intensity recreational uses shall be permitted in all wetlands provided that such uses do not involve any structure other than those authorized in Section 6-112.

Section 6-112.

Water-Dependent Recreational Facilities

A. Docks, piers, moorings, and boat launches for the use of a landowner shall be permitted in all wetlands, provided that the use will not result in a significant adverse impact, as set forth in Section 6-107, and conforms to all state and federal regulations.

B. Commercial or public docks, piers, moorings, and boat launches shall be permitted provided that:

1. There is a demonstrated need for the facility that cannot be met by existing facilities;

2. The development conforms with all state and federal regulations; and

3. The development will not result in a significant adverse impact, as set forth in Section 6-107.

Section 6-113.

Public Improvements

Bridges, roads, trails and utility transmission and distribution facilities shall be permitted in wetlands provided that:

A. There is no feasible alternative route or site for the facility that does not involve development in a wetland;

B. The public need cannot be met by existing facilities or modification thereof; and

C. The facility will not result in a significant adverse impact, as set forth in Section 6-107.

Section 6-114.

Wetland Transition Areas

No development, except for those uses which are specifically authorized in this Part, shall be carried out within 300 feet of any wetland, unless the applicant has demonstrated that the proposed development will not result in a significant adverse impact on the wetland, as set forth in Section 6-107.

PART 2—VEGETATION

Section 6-201.

Purpose

Vegetation represents the most visible element of the essential character of the Pinelands and constitutes the fundamental structure of wildlife habitats, including the habitats of several species which are designated as threatened or endangered. The Pinelands landscape is comprised of a mosaic of plant associations which reflects the interaction of water, soil, topography, fire and human influence. The continued integrity of the Pinelands vegetation is essential to the preservation and maintenance of the essential character of the Pinelands. Therefore, vegetation clearing should be limited to authorized forestry activities, fire hazard

mitigation, preparation of agricultural fields, and the minimum clearing necessary to permit construction of development or land use authorized by this Plan. In addition, landscaping materials employed in the Pinelands must be compatible with native vegetation in order to preserve the visual and ecological character of the Pinelands.

Section 6-202.

Vegetation Management Program

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan or land use ordinance must provide for the protection of the integrity of

Pinelands vegetation. It is not necessary that a municipal program incorporate the literal terms of the program set out in this Part; rather, a municipality may adopt alternative and additional techniques which will achieve equivalent protection of Pinelands vegetation as would be achieved under the provisions of this Part.

Section 6-203.

Vegetation Removal Standards

The clearing of more than 1500 square feet of vegetation from any parcel of land, other than clearing for agricultural activities, shall be authorized only if the applicant can demonstrate:

A. That the removal is necessary to accommodate the development or maintenance of a permitted structure or to carry out a permitted use of the property; or

B. That removal is necessary in order to implement the fire management objectives of this Plan; or

C. That removal is necessary to eliminate a pedestrian or vehicular safety hazard; or

D. That removal is necessary to eliminate a hazard to a building; and

E. That specimen trees will not be cleared or removed; and

F. That the area to be cleared will be landscaped in accordance with the following requirements:

1. All landscaping as shown on the site plan shall be completed within six months of completion of construction;

2. All landscaping shall ensure the stabilization of soils;

3. All development in the Pinelands, other than turfed areas dedicated for public recreational purposes, shall utilize native vegetation for landscaping, including but not limited to:

- (a) Pitch pine;
- (b) Short-leaf pine;
- (c) Black oak;
- (d) Southern red oak;
- (e) White oak;
- (f) Blackjack oak;
- (g) Scrub oak;

- (h) Post oak;
- (i) Chestnut oak;
- (j) Scarlet oak;
- (k) Black huckleberry;

(l) Dangleberry;

(m) Sheep laurel;

(n) American holly;

(o) Low bush blueberry;

(p) Mountain laurel; and

(q) Grasses, such as the little blue-stem, deertongue, redtop, and switchgrass, to the extent practicable; however, in no case shall areas planted with non-native grasses exceed 12 feet in width.

Section 6-204.

Development Prohibited in the Vicinity of Threatened or Endangered Plants

No developments shall be carried out by any person unless it is designed to avoid irreversible adverse impacts on the survival of populations of the following plants, which are hereby found and declared to be threatened or endangered plants of the Pinelands:

1. Sensitive-joint vetch,
Aeschynomene virginica.
2. Red milkweed,
Asclepias rubra.
3. Silvery aster,
Aster concolor.
4. Pickering's morning glory,
Breweria pickeringii.
5. Pine Barrens reedgrass,
Calamovilfa brevipilis.
6. Barratt's sedge,
Carex barrattii.
7. Sickle-leaved golden aster,
Chrysopsis falcata.
8. Spreading pogonia,
Cleistes divaricata.
9. Broom crowberry,
Corema conradii.
10. Rose-colored tickseed,
Coreopsis rosea.
11. Rushfoil,
Crotonopsis elliptica.

12. Stiff tick trefoil,
Desmodium strictum.
13. Knotted spike rush,
Eleocharis equisetoides.
14. Resinous boneset,
Eupatorium resinosum.
15. Pine Barrens gentian,
Gentiana autumnalis.
16. Yellow-fringed orchid,
Habenaria ciliaris.
17. Crested yellow orchid,
Habenaria cristata.
18. Southern yellow orchid,
Habenaria integra.
19. Swamp pink,
Helonias bullata.
20. New Jersey rush,
Juncus caesariensis.
21. Lily-leaved twayblade,
Liparis lilifolia.
22. Loesel's twayblade,
Liparis loeselii.
23. Southern twayblade,
Listera australis.
24. Boykin's lobelia,
Lobelia boykinii.
25. Canby's lobelia,
Lobelia canbyi.
26. Hairy ludwigia,
Ludwigia hirtella.
27. Linear-leaved ludwigia,
Ludwigia linearis.
28. Climbing fern,
Lygodium palmatum.
29. Torrey's muhly,
Muhlenbergia torreyana.
30. Yellow asphodel,
Narthecium americanum.
31. Floating heart,
Nymphoides cordata.
32. Narrow panic grass,
Panicum hemitomom.
33. Hirst's panic grass,
Panicum hirstii.
34. American mistletoe,
Phoradendron flavescens.
35. Maryland milkwort,
Polygala mariana.
36. Slender rattlesnake root,
Prenanthes autumnalis.
37. Awned meadow beauty,
Rhexia aristosa.
38. Capitulate beakrush,
Rhynchospora cephalantha.
39. Slender beaked rush,
Rhynchospora inundata.
40. Knieskern's beaked rush,
Rhynchospora knieskernii.
41. Curly grass fern,
Schizaea pusilla.
42. Chaffseed,
Schwalbea americana.
43. Long's bulrush,
Scirpus longii.
44. Slender nut rush,
Scleria minor.
45. Reticulated nut rush,
Scleria reticularis.
46. Sclerolepis,
Sclerolepis uniflora.
47. Wand-like goldenrod,
Solidago stricta.
48. Little ladies tresses,
Spiranthes tuberosa.
49. False asphodel,
Tofieldia racemosa.
50. Humped bladderwort,
Utricularia gibba.
51. White-flowered bladderwort,
Utricularia olivacea.
52. Purple bladderwort,
Utricularia purpurea.
53. Reclined bladderwort,
Utricularia resupinata.
54. Yellow-eyed grass,
Xyris flexuosa.

PART 3—FISH AND WILDLIFE

Section 6-301.

Purpose

The Pinelands environment supports a rich diversity of fish and wildlife species. Many threatened and endangered species are found in the Pinelands and they, together with the other fauna of the area, constitute an important part of the essential ecological character of the Pinelands that requires careful management and protection.

Section 6-302.

Protection of Threatened or Endangered Wildlife Required

No development shall be carried out unless it is designed to avoid irreversible adverse impacts on habitats that are critical to the survival of populations of the following Pinelands threatened or endangered animals:

A. Amphibians.

1. Eastern tiger salamander,
Ambystoma tigrinum.
2. Pine Barrens treefrog,
Hyla andersoni.
3. Southern grey treefrog,
Hyla chrysoscelis.
4. Eastern mud salamander,
Pseudotriton montanus.

B. Reptiles.

1. Bog turtle,
Clemmys muhlenbergi.
2. Timber rattlesnake,
Crotalus horridus horridus.
3. Wood turtle,
Clemmys insculpta.
4. Corn snake,
Elaphe guttata.
5. Northern pine snake,
Pituophis melanoleucus melanoleucus.

C. Birds.

1. Bald eagle,
Haliaeetus leucocephalus.
2. Peregrine falcon,
Falco peregrinus.
3. Osprey,
Pandion haliaetus.

4. Cooper's hawk,
Accipiter cooperii.
5. Least tern,
Sterna albifrons.
6. Black skimmer,
Rynchops nigra.
7. Great blue heron,
Ardea herodias.
8. Red-shouldered hawk,
Buteo lineatus.
9. Northern harrier,
Circus cyaneus.
10. Merlin,
Falco columbarius.
11. Upland sandpiper (plover),
Bartramia americana.
12. Roseate tern,
Sterna dougallii.
13. Barred owl,
Strix varia.
14. Short-eared owl,
Asio flammeus.
15. Red-headed woodpecker,
Melanerpes erythrocephalus.
16. Cliff swallow,
Petrochelidon pyrrhonota.
17. Bobolink,
Dolichonyx oryzivorus.
18. Ipswich sparrow,
Passerculus sandwichensis princeps.
19. Pied-billed grebe,
Podilymbus podiceps.
20. Short-billed marshwren,
Cistothorus platensis.
21. Savannah sparrow,
Passerculus sandwichensis.
22. Henslow's sparrow,
Ammodramus henslowii.
23. Vesper sparrow,
Poocetus gramineus.

D. Fishes

1. American shad,
Alosa sapidissima.
2. Native brook trout,
Salvelinus fontinalis.

Section 6-303.
Protection of Wildlife Habitat

All development or other authorized activity shall be carried out in a manner which

avoids disturbance of fish and wildlife habitats that are essential to the continued nesting, resting, breeding and feeding of significant populations of fish and wildlife in the Pinelands.

PART 4—FORESTRY

Section 6-401.
Purpose

Forest vegetation represents a unique and financially valuable part of the essential character of the Pinelands. If they are properly managed, Pinelands forests represent significant economic opportunities to their owners while perpetuating the overall ecological value of the Pinelands. This Part encourages commercial forestry that will maximize forest land values and provide for the long-term economic and environmental integrity of the Pinelands.

Section 6-402.
Forestry Management Program

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan and land use ordinance must provide for the protection of the integrity of Pinelands forests. It is not necessary that the municipal program incorporate the literal terms of the program set out in this Part; rather, a municipality may adopt alternative and additional techniques which will achieve equivalent protection of forestry resources as would be achieved under the provisions of this Part.

Section 6-403.
Forestry Application Requirements

In addition to the information required by Section 4-102(B) [APPLICATION REQUIREMENTS] of this Plan, an application for any permit involving the harvesting of trees for commercial purposes or fish and wildlife management shall include the following:

1. A Forestry Management Plan, which details the management practices proposed to

be employed, including but not limited to harvesting practices, reforestation, and the following:

(a) location and size of tracts;

(b) type of ownership;

(c) map of the property showing wetlands, types of vegetation cover, receiving waters, location of stream crossings and alternatives, location of skid trails, location of access roads and landings, cutting boundaries and size of filter or buffer strips.

(d) property description including land use; acreage of open, crop, and woodland; general soil types and erodibility; range of percent of slope; timber quality and age (forest type, species, age, DBH, height, volume, and reproduction); and understory;

(e) description of timber to be harvested;

(f) description of regeneration plans; and

(g) description of intermediate management practices to be applied.

2. A letter of comment or no comment from the New Jersey Bureau of Forest Management on the Forestry Management Plan; and

3. A financial surety, guaranteeing performance of the requirements of Subsections 6-404(d) and (e) in the form of guaranty, letter of credit or other recognized form of financial surety.

Section 6-404.
Forestry Standards

Forestry shall be authorized throughout the Pinelands provided:

(a) That access to land proposed for harvesting:

(i) is direct;

(ii) follows previously established roads and trails to the maximum extent practical;

(iii) avoids wetland areas except as are absolutely necessary to harvest wetland species or to gain access to the harvesting site; and

(iv) avoids crossing streams with high and unstable banks and those with approaching slopes exceeding 10% where alternative crossings exist.

(b) That all activities during and after harvesting are carried out in a manner to avoid damage to stream banks and bottoms, erosion, and degradation of water quality, including the following:

(i) stream banks at crossings shall be stabilized during and after harvesting;

(ii) culverts and bridges shall be temporary in nature;

(iii) trees which serve to stabilize stream banks shall be retained; other trees shall be felled to avoid stream banks where practical and winched off such banks where felling occurs;

(iv) a 25-foot vegetated buffer along streams, ponds, lakes, and marshes shall be maintained;

(v) the use of active and intermittent stream channels for skidding of logs shall be prohibited;

(vi) skidding shall not occur within 25 feet of streams, ponds, lakes, and marshes except for necessary crossings;

(vii) accessways for forestry activities shall be located at least 100 feet from streams, ponds, lakes, and marshes where practical;

(viii) landings shall be located in well drained areas where practical, at least 200 feet from public roads where practical, and at least 200 feet from ponds, lakes, marshes;

(ix) filter strips shall be located between: harvested areas, landings, and skid trails; and streams, ponds, lakes, and marshes;

(x) water diversion devices shall be installed as necessary to control erosion.

(c) That only those trees which have been selected for harvesting are cut; that all trees are cut to the base; and all practical steps are taken to minimize damage to undesignated trees.

(d) That at the conclusion of any harvesting operation:

(i) all areas disturbed for access, processing, moving or loading trees shall be regraded to approximate natural slopes and that water diversion devices are installed as necessary in order to avoid erosion;

(ii) all accessways shall be closed and devices installed, such as poles, pilings or berms that will preclude use of the accessway;

(iii) bare ground areas shall be stabilized with vegetation where necessary;

(iv) all debris shall be removed from streams;

(v) all non-vegetative refuse shall be collected; and

(vi) all hanging trees shall be removed.

(e) That harvesting and reforestation activities shall ensure the regeneration of the harvested forest and;

(f) That harvesting and reforestation in Atlantic White Cedar and hardwood swamps is conducted in the following manner:

(i) Atlantic White Cedar will be clear-cut and slash will be managed to create site conditions favorable to regeneration of Atlantic White Cedar;

(ii) reforestation to ensure Atlantic White Cedar regeneration will involve control of competitive hardwood species;

(iii) existing streams shall be cutting boundaries where practical;

(iv) harvesting methods employed shall be those which minimize environmental damage including the use of winches, corduroy roads and helicopters; and

(v) harvesting will occur to the greatest extent practical during dry periods or when the ground is frozen.

(g) That proposed activity does not involve the draining or filling of wetlands.

PART 5—AGRICULTURE

Section 6-501.

Purpose

Agricultural activity is an important element of the Pinelands economy and plays a significant role in the conservation of the essential ecological character of the Pinelands. In particular, the dependency of berry agriculture on pristine water has contributed greatly to the ecological stability of the Pinelands. However, the long-term vitality of agricultural activities depends upon protection from competing land uses and continued use of agricultural practices that conserve the soil and water resources of the Pinelands.

Section 6-502.

Agricultural Management Program

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan and land use ordinance must contain a program to protect the integrity of agriculture in the Pinelands. It is not necessary that the municipal program incorporate the literal terms of this Part; rather, a municipality may adopt alternative and additional techniques which will achieve equivalent protection of agriculture as would be achieved under the provisions of this Part.

Section 6-503.

General Agricultural Standards

A. All agricultural activities and fish and wildlife management activities, including the preparation of land and the planting, nurturing and harvesting of crops, shall be carried out in accordance with recommended management practices established for the particular agricultural activity by the New Jersey Department of Agriculture, the Soil Con-

servation Service, and the New Jersey Agricultural Experimental Station at Rutgers University.

B. In Agricultural Production Areas and Special Agricultural Production Areas a Resource Conservation Plan shall be prepared by the operator of every agricultural use, or the appropriate Soil Conservation District, located in an area which has been designated by any agency of federal, state, or local government as having substandard surface or ground water. If prepared by the operator, such plan shall be submitted to the Soil Conservation District for review. The Resource Conservation Plan shall be reviewed, updated and revised as necessary and shall provide for the use of recommended management practices as found in, but not limited to, the following publications:

1. Erosion and runoff—Soil Conservation Service Technical Guide;
2. Animal waste—Soil Conservation Service Animal Waste Management Field Manual; and
3. Fertilizers and Pesticides—Rutgers University, Cook College, Cooperative Extension Service Annual Recommendations.

Section 6-504.

Exemption from Nuisance Ordinances ("Right-to-Farm")

As an element of its agricultural program each municipality shall exempt agricultural operations in any Agricultural Production or Special Agricultural Production Area from all municipal ordinances and regulations which inhibit efficient crop production, including but not limited to ordinances and regulations imposing time limits on operations, dust limits and odor restrictions, except those ordinances and regulations which are strictly necessary for the maintenance of public health.

PART 6—RESOURCE EXTRACTION

Section 6-601.

Purpose

Sand, gravel and other mineral resources are important Pinelands values that have been commercially utilized in the past. Such activity can provide a substantial economic benefit to landowners; however, it is critical that such activities do not conflict with other values of the Pinelands. This Part is intended to ensure that extraction activities do not adversely affect long-term ecological values in the Pinelands, and that abandoned extraction sites will be restored so that they will be a functional part of the Pinelands ecosystem.

Section 6-602.

Resource Extraction Management Program

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan and land use ordinance must contain a program to manage resource extraction operations. It is not necessary that the municipal program incorporate the literal terms of the program set out in this Part; rather, a municipality may adopt alternative and additional techniques which will achieve equivalent protection of the Pinelands as would be achieved under the provisions of this Part.

Section 6-603.

Existing Resource Extraction Operations

A. No new resource extraction operations shall be permitted in the Preservation Area District or Special Agricultural Production Areas. Resource extraction operations that were in operation on August 8, 1990 may be continued in any portion of the Preservation Area District or Special Agricultural Areas provided that:

1. The operation was authorized by a valid registration certificate issued by the New Jersey Department of Labor and Industry, under N.J.S.A. 34:6-96 4(h) prior to February 8, 1979; or

2. The operation was exempt from registration requirements of the New Jersey De-

partment of Labor and Industry and was authorized by and operating under a valid municipal permit prior to February 8, 1979; and

3. The area of extraction is limited to the value given under the category "acreage to be mined" on the mine registration application submitted to the Department of Labor and Industry, or the municipal permit in the case of an operation permitted under subsection 2 of this Section; and

4. The extraction activity meets the standards and requirements of Sections 6-606 and 6-607.

B. The owner or operator of existing resource extraction operations in the Preservation Area shall register with the Pinelands Commission on or before January 21, 1981. The owner or operator of existing resource extraction operations in the Protection Area shall register with the Pinelands Commission within 120 days of the effective date of this Plan. Such registration shall describe the area and extent of the operation's existing permit and shall include a copy of all outstanding permits. Existing operations in the Preservation Area shall obtain a development permit on or before February 20, 1981. All existing operations in the Protection Area shall file an application for development approval within 60 days of the applicable effective date of this Plan.

Section 6-604.

Time Limit on Resource Extraction Permits

No permit authorizing resource extraction shall be issued for any period exceeding two years. Nothing in this Section shall be construed to prohibit any person from securing additional permits provided that the requirements of Section 6-603 [EXISTING RESOURCE EXTRACTION OPERATIONS] are met.

Section 6-605.

Application Requirements for Resource Extraction

All applications for development involving resource extraction shall include, in addition

to the information required by Section 4-102(B) [APPLICATION REQUIREMENTS], the following information:

1. A topographic map at a scale of 1 inch equals 400 feet, showing the proposed dimensions, location and operations on the subject property;

2. A U.S.G.S. quadrangle map showing the dimensions of the property and an area of at least 1000 feet beyond such boundary in all directions;

3. The location, size and intended use of all buildings;

4. The location of all points of ingress and egress;

5. The location of all streams, wetlands and significant vegetation, forest associations and wildlife habitats;

6. The location of all existing and proposed streets and rights-of-way, including railroad rights-of-way, excluding those included within the area to be mined;

7. A soils map;

8. A reclamation plan which includes:

(a) method of stockpiling topsoil and overburden;

(b) proposed grading and final elevations;

(c) topsoil material application and preparation;

(d) type, quantity and age of vegetation to be used;

(e) fertilizer application including method and rates;

(f) planting method and schedules; and

(g) maintenance requirements schedule.

Section 6-606.

Resource Extraction Standards

Resource extraction operations shall be approved only if the applicant can demonstrate that the proposed resource extraction operation:

1. Is designed so that no area of excavation, sedimentation pond, storage area equipment or machinery or other structure or facility is closer than:

(a) 200 feet to any property line;

(b) 500 feet to any residential or non-resource extraction related commercial use which is in existence on the date the permit is issued;

2. Is to be located on a parcel of land of at least 20 acres;

3. Provides that all topsoil that is necessary for restoration will be stored on the site and will be protected from wind or water erosion;

4. Is fenced or blocked so as to prevent unauthorized entry into the resource extraction operation through access roads;

5. Provides ingress and egress to the resource extraction operation from public roads by way of gravel or porous paved roadways;

6. Is designed so that surface runoff will be maintained on the parcel in a manner that will provide for on-site recharge to ground water;

7. Will not involve excavation below the seasonal high water table, unless the excavation will serve as a recreational or wildlife resource or a water reservoir for public, agricultural or industrial uses or for any other use authorized in the area in which the site is located; provided that in no case shall excavation have a depth exceeding 65 feet below the natural surface of the ground existing prior to excavation unless it can be demonstrated that a depth greater than 65 feet will result in no significant adverse impact relative to the proposed final use or on off-site areas;

8. Will be carried out in accordance with an extraction schedule which depicts the anticipated sequence, as well as anticipated length of time that each portion of the parcel proposed for extraction will be worked;

9. Will involve restoration of disturbed areas at the completion of the resource extraction operation in accordance with the requirements of Section 6-607 [RESTORATION STANDARDS], of this Part, and the implementation of the restoration plan is secured by a letter of credit, surety bond or other guarantee of performance; and

10. Will not involve clearing adjacent to

ponds in excess of 20 acres or an area necessary to complete scheduled operations; or will not involve unreclaimed clearing exceeding 150 acres for surface excavation at any time.

Section 6-607.

Restoration Standards

All parcels of land which are used for resource extraction operations shall be restored as follows:

1. Restoration shall be a continuous process, and each portion of the parcel shall be restored within two years after resource extraction is completed for that portion;

2. Restoration shall proceed in the same sequence and time frame set out in the extraction schedule required in Section 6-606(8);

3. All restored areas shall be graded so as to conform to the natural contours of the parcel; the slope of surface of restored surfaces shall not exceed one foot vertical to three feet horizontal except as provided in Subsection 6 of this Section;

4. Topsoil shall be restored in approximately the same quality and quantity as existed at the time the resource extraction operation was initiated;

5. Drainage flows, including direction and

volume, shall be restored to the maximum extent practical to those flows existing at the time the resource extraction operation was initiated;

6. Any body of water created by the resource extraction operation shall have a graded shoreline with a slope not to exceed one foot vertical to five feet horizontal;

7. All equipment, machinery and structures, except for structures that are useable for recreational purposes or any other use authorized in the area, shall be removed within six (6) months after the resource extraction operation is terminated and restoration is completed; and

8. Reclamation shall to the maximum extent practical result in the reestablishment of the vegetation association which existed prior to the extraction activity and shall include:

(a) the planting of a minimum of 1000 one-year-old pitch pine seedlings per acre;

(b) stabilization of exposed areas by establishing ground cover vegetation;

(c) cluster planting of characteristic Pinelands oak species, such as blackjack oak, bear oak, chestnut oak and black oak, and shrubs such as black huckleberry, sheep laurel and mountain laurel, at a spacing sufficient to ensure establishment of these species.

PART 7—WASTE MANAGEMENT

Section 6-701.

Purpose

The disposal of solid and liquid waste by application to land in the Pinelands represents a substantial threat to surface and ground water quality. It is the purpose of this Part to provide standards to protect the Pinelands from degradation resulting from waste disposal activities.

Section 6-702.

Waste Management Program

In order to be certified under the pro-

visions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal or county master plan and land use ordinances must contain a program for waste management. It is not necessary that the municipal or county program incorporate the literal terms of the program set out in this Part; rather, a municipality or county may adopt alternative or additional management techniques which will achieve the protection of the Pinelands equivalent to that which would be achieved under the provisions of this Part.

Section 6-703.

Landfills Prohibited

Except as otherwise provided in this Part, no person shall operate any landfill within the Pinelands.

Section 6-704.

Existing Landfills

Landfill operations that were in lawful use on August 8, 1980 may be continued provided that:

1. No landfill shall be operated within the Preservation Area;

2. Landfills in Regional Growth Areas, Pinelands Towns and Villages, or Rural Development Areas are terminated on August 8, 1990;

3. Landfills in Agricultural Production Areas or Forest Areas are terminated on August 8, 1990, or when the new waste disposed of equals twenty-five percent of the authorized disposal capacity on August 8, 1980, whichever occurs first;

4. There are no practical, alternative disposal sites available outside of the Pinelands;

5. All waste accepted from outside the Pinelands is from counties with at least fifty percent of their land area within the Pinelands;

6. The operation of the landfill will meet the requirements of the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq. and all adopted and certified district waste management plans;

7. All areas filled to final design elevations shall be capped with an impervious material within one year. Prior to the establishment and filling of new areas, all existing areas shall be filled to final elevation and capped with an impervious material. The type and nature of capping shall be in accordance with the standards of the New Jersey Solid Waste Administration; and

8. Expansion of any existing landfill operation shall only occur if:

(a) no feasible alternative disposal techniques are available;

(b) the expansion does not involve the disposal of waste within 2500 feet of an existing residential use;

(c) the expansion area is lined and includes a leachate collection and treatment system and a methane collection and disposal system; and either

(d) the expansion will occur only on lands containing adequate clay aquicludes as determined by the Commission in consultation with the New Jersey Solid Waste Administration; or

(e) when there are no lands containing adequate clay aquicludes, all measures necessary to prevent the degradation of ground water shall be reviewed and analyzed. Those measures determined to be most effective to prevent the degradation of ground water shall be implemented.

Section 6-705.

New Landfills

Landfills not existing on August 8, 1980 shall be permitted in the Protection Area only if a solid waste management district demonstrates to the Commission that a new landfill is significantly preferable from an environmental perspective to continuation of an existing landfill, that there are no practical alternative disposal techniques available, as demonstrated in a certified solid waste management plan, that there are no feasible alternative land sites available, that all waste to be accepted is from counties with at least 50% of their land area within the Pinelands, and that the new landfill shall be operated in accordance with Sections 6-704(6)-(8). New landfills established under this Section may be continued only until August 8, 1990.

Section 6-706.

Categories of Wastes Prohibited

No hazardous, toxic, chemical, petroleum (including oil spill pollutants), or nuclear waste shall be accepted for disposal or disposed of at any site within the Pinelands. No septic waste or liquid sludge shall be accepted for disposal or disposed of at any landfill site within the Pinelands except in accordance with state and federal regulations; provided, however, that nothing in this Part shall be construed to prohibit the surface application of liquid sludge and sewage as a part of an agricultural program.

Section 6-707.

Compliance with County, State and Federal Requirements

No provision of this Plan shall be construed as authorizing any landfill operation

in violation of any local, state or federal regulation or plan governing the disposal of waste material, including the Resource Conservation and Recovery Act, 42 U.S.C. §6901 et seq., and associated implementing rules and regulations.

PART 8—WATER QUALITY

Section 6-801.

Purpose

An essential element of the overall ecological value of the Pinelands environment is its extensive surface and ground water resources of exceptional quality. The Pinelands Protection Act provides that the Plan protect and maintain the quality of surface and ground water through the control of development and land use, and close cooperation and coordination with local, state and federal agencies of government. This management program is intended to protect and preserve surface and ground waters of the Pinelands and to ensure that random and uncontrolled growth and development will not degrade the Pinelands environment.

Plan, or under a certified county or municipal master plan or land use ordinance, shall be designed and carried out so that the quality of surface and ground water will be protected and maintained.

B. Except as specifically authorized in this part, no development shall be permitted which degrades surface and ground water quality.

C. No development shall be permitted which does not meet the minimum water quality and potable water standards of the State of New Jersey or the United States.

Section 6-802.

Water Quality Management Program Required

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan and land use ordinance must provide for the protection of surface and ground water quality in the Pinelands. It is not necessary that the municipal program incorporate the literal terms of the program set out in this Part; rather, a municipality may adopt alternative and additional techniques which will achieve the equivalent protection of surface and ground water quality as would be achieved under the provisions of this Part.

Section 6-804.

Minimum Standards for Point and Non-Point Source Discharges

The following point and non-point sources may be permitted in the Pinelands:

A. Commercial, industrial and waste water treatment facilities, provided that:

1. There will be no direct discharge into any surface body;

2. All discharges from the facility are of a quality and quantity such that ground water exiting from the parcel of land or entering a surface body of water will not exceed 2 parts per million nitrate/nitrogen;

3. All public waste water treatment facilities are designed to accept and treat septage; and

4. All storage facilities, including ponds or lagoons, are lined to prevent leakage into ground water.

B. On-site conventional septic waste water treatment systems, provided that:

1. The location of the system and its discharge point, and the size of the parcel on which the system is located, will ensure that ground water exiting from the parcel or en-

Section 6-803.

Minimum Standards Necessary to Protect and Preserve Water Quality

A. All development permitted under this

tering a surface body of water will not exceed 2 parts per million nitrate/nitrogen;

2. The depth to seasonal high water table is at least five feet;

3. Any potable water well will be drilled and cased to a depth of at least 100 feet, unless the well penetrates an impermeable clay aquiclude, in which case the well shall be cased to at least 50 feet; and

4. The system will be maintained and inspected in accordance with the requirements of Section 6-805 [INDIVIDUAL WASTEWATER TREATMENT FACILITY AND PETROLEUM TANK MAINTENANCE] of this Part.

C. On-site alternative and innovative technology wastewater disposal systems, provided that:

1. The parcel on which the system is to be located is located in a Pineland Village or Town or Regional Growth Area or is exempted from the density limitations of this Plan pursuant to Part 5 of Article 4;

2. The location of the system and its discharge point and the size of the parcel on which the system is located will ensure that ground water exiting from the parcel or entering a surface body of water will not exceed 2 parts per million nitrate/nitrogen;

3. The depth to seasonal high water table is at least five feet;

4. Any potable water well will be drilled and cased to a depth of at least 100 feet, unless the well penetrates an impermeable clay aquiclude in which case the well shall be cased to at least 50 feet; and

5. The alternative or innovative wastewater technology has been approved for use by the New Jersey Department of Environmental Protection;

6. The alternative or innovative system will be inspected and maintained in accordance with the requirements of Section 6-805 of this Part; and

7. Any effluent discharged from innovative and alternative technology facilities will be monitored at six-month intervals for a period of at least three years, and the results of each sampling period are provided to local boards of health and the Pinelands Commission.

D. Surface water run-off, provided that:

1. The volume and rate of runoff generated from the parcel by a fifty (50) year storm of a 24-hour duration as calculated in accordance with the United States Soil Conservation Service Technical Release No. 55 or the S.C.S. National Engineering Handbook §4 will not increase as a result of any development of the parcel;

2. Surface water runoff from impervious surfaces will be retained to facilitate infiltration into the ground water; and

3. Runoff shall not be recharged where depth to water table is more than 20 feet below the surface, wherever practical; and

4. Excessively and somewhat excessively drained soils, as defined by the Soil Conservation Service, should be avoided for recharge of runoff wherever practical.

Section 6-805. Individual Wastewater Treatment Facility and Petroleum Tank Maintenance

A. The owner of every on-site conventional septic wastewater treatment facility in the Pinelands shall, as soon as a suitable septage disposal facility capacity is available, in accordance with the provisions of Chapter 326 of the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq. and Section 201 of the Clean Water Act:

1. Have the facility inspected by a qualified technician at least once every three years;

2. Have the facility cleaned at least once every three years; and

3. Once every three years submit to the municipality in which the facility is located a sworn statement that the facility has been inspected and cleaned, setting forth the name of the person who performed the inspection and cleaning and the date of such inspection.

B. The owner of every alternative technology on-site disposal facility shall have the facility inspected every three years and shall submit to the municipality in which the facility is located a sworn statement that the alternative system is in full and complete operation.

C. The owner of every commercial petrole-

um storage tank shall have the tank pressure tested at installation and every five years thereafter and shall submit a sworn statement to the municipality in which the tank is located that the tank is water-tight.

Section 6-806.
Water Management

A. Interbasin transfer of water between watersheds in the Pinelands should be avoided to the maximum extent practical. In areas served by central sewers, water-saving devices such as water-saving toilets, showers and sink faucets shall be installed in all new development.

B. Water shall not be exported from Pinelands counties except by natural surface and ground water flows.

Section 6-807.
Prohibited Chemicals and Materials

A. Use of the following substances is pro-

hibited in the Pinelands to the extent that such use will result in direct or indirect introduction of such substances to any surface, or ground or surface water or any land:

1. Septic tank cleaners; and
2. Waste oil

B. All storage facilities for deicing chemicals shall be lined to prevent leaking into the soil, and shall be covered with an impermeable surface which shields the facility from precipitation.

C. No person shall apply any herbicide to any road or public utility right-of-way within the Pinelands unless necessary to protect an adjacent agricultural activity.

D. No hazardous, toxic, chemical, petroleum (including oil spill pollutants), septic or nuclear waste or liquid sludge shall be discharged or disposed of on any land in the Pinelands, except as part of a land application of liquid sludge for agricultural purposes.

PART 9—AIR QUALITY

Section 6-901.
Purpose

Air quality in the Pinelands is important to the character and ecology of the Pinelands. It is the purpose of this Part to ensure that the quality of the air in the Pinelands region is protected and enhanced.

Section 6-902.
Pinelands Air Quality Review

In order to obtain certification under the provisions of Article 3 of this plan [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS], the master plan and land use ordinances must ensure that any application for major development in the Pinelands where the proposed development will generate substantial vehicular traffic or space heating emissions, including development involving 100 or more dwelling units or more than 300 parking spaces, shall include, in

addition to the information required by Section 4-102(B) [APPLICATION REQUIREMENTS], the following information relative to the impact of the proposed development on air quality:

1. A summary of ambient air quality in the vicinity of the facility expressed in terms of levels of sulfur dioxide, particulates, and carbon monoxide concentrations compared with all applicable ambient air quality standards. This data may be obtained from on-site monitoring or, upon approval of the New Jersey Department of Environmental Protection, Division of Environmental Quality, from the nearest New Jersey state monitoring site.

2. An analysis of the use of all existing and proposed access roads, including:

(a) Current traffic volume, in vehicles per hour, for peak hours, peak eight-hour periods and for an average day; and

(b) Traffic capacity in vehicles per

hour calculated pursuant to the procedures set out in the Highway Capacity Manual 1965, Highway Research Board Special Report 87 and NAS-NRC Publication 1328.

3. An estimate of traffic volumes to be generated by the proposed development in vehicles per hour for peak hours and peak eight-hour periods at the time of completion of construction and 10 years after completion.

4. A description of parking facilities including:

- (a) locations;
- (b) number of parking spaces;
- (c) number of parking levels; and
- (d) whether the parking area is to be open or covered.

5. An analysis of emissions from space heating, including:

(a) type and amount of fuel used and pollution emission factors used to calculate emissions; and

(b) the emission rates of sulfur dioxide, particulates, carbon monoxide, hydrocarbons and oxides of nitrogen in tons per day averaged over the five-month heating season.

6. An analysis of motor vehicle emissions to be generated by the proposed development and, where appropriate, by growth induced by the proposed development based on annual average daily traffic and space heating emissions expressed as tons per day of carbon monoxide, hydrocarbons, nitrogen oxide, sulfur dioxide and particulates. The latest data available from the United States Environmental Protection Agency's publication AP-42, "Compilation of Air Pollution Emission Factors," is to be used to calculate emissions if more definitive information is not available.

7. An analysis of the effect of carbon monoxide emissions on air quality including anticipated carbon monoxide concentrations compared with ambient air quality standards and with concentrations in the absence of the proposed development at:

- (a) places of maximum concentration;
- (b) critical locations including monitoring sites and sensitive receptors such as hospitals, schools, nursing homes, residences and playgrounds.

This analysis should be prepared pursuant to the procedures established in the United States Environmental Protection Agency's publication "Guidelines for Air Quality Maintenance, Planning, and Analysis, Volume 9: Evaluating Indirect Sources." Publication No. EPA-450/4-750-001 OAQPS No. 1.2-028 or equivalent procedure.

8. An analysis of the availability of public transportation and, for housing projects, the accessibility, including distance, safety, and convenience of route, by automobile and by other modes of transportation of the following facilities:

- (a) medical (including professional offices and hospitals);
- (b) recreational;
- (c) educational;
- (d) commercial (including personal shopping); and
- (e) places of employment.

9. A description of measures taken in planning the proposed development which are intended to reduce vehicle miles travelled, including but not limited to those measures described in the United States Environmental Protection Agency's publication "Guidelines for Air Quality Maintenance, Planning and Analysis, Volume 3: Control Strategies" (Chapter II, Section E), Publication No. EPA-450/4-74-003 (OAQPS No. 1.2-002), and in Section 108(f)(1)(A) of the Clean Air Act Amendment of 1977, 42 U.S.C. §7410.

10. A description of measures taken in planning the proposed development which are intended to reduce emissions during construction and minimize dust emissions from the completed development in accordance with the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. Applicable standards for dust control are available in the New Jersey Department of Agriculture publication "Standards for Soil Erosion and Sediment Control in New Jersey."

11. Information evidencing compliance with the provisions of the New Jersey Administrative Code, Title 7, Chapter 27, (New Jersey air pollution control regulations) and 45 F.R. 52676-52748 (August 7, 1980), (EPA Regulations for Prevention of Significant Deterioration).

PART 10—SCENIC

Section 6-1001.

Purpose

The Pinelands is a complex of environmental values that presents a definable visual character to residents and visitors. This character contributes substantially to the attractiveness of the area and therefore is an important element of the area's economy. This Part is intended to ensure that development will take advantage of and enhance the visual character of the Pinelands.

Section 6-1002.

Scenic Management Program

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan or land use ordinance must provide a program for the protection of the scenic values of the Pinelands. It is not necessary that the municipal program incorporate the literal terms of the program set out in this Part; rather, a municipality may adopt alternative and additional techniques which will achieve equivalent protection of scenic values which would be achieved under the provisions of this Part.

Section 6-1003.

Scenic Corridors

A. All public, paved roads in the Preservation Area District, the Rural Development and Forest Areas shall be considered scenic corridors.

B. All navigable streams and all lakes and ponds in the Preservation Area District, the Rural Development and Forest Areas shall be considered scenic corridors; those rivers designated in Section 6-1004(D) shall be considered as special scenic corridors in any part of the Pinelands.

Section 6-1004.

Special Requirements for Scenic Corridors

A. Except as provided in this Section, no permit shall be issued for development other than for agricultural product sales estab-

lishments unless the applicant demonstrates that all buildings are set back at least 200 feet from the center line of the scenic corridor.

B. If compliance with the 200-foot setback is constrained by environmental or other physical considerations, such as wetland, or active agricultural operation, the building shall be set back as close to 200 feet as practical and the site shall be landscaped in accordance with the provisions of Part 2 of this Article [VEGETATION] so as to provide screening from the corridor.

C. If an applicant for development approval demonstrates that existing development patterns of the corridor are such that buildings are set back less than 200 feet within 1000 feet of the site proposed for development, then a setback shall be set for the proposed development which is consistent with the established development pattern, provided that the site is landscaped in accordance with the provisions of Part 2 of this Article [VEGETATION] so as to provide screening between the building and the corridor.

D. The following rivers are hereby designated to be wild and scenic rivers and scenic corridors of special significance to the Pinelands. All structures within 1000 feet of the center line of these rivers shall be designed to avoid visual impacts as viewed from the river:

Great Egg Harbor River—Great Egg Bay (Garden State Parkway) to Route 536.

Tuckahoe River—Great Egg Bay to the Route 552 crossing in Milmay.

Middle River—Great Egg Bay to Schoolhouse Lane crossing north of Corbin City.

Mullica River—Garden State Parkway to Medford Road crossing at the Medford, Waterford, and Shamong Township boundaries.

Wading River—Confluence with the Mullica River to Route 563 crossing at Speedwell.

Oswego River—Confluence with the Wading River to Sim Place reservoir dam.

Batsto River—Confluence with Mullica

River to Carranza Memorial Road crossing at Shamong and Tabernacle Township boundaries.

Bass River—Confluence with the Mullica River to Stage Road crossing in Bass River State Forest.

Nescochague Creek—Confluence with the Mullica River to confluence with Great Swamp Branch and Albertson Branch.

Great Swamp Branch—Confluence with Nescochague Creek to Route 206 bridge in Hammonton.

Rancocas Creek—Route 530 crossing in Browns Mills to the Pinelands boundary.

Cedar Creek—Route 9 crossing to the dam at Bamber Lake.

West Creek—Confluence with Delaware Bay to Pickle Factory Pond above Route 550.

Dennis Creek—Confluence with Delaware Bay to the headwaters of the mainstem in the Great Cedar Swamp west of Route 9.

North Branch of the Forked River—Garden State Parkway to the confluence with Cave Cabin Branch east of Howardsville.

Toms River—From the Central Railroad of New Jersey bridge to the Route 528 crossing east of Cassville.

Maurice River—Delaware Bay to Manumuskin River.

Manumuskin River—Confluence with the Maurice River to the Route 49 crossing near Cumberland Road.

Mount Misery Branch—Route 70 crossing to the Greenwood Branch continuing to the North Branch of the Rancocas Creek.

Section 6-1005.

Signs

Each municipality shall adopt provisions governing signs in its municipal master plan and ordinances. Section 6-1006 (MANDATORY SIGN PROVISIONS) contains provisions which must be included in all municipalities; Section 6-1007 contains mandatory

provisions for municipalities in the Preservation Area District and Special Agricultural Production Areas; and Section 6-1008 contains suggested guidelines for additional sign provisions for other areas of the Pinelands.

Section 6-1006.

Mandatory Sign Provisions

A. No sign, other than warning or safety signs, which is designed or intended to attract attention by sudden, intermittent or rhythmic movement, or physical or lighting change, shall be permitted in any area.

B. No sign, other than warning or safety signs, which changes physical position by any movement or rotation or which gives the visual impression of such movement or rotation shall be permitted in any area.

C. No outdoor off-site commercial advertising sign, other than signs advertising agricultural roadside stands, shall be permitted in the Pinelands.

D. No existing sign which does not conform to Subsections A, B, and C hereof shall be permitted to continue beyond ten years after the effective date of this Plan.

E. To the maximum extent practical, the character and composition of construction materials for all signs shall be harmonious with the scenic values of the Pinelands.

Section 6-1007.

Mandatory Sign Provisions in the Preservation Area District and Special Agricultural Production Areas

A. No sign shall be constructed, repaired or maintained except in accordance with the provisions of Section 6-1006 and this Section.

B. The following signs are permitted in the Preservation Area District and the Special Agricultural Production Areas:

1. Official public safety and information signs displaying road names, numbers and safety directions;

2. On-site signs advertising the sale or rental of the premises, provided that:

(a) the area on one side of any such sign shall not exceed twelve square feet;

(b) no more than one sign is located on any parcel of land held in common ownership.

3. On-site identification signs for schools, churches, hospitals, or similar public service institutions, provided that:

(a) the size of any such sign shall not exceed twelve square feet;

(b) no more than one sign is placed on any single property.

4. Trespassing signs or signs indicating the private nature of a road, driveway, or premises, and signs prohibiting or otherwise controlling fishing or hunting, provided that the size of such signs does not exceed twelve square feet;

5. On-site professional, home occupation, or name signs indicating the profession and/or activity and/or name of the occupant of the dwelling, provided that:

(a) the size of any such sign shall not exceed twelve square feet;

(b) no more than one sign is permitted for any individual parcel of land.

6. On-site business or advertising signs, provided that:

(a) no more than two signs are located on any one premise or on the premises leased or utilized by any one business establishment;

(b) the total area of such signs shall not exceed twenty square feet per side, with the maximum height to the top of the sign not to exceed fifteen feet from ground level.

7. Temporary signs advertising political parties or candidates for election, provided that the size of any such sign does not exceed four square feet.

8. Temporary on- and off-site signs advertising civil, social or political gatherings and activities, provided that the size of such signs does not exceed four square feet.

Section 6-1008.

Guidelines for Sign Provisions Outside the Preservation Area District and Special Agricultural Production Areas

The following guidelines may be used in formulating municipal sign ordinances:

1. Official public safety and information signs displaying road names, numbers and safety directions may be permitted;

2. On-site signs advertising the sale or rental of the premises may be permitted, provided that:

(a) the area on one side of any such sign does not exceed twelve square feet;

(b) no more than one sign is located on any parcel of land held in common ownership.

3. On-site identification signs for schools, churches, hospitals, or similar public service institutions may be permitted; provided that:

(a) the size of any such sign does not exceed twelve square feet;

(b) no more than one sign is placed on any single property.

4. Temporary signs advertising political parties or candidates for election may be permitted, provided that the size of any such sign does not exceed twelve square feet;

5. Temporary on- and off-site signs advertising civil, social or political gatherings and activities may be permitted, provided that the size of such signs does not exceed twelve square feet;

6. Trespassing signs or signs indicating the private nature of a road, driveway, or premise, and signs prohibiting or otherwise controlling fishing or hunting may be permitted, provided that the size of such signs does not exceed twelve square feet;

7. On-site professional, home occupation, or name signs indicating the profession and/or activity and/or name of the occupant of the dwelling may be permitted, provided that:

(a) the size of such sign does not exceed four square feet;

(b) no more than one sign is permitted for any individual parcel of land.

8. On-site business or advertising signs may be permitted provided that:

(a) no more than two signs are located on any one premise or on the premises leased or utilized by any one business establishment;

(b) the total area of such signs does not exceed twenty square feet per side with the maximum height to the top of the sign not to exceed fifteen feet from ground level.

Section 6-1009.

Motor Vehicle Screening and Storage

In order to obtain certification, municipalities shall adopt local ordinances which provide that no more than ten automobiles, trucks or other motor vehicles, whether or not they are in operating condition, shall be stored on any lot unless such motor vehicles are adequately screened from adjacent residential uses and scenic corridors. All vehicles not in operating condition shall be stored only if the gasoline tanks of such vehicles are drained. This section shall not apply to vehicles which are in operating condition and which are maintained for agricultural purposes.

Section 6-1010.

Location of Utilities

- A. New utility distribution lines and telephone lines to locations not presently served by utilities shall be placed underground, except for those lines which are located on or adjacent to active agricultural operations.
- B. All electric utility transmission lines shall be located on existing towers or underground to the maximum extent practical.
- C. Above-ground generating facilities, switching complexes, pumping stations, storage tanks and substations shall be screened with vegetation from adjacent uses in accordance with Part 2 of Article 6 [VEGETATION].

PART 11—FIRE MANAGEMENT

Section 6-1101.

Purpose

Forest vegetation represents a significant wildfire threat to structures developed within the Pinelands. Therefore all development in the Pinelands shall conform to the requirements of this Part in order to protect life and property from catastrophic forest fires and to ensure the maintenance of the Pinelands forest ecosystems.

Section 6-1102.

Fire Management Program

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan or land use ordinance must provide a fire management program. It is not necessary that the municipal program incorporate the literal terms of the program set out in this Part; rather, a municipality may adopt alternative and additional techniques which will achieve the equivalent management objectives as would be achieved under the provisions of this Part.

Section 6-1103.

Fire Hazard Classification

The following vegetation classifications

shall be used in determining the fire hazard of a parcel of land:

Fire Hazard Classification	
Hazard	Vegetation Type
Low	Atlantic white cedar. Hardwood swamps.
Moderate	Pine-oak or oak-pine greater than 20' tall and less than 20' spacing. Non-Pine Barrens forest Prescribed burned areas.
High	Pine-oak or oak-pine less than 20' tall and greater than 20' spacing.
Extreme	Immature pine-oak or oak-pine, including those less than 20' tall and less than 20' spacing. Pitch pine lowlands (all size classes).

Section 6-1103.

Fire Hazard Mitigation Standards

No application for development approval shall be granted in moderate, high and extreme fire hazard areas unless the applicant demonstrates that:

A. All proposed developments, or units or sections thereof, of 25 dwelling units or more will have two accessways of a width and surface composition sufficient to accommodate and support fire fighting equipment;

B. All dead-end roads will terminate in an area adequate to provide ingress and egress for fire fighting equipment;

C. The rights-of-way of all roads will be maintained so that they provide an effective fire break;

D. A fire hazard fuel break is provided around structures proposed for human use by the selective removal or thinning of trees, bushes, shrubs and ground cover as follows:

1. In moderate fire hazard areas a fuel break of 30 feet measured outward from the structure in which:

(a) shrubs, understory trees and bushes and ground cover are to be selectively removed, mowed, or pruned on an annual basis; and

(b) all dead plant material is removed.

2. In high fire hazard areas a fuel break of 75 feet measured outward from the structure in which:

(a) shrubs, understory trees and bushes and ground cover are to be selectively removed, mowed or pruned and maintained on an annual basis;

(b) all dead plant material is removed.

3. In extreme high hazard areas a fuel break of 100 feet measured outward from the structure in which:

(a) shrubs, understory trees and bushes and ground cover are to be selectively removed, mowed or pruned and maintained on an annual basis;

(b) no pine tree (*Pinus* spp.) is closer than 25 feet to another tree; and

(c) all dead plant material is removed.

E. All residential development of 100 dwelling units or more in high or extreme high hazard areas will have a 200-foot perimeter fuel break between all structures and the forest in which:

(a) shrubs, understory trees and bushes and ground cover are selectively removed, mowed or pruned and maintained on an annual basis;

(b) all dead plant material is removed;

(c) roads, rights-of-way, wetlands and waste disposal sites shall be used as fire breaks to the maximum extent practical; and

(d) there is a specific program for maintenance.

F. All structures will meet the following specifications;

1. Roofs and exteriors will be constructed of fire resistant materials such as asphalt rag felt roofing, tile, slate, asbestos cement shingles, sheet iron, aluminum, brick, or fire retardant-treated wood shingles or shakes.

2. All projections such as balconies, decks, and roof gables shall be constructed of fire resistant materials or materials treated with fire retardant chemicals.

3. Any openings in the roof, attic, and the floor shall be screened.

4. Chimneys and stovepipes which are designed to burn solid or liquid fuels shall be equipped with screens over the outlets.

5. Flat roofs are prohibited in areas where vegetation is higher than the roof.

PART 12—HOUSING

Section 6-1201.

Purpose

In order to ensure that low, moderate and middle income households will have adequate and reasonable housing opportunities under the Comprehensive Management Plan, it is necessary that master plans and land use ordinances of municipalities with land in the

Regional Growth Areas include a housing program that implements the minimum standards of this Part. There are a variety of methods by which a municipal housing program can implement the minimum standards of this Part. The primary consideration of the Commission will be whether the program is economically feasible and likely to result in the availability of housing opportunities for

low, moderate and middle income households. It is not necessary that a municipality incorporate the literal terms of this Part, provided that the municipal master plan and land use ordinances ensure the equivalent provision of housing opportunities as would be achieved under the provisions of this Part.

Section 6-1202.

Minimum Standards

In order to be certified under the provisions of Article 3 of this Plan (CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS), a municipal master plan or land use ordinance must include a housing program that:

A. Ensures that at least 10% of all available housing units in the portion of the municipality which is located in a Regional Growth Area will be affordable to low income households;

B. Ensures that in addition to the housing units which are affordable to low income households, at least 10% of all available housing units in that portion of the municipality which is located in a Regional Growth Area will be affordable to moderate income households;

C. Ensures that in addition to the housing units which are affordable to low and moderate income households, at least 5% of all available housing units in the portion of the municipality which is located in a Regional Growth Area will be affordable to middle income households;

D. Ensures that minimum floor area requirements are not applicable to dwelling units which meet the minimum standards of Subsection A, B and C of this Section;

E. Ensures that dwelling units that meet the minimum standards of Subsections A, B and C of this Section are compatible with surrounding land uses;

F. Ensures that the dwelling units required by Subsections A, B and C of this Section are available at approximately the same rate as is non-required housing;

G. Includes provisions that will ensure that the dwellings, required in Subsections A, B and C of this Section will continue to be

available to low, moderate and middle income households.

Section 6-1203.

Minimum Housing Standards in Uncertified Municipalities

In municipalities that have not received certification of their master plans and land use ordinances, all development shall meet the following minimum standards:

A. In developments involving 25 to 99 dwelling units, at least 25% of the dwelling units proposed for development shall be affordable to low, moderate and middle income households, provided that at least 4/5th's of the required low, moderate and middle income housing units are affordable to low and moderate income households.

B. In developments of 100 or more dwelling units, 25% of the dwelling units shall be affordable to low, moderate and middle income households as follows:

1. At least 10% of the dwelling units shall be affordable to low income households; provided, however, if a developer can demonstrate that low income housing units cannot be provided because of the inavailability of subsidy funds, the applicant may satisfy the low income housing requirement of this Subsection by dedication of land suitable for development of an equivalent number of low income housing units or by a payment in lieu thereof to a qualified public housing agency;

2. At least 10% of the dwelling units shall be affordable to moderate income households; and

3. At least 5% of the dwelling units shall be affordable to middle income households.

C. All required low, moderate and middle income housing units shall be compatible with the non-required housing units and uses in the vicinity of the proposed development.

D. Required low, moderate and middle income housing units shall be constructed at the same rate as non-required housing.

E. Deed restrictions or other legally enforceable provisions ensuring the availability of required housing for low, moderate and middle income households shall be provided for a period of at least thirty (30) years from the date of initial occupancy.

PART 13—RECREATION

Section 6-1301.

Purpose

The Pinelands are an important recreational resource. It is the purpose of this Part to protect those natural resources necessary for compatible recreational uses, promote diverse recreational opportunities in a manner that minimizes land use conflicts, promote the location of low intensity recreational uses in undeveloped areas, and promote intensive recreational uses in developed areas.

Section 6-1302.

Recreational Management Plan

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan and land use ordinance must contain a program to protect and enhance recreational resources. It is not necessary that the municipal program be precisely the program set out in this Part; rather, a municipality may adopt alternative and additional techniques to protect recreational resources. In reviewing the municipal plan, the Commission shall consider the extent to which the plan and ordinances implement the standards and objectives of this Part.

Section 6-1303.

General Requirements

All recreational facilities in the Pinelands shall comply with the following requirements:

A. No power vessel in excess of 10 horsepower shall operate on state waters within the Pinelands Area except on:

1. That portion of the Mullica River downstream from Burlington County Route 542; and
2. That portion of the Wading River downstream from its confluence with the Oswego River.

B. No motor vehicle other than fire, police or emergency vehicles or those vehicles used for the administration or maintenance of any

public land shall be operated upon publicly owned land within the Pinelands. Other motor vehicles may operate on public lands for recreational purposes on public highways and areas on land designated prior to August 8, 1980 for such use by state and local governmental entities until designated as inappropriate for such use under Subsection C hereof.

C. The Commission shall from time to time designate areas which are inappropriate for use of motor vehicles. Such designation shall be based upon the following considerations and upon consultation with the New Jersey Department of Environmental Protection and other interested persons:

1. A need to protect a scientific study area;
2. A need to protect the location of threatened or endangered plant or animal species;
3. A need to provide a wilderness recreational area;
4. A need to prevent conflicts with adjoining intensively used recreational areas;
5. A need to protect historic or archaeological sites;
6. A need to protect critical wildlife habitats;
7. A need to address a situation of public health and safety;
8. A need to protect extensively disturbed areas from further impact; and
9. The extent to which such road closure would substantially impair recreation access to and uses of surrounding resources.

D. Route maps for organized off-road vehicle events shall be filed with and approved by the Executive Director.

E. All electrically powered equipment or machinery shall have battery boxes encased in containers to avoid accidental chemical spillage.

F. All recreation areas and facilities shall be designed in accordance with the New Jersey Department of Environmental Protection publication "Administration Guidelines: Barrier-Free Design Standards for Parks and Recreational Facilities."

G. Improved bicycling facilities are provided only in conjunction with paved roads within the Preservation Area District and Forest Area.

**Section 6-1304.
Guidelines for Recreational Land
and Facilities**

In preparing the recreational program element of its master plan and ordinances, each municipality may consider the following requirements:

A. Lawn areas shall be permitted in association with commercial and industrial development provided that such lawns are designed and used for public recreational purposes, meet an identified public recreation need, and are dedicated to public recreation use.

B. Lawn areas developed in association with recreational development shall be limited to those which support recreation activities and shall, to the extent practical, be of a variety of grass which requires minimal fertilization.

C. Each municipality shall have ordinances which provide for open space and recreational facilities in association with residential developments. The following guidelines may be utilized to develop these ordinances:

1. All residential development of 25 units or more shall provide:

(a) 8 acres of land to be used for recre-

ational purposes for every 1,000 projected residents of the development; provided, however, that such acreage shall not be required to exceed 10% of the total acreage of the proposed development;

(b) land provided in accordance with paragraph (a) above shall be provided in a single area or in individual parcels at least one acre in size;

(c) all residential units for which the recreational land is provided in accordance with paragraph (a) above shall be located within 1/4 mile of such recreational land; and

(d) at least 50% of the recreational land provided in accordance with paragraph (a) above shall be turfed or landscaped with otherwise suitable materials to permit informal recreational activities.

2. All residential development of 50 units or more should provide recreational land in accordance with Subsection (1) above. Recreational facilities in accordance with the following schedule shall also be provided to the extent recreational needs are generated by the proposed development. An analysis of the recreational needs of a proposed development within a specified service area around the development shall be conducted by comparing the following schedule of facility standards with existing recreational facilities within the service area and the projected population of the service area:

Recreational Facility Guidelines

	Population	Minimum Facility Space Standards	Recreational Service Area Radius
Basketball courts	1 per 1000	Court dimensions range from 60' x 80' to 70' x 104'	1/2 mile
Tennis courts	1 per 2000	Court dimensions range from 60' x 120'—single court 45' x 120'—additional adjoining courts	1 mile
Multi-purpose paved areas	1 per 2000	.50 acre (including basketball and tennis courts)	1/2 mile

Recreational Facility Guidelines (continued)

	Population	Minimum Facility Space Standards	Recreational Service Area Radius
Passive area (sitting)	1 per 2000	.50 acre	1/2 mile
Senior citizen (bocce, shuffle- board, horseshoe)	1 per 1000 over 55	.50 acre	1/4 mile
Pre-school playground	1 per 2000	.25 acre	1/4 mile
Advanced playground	1 per 2000	.25 acre	1/2 mile
Multi-purpose turf area	1 per 2000	.50 acre	1 mile
Football/soccer fields	1 per 10,000	Field dimensions 140' x 280'—youth 190' x 420'—adult	1 mile
Baseball—regulation 90' diamond	1 per 6000	2.8 acres 325-foot outfield	1 mile
Baseball—youth Softball 60' diamond	1 per 6000 1.0 acre	1.0 acre 200-foot outfield	1 mile
Picnic area	1 per 6000	8-foot tables	1 mile

PART 14—HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL PRESERVATION

Section 6-1401.

Purpose

The Pinelands Commission may designate historic districts and historic, archaeological or cultural resources in furtherance of the following public purposes:

(a) To effect and accomplish the protection, enhancement, perpetuation and use of improvements and areas of special historic and archaeological interest or value which represent or reflect significant elements of the Pinelands' cultural, social, economic, political and architectural history and pre-history;

(b) To safeguard the Pinelands' pre-historic, historic, and cultural heritage as embodied and reflected in such improvements and areas;

(c) To stabilize and improve property values in such areas;

(d) To prevent neglect and vandalism of historic, archaeological and cultural sites;

(e) To foster pride in the beauty and noble accomplishments of the past; and

(f) To preserve opportunities for traditional life styles related to and compatible with the ecological values of the Pinelands.

Section 6-1402.

Historic, Archaeological and Cultural Management Program

In order to be certified under the provisions of Article 3 [CERTIFICATION OF COUNTY, MUNICIPAL AND FEDERAL INSTALLATION PLANS] of this Plan, a municipal master plan or land use ordinance must provide a program for the protection of historic, archaeological and cultural resources. It is not necessary that the municipal program incorporate the literal terms of the program set out in this Part; rather, a municipality may adopt alternative and additional techniques which will achieve the equivalent protection provided under the provisions of this Part.

Section 6-1403.

Authority of Historic, Archaeological and Cultural Preservation Board

The Planning Board of each municipality shall serve as the Historic, Archaeological and Cultural Preservation Board (hereinafter Preservation Board) and have the powers and duties provided in this Part, unless the municipality designates a separate Board for this purpose. The Preservation Board or Planning Board, as the case may be, shall have the following powers and duties:

- A. To initiate, hear, review and make recommendations to the Pinelands Commission regarding designation of historic, archaeological and cultural resources and districts of Pinelands, national or state significance in accordance with the provisions of Sections 6-1404 of this Part;
- B. To initiate, hear, review and designate historic, archaeological and cultural resources and districts of local significance in accordance with the provisions of Section 6-1404 of this Part;
- C. To review and grant or deny certificates of appropriateness in accordance with the provisions of Section 6-1405 of this Part;
- D. To review and report on any matter related to this Part referred to it by the Pinelands Commission;
- E. To make its general knowledge and expertise available upon reasonable written

request to the Pinelands Commission or any agency of the municipality, county, state or federal government;

- F. To consult with any county, state, or national agency with special expertise in the area of historic and archaeological resources;
- G. To prepare and adopt plans and implementing measures to preserve the cultural heritage of traditional Pinelands Villages;
- H. To develop and maintain a manual of recommended rehabilitation techniques and the relationship of new construction to natural areas for the guidance of the public; and
- I. To adopt rules of procedure which are not in conflict with the provisions of this Part.

Section 6-1404.

Designation of Historic, Archaeological or Cultural Resources and Districts

A. Designation.

The Pinelands Commission hereby designates the following structures and sites as historic, archaeological and cultural resources of significance to the Pinelands:

- L.N. RENAULT AND SONS WINERY
Bremen Avenue and Leibig Street,
Galloway Township
- HANOVER FURNACE
Hanover Lake area,
New Hanover Township
- ATSION VILLAGE
Route 206,
Shamong Township
- BATSTO VILLAGE
Wharton State Forest,
Route 542,
Washington Township
- GRANT A.M.E. CHURCH
4th and Washington Streets,
Chesilhurst Borough
- DENNISVILLE HISTORIC DISTRICT
Petersburg Road and Main Street,
Dennis Township
- DOUBLE TROUBLE STATE PARK
HISTORIC DISTRICT,
Double Trouble State Park,
Berkeley and Lacey Townships

HANGAR NUMBER ONE,
LAKEHURST NAVAL AIR STATION
County Route 547,
Manchester Township
MULLICA RIVER-CHESTNUT NECK
HISTORIC DISTRICT
includes parts of Atlantic,
Burlington and Ocean Counties.

B. Standards for Designation.

The Pinelands Commission may designate additional historic, archaeological and cultural resources and districts if it determines one or more of the following:

1. The presence of structures, sites, or areas associated with events of significance to the cultural, political, economic or social history of the nation, state, local community or the Pinelands; or

2. The presence of structures, sites or areas associated with the lives of persons or institutions of significance to the cultural, political, economic or social history of the nation, state, local community or the Pinelands; or

3. The presence of structures which represent distinctive characteristics of a type, period or method of construction of significance to the cultural, political, economic or social history of the nation, state, local community or the Pinelands; or

4. The presence of a site or area which has yielded or is likely to yield significant information regarding the history or archaeological history of the Pinelands.

The Preservation Board or the Planning Board shall utilize these standards in designating areas, sites, structures or districts as resources of local significance.

C. Initiation of Designation.

The designation of historic, archaeological or cultural resources or districts of Pinelands significance may be initiated by the Pinelands Commission, the Executive Director, a Preservation Board, a Planning Board, or any other person.

D. Designation Application.

If the designation is proposed by a Preservation Board, a Planning Board or other person, the application shall be filed with the

Pinelands Commission. The application shall contain the following information:

1. A statement setting forth the basis for designation with specific reference to the standards set forth in Section 6-1404(C);

2. One or more photographs, together with descriptive captions, illustrating the features of the proposal which support its designation;

3. A detailed description of the present and original, if known, physical appearance of any structure or site to be designated, including a detailed architectural description, if applicable;

4. Comments from the local planning board if the designation is proposed by a person who is not a member of the planning board;

5. Such additional information as may be required from time to time by the Pinelands Commission or applicable Planning or Preservation Board.

E. Review.

All proposed designations shall be reviewed and a public hearing held in the manner provided in Article 4 of this Plan [DEVELOPMENT REVIEW].

Section 6-1405.

Certificates of Appropriateness

A. General Requirement.

No construction, alteration, remodeling, removal or demolition of any structure, area or site designated in Section 6-1404(B), or as may be hereafter designated in accordance with the provisions of this Part, shall be permitted without first obtaining a certificate of appropriateness from the Planning Board.

B. Purpose.

The purpose for requiring a certificate of appropriateness is to provide a means for reviewing plans to alter, remodel, relocate, or demolish designated structures, areas or sites in order to ensure that such work will comply with the standards established to preserve the integrity of structures, areas, and sites which have been determined to merit special protection by designation.

C. Application for Certificate of Appropriateness.

An application for a certificate of ap-

propriateness shall contain the following information:

1. Detailed plans depicting the exact work to be performed, including detailed renderings of the exterior of any proposed new structure or any exterior alterations to existing structures. A delineation of the relationship of the renderings of the proposal in relation to adjacent structures or surrounding lands may be requested.

2. A statement of the relationship of the proposed work to the standards for designation in Section 6-1404(B) [STANDARDS FOR DESIGNATION] and the standards for approval of certificates of appropriateness set forth in Section 6-1405(D) [STANDARDS FOR CERTIFICATES OF APPROPRIATENESS] hereof.

3. In the event the requested certificate of appropriateness, if issued, would permit the demolition of a designated structure, a detailed analysis of the economic feasibility of maintaining the structure in its present form, including the amount paid for the property; date of purchase; the current assessed value of the lands and improvements; real estate taxes for the previous two years; the annual debt service, if any, for the previous two years; gross income from property for the previous two years; and annual cash flow, if any.

4. A statement of measures to be taken to mitigate the adverse effects of the proposed work on a designated structure or area.

5. If the proposed work involves the disturbance of a designated archaeological site, a statement describing the mitigation program proposed and the qualifications of those professionals who will be conducting data recovery operations.

6. Such other information as may be required from time to time by the Executive Director, the Preservation Board or the Planning Board.

D. Standards for Certificates of Appropriateness.

The Preservation Board, or the Planning Board, as the case may be, shall consider the following in approving or disapproving applications for certificates of appropriateness:

1. The effect of the proposed work upon the purposes for which the designation was

originally granted, as set out in Section 6-1404(C) [APPLICATION FOR CERTIFICATES OF APPROPRIATENESS].

2. The extent of the alteration, destruction, or removal of the distinctive character or architectural features of the designated structure, including consideration of the harmony of materials, details, height, mass, proportion, rhythm, scale, setback, shape, street accessories, and workmanship.

3. The relationship of the designated site to the surrounding land and natural features.

4. The degree to which the proposed work would isolate the designated structures or area from their historical or architectural surroundings.

5. The degree to which the proposed work is compatible with the original design concept of the structure or with the general design characteristic of that era.

6. The degree to which the proposed building materials are compatible with the aesthetic and structural appearance of the designated structure or area, including the texture, style, color of the materials and the proposed combination of materials such as brick, stone, concrete, shingle, wood or stucco.

7. If the proposed work involves a designated archaeological site, the degree to which the proposed work disturbs the designated site or complies with the rules of the Department of the Interior governing the recovery of archaeological data, 43 C.F.R. §3 et seq.

8. If the proposed work involves the demolition of a designated structure, the degree to which the applicant has explored preservation options, such as the sale of the structure to an individual or group interested in preserving the structure.

9. The degree to which the proposed work is in conformity with the Department of the Interior's Standards for Historic Preservation Projects, 36 C.F.R. §1207 et seq.

E. Issuance of Certificate of Appropriateness.

The Preservation Board, or the Planning Board, may approve, disapprove or approve with conditions the issuance of a certificate of appropriateness upon determining that the

proposed plans are or are not in conformity with the standards set forth in Section 6-1405(D) [STANDARDS FOR CERTIFICATES OF APPROPRIATENESS].

F. Effect of Issuance of Certificate of Appropriateness.

The issuance of a certificate of appropriateness authorizes the applicant to apply for any additional approvals which may be required by the municipality or any other jurisdiction prior to the commencement of work. The issuance of a certificate of appropriateness may be appealed in accordance with Article 4, Part 8 [RECONSIDERATION AND JUDICIAL REVIEW] of this Plan.

Section 6-1406.

Emergency Provision

Notwithstanding any other provision of this Part, in any case where the Executive Director determines that alteration, remodeling, or demolition of a designated structure is necessary to remedy a condition that is dangerous to life, health or safety, a certificate of appropriateness which is required under the provisions of this Part may be issued under the signature of the Executive Director.

Section 6-1407.

Undesignated Historic and Archaeological Sites

A. A cultural resource survey shall accompany all applications for major development. Guidelines for this survey will be available at the principal offices of the Commission. In general, the survey shall include: a statement

as to the presence of any properties listed on the National and State Registers of Historic Places on the site or within the area of the project's potential environmental impacts; a thorough search of state, local and any other pertinent inventories to identify sites of potential cultural significance; a review of the literature and consultation with professional and avocational archaeologists knowledgeable about the area; a thorough pedestrian survey to provide reasonable evidence of the absence of archaeological resources, and a list of personnel involved and qualifications of the person(s) performing the survey.

B. An applicant for development approval in the Pinelands may request a letter of interpretation in order to determine the presence of significant archaeological sites on his property in accordance with the provisions of Article 4, Part 6 of this Plan.

C. Where archaeological or historic resources are present, the developer shall take all reasonable steps in planning his development to preserve the resource, or if on-site preservation is impractical, to protect the data in accordance with the guidelines established by the United States Department of the Interior, 43 C.F.R. §3 et seq. In addition, if at any time after construction has been commenced, archaeological data is discovered on a site, the developer shall immediately cease construction, notify the Commission and take all reasonable steps to protect the archaeological data in accordance with the guidelines established by the Department of the Interior governing the recovery of archaeological data.



The Pinelands Commission

P.O. Box 7, New Lisbon, N. J. 08064 (609) 894-9342

Effective April 19, 1982

Dear Reader:

The Pinelands Commission has adopted a series of technical amendments to the New Jersey Comprehensive Management Plan.

These amendments resulted in the following changes to the printed text of the Plan:

Page 203, Paragraph 1 is deleted

Page 208, Paragraph 4 - Special Categories

There are three special categories of development provided within the plan. In the Forest, Rural Development and Agricultural Production Areas, the owner of a parcel greater than one acre is exempted from the density limitations provided that the minimum standards of Part II are met. The second category affects those subdivisions for which a valid final subdivision approval under the Municipal Land Use Law was in effect on February 7, 1979. These subdivisions may continue to develop provided that the proposed development is in conformance with the standards and guidelines of Part II of this plan. For additional subdivisions on which expenditures have been made in good faith reliance on a valid municipal development approval, the Commission shall determine whether a minimum reasonable rate of return can be realized based on the applicant's debt to equity ratio, and what the appropriate number of units should be to realize this return. The third category relates to the clustering or transfer of residential development rights within the Protection Area. Municipalities are required in Part 2 to provide this opportunity when a development right is granted to alleviate a hardship situation and may, at a municipality's discretion, be broadened to include its own transfer or cluster program. The Special Areas Map (Figure 7.1) identifies those areas which should not be utilized for such purposes.

Page 346, Section 2-201

A-3 Affordable Housing.

Housing which falls within the financial means of a household; guidelines being that a household will not have to spend more than 30% of its annual income for shelter or expend more than two times the amount of its annual income for the purchase of a home.

M-1 Median Income

The median of household income as determined from time to time by the United States Department of Housing and Urban Development to be the median.

Page 361, Section 3-501 - Conformance of Federal Installation Master Plans

Within one year after approval of this Plan by the Secretary of the Interior, each military installation and federal aviation facility shall provide a copy of its master plan for the installation or facility to the Commission. The preparation and adoption of the installation master plan shall be independent of the application procedures as set forth in Article 4 of this Plan.

Page 361, Section 3-502 - Elements of Federal Installation Master Plan

A federal installation master plan shall include at least, if applicable to that federal installation, the following items in the standard format applicable to that installation:

- A. Environmental information prepared by the installation or other appropriate agency as required by the National Environmental Policy Act of 1969;
- B. A delineation of any areas of critical ecological importance;
- C. An existing land use map which should include the location, character, and intensity of existing land uses;
- D. A future land use map depicting planned or anticipated land uses which should include the location, character, and intensity of uses; and
- E. The status of major construction projects which should include a description of ongoing or planned projects and projected dates of commencement and completion.

Page 361, Section 3-503 - The heading is changed to: Preparation of the Plan for Review

Page 361, Section 3-505 - Review of Federal Installation Master Plans

Within sixty days after receipt of the Executive Director's report, the Commission shall review the findings and recommendations. The Commission shall specify the changes necessary in order to ensure substantial conformance with this Plan. The Commission shall inform the federal installation of its recommendations.

Page 361, Section 3-506-deleted, Section 5-307 is renumbered to Section 3-506 and amended as follows: Section 3-506 Amendments to Federal Installation Plans

Each federal installation and the Commission may propose amendments

to an installation plan from time to time. Such amendments shall be reviewed in the manner provided in this Part for review of the original plan and such amendments shall not require the revisions or approval of the plan as a whole.

Page 374, Section 4-304 - Certificate of Filing; Required for Determination of Completeness

Upon determining that an application is complete, the Executive Director shall issue a Certificate of Filing. No local permitting agency shall determine that any application for development is complete unless it is accompanied by a Certificate of Filing issued pursuant to this Section.

Page 375, Section 4-305 B - Notice of Filing

Within seven days following a determination of completeness of an application for development, or any change to any application for development which was previously filed, notice of such application shall be given by the local agency, by mail, to the Commission. The notice shall be in such form as the Executive Director shall from time to time specify; but each such notice shall contain at least the following information:

1. The name and address of the applicant;
2. The legal description and street address, if any, of the property which the applicant proposes to develop;
3. A brief description of the proposed development, including uses and intensity of uses proposed;
4. The docket number of the Certificate of Filing issued by the Executive Director and the date on which it was issued;
5. The date on which the application, or change thereto, was filed and any docket or other identifying number assigned to such application by the local permitting agency;
6. The local permitting agency with which the application or change thereto was filed;
7. The content of any change made to any such application since it was filed with the Commission; and
8. The nature of the local approval or approvals being sought.

Page 375, Section 4-305 C - Notice of Hearings and Meetings

Notice of any hearing, public meeting or other formal proceeding at which an application for development is to be considered shall be given to the Commission by mail or delivery of the same to the principal office of the Commission not less than five days prior to such meeting, hearing or proceeding and shall be in such form as the Executive Director shall from time to time specify. Each notice shall contain at least the following information:

1. The name and address of the applicant;
2. The docket number of the Certificate of Filing issued by the Executive Director and the date on which it was issued;
3. The date, time and location of the meeting, hearing, or other formal proceeding;
4. The name of the local permitting agency or representative thereof which will be conducting the meeting, hearing, or other formal proceeding;
5. Any written reports or comments received by the local permitting agency on the application for development which have not been previously submitted to the Commission; and
6. The purpose for which the meeting, hearing or other formal proceeding is to be held.

Page 378, Section 4-309 - Notice of Changes Made Subsequent to Local Preliminary Approval

Each local permitting agency shall give notice to the Commission of any design, engineering or other changes made to any application for development by an applicant subsequent to any local preliminary approval reported to the Commission pursuant to Section 4-305 (D) (NOTICE OF PRELIMINARY APPROVAL), including changes made in response to conditions imposed by the Executive Director or Commission pursuant to Section 4-308 (DECISION ON REVIEW), to the Executive Director, by mail, within five days of receipt of such changes. Such notice shall be in such form as the Executive Director shall from time to time specify but shall contain at least the following information:

1. The name and address of applicant;
2. The legal description and street address, if any, of the property which the applicant proposes to develop;
3. The docket number of the Certificate of Filing issued by the Executive Director and the date on which it was issued;
4. Copies of any amended application, site plans, plats or other documents reflecting such changes; and
5. A brief description of the nature of such changes.

Any such change shall be subject to review by the Commission pursuant to Sections 4-307 (COMMISSION REVIEW FOLLOWING PRELIMINARY APPROVAL) and 4-308 (DECISION ON REVIEW) in the same manner as the original preliminary approval.

All development within the Pinelands Area by any state or local public agency shall be in conformance with the minimum standards set out in Section 4-206 (STANDARDS FOR UNCERTIFIED AREAS) and all other standards and guidelines contained in this Plan, except as otherwise provided by memoranda of agreement between the Commission and such agency and/or a state agency plan approved by the Commission pursuant to subsection E hereof. All development within a military and federal installation area shall be in substantial conformance with the minimum standards and guidelines contained in this Plan, except where incompatible with national defense missions or other national security requirements as provided in Section 4-402D (EXCEPTION FOR NATIONAL DEFENSE).

Page 380, Section 4-402 B - Commission Approval Required

Except as provided in an intergovernmental agreement, no development shall be initiated by any state or local public agency prior to conferring with and obtaining the approval of the Commission pursuant to the procedures established by this Part. Except as provided in an intergovernmental memorandum of agreement, the Commission shall review development within a federal military installation or development by another federal agency only where a state or local permit is required by Federal law or regulations. Such reviews shall be in accordance with the provisions of Part 7 of this Article (COORDINATED PERMITTING WITH STATE AGENCIES).

Page 380, Section 4-402 D - Exception for National Defense

1. Notwithstanding any provision of this Plan, if the commander of a military installation determines that compliance with the provisions of this Plan, the installation master plan or a memorandum of agreement with a military installation would be incompatible with the installation's mission, safety or other national defense requirements, the installation commander shall notify the Commission.

2. Upon receipt by the Commission of such notification compliance with any provision of this Plan shall be deemed to be waived.

3. In time of war or when war is imminent or a national emergency is declared by Congress or the President, nothing in this Plan shall modify or limit any other provisions of law granting emergency powers to the President, the Secretary of Defense, or persons possessing such authority by delegation from the President or Secretary of Defense, to include but not be limited to acts of using property, mobilizing and training personnel, or acquiring property.

Page 380, Section 4-402 E - State Agency Plans

1. Any agency of the State of New Jersey may submit to the Commission for review and approval a comprehensive plan of its

existing and planned land use, resource management, and development activities within the Pinelands. Such plans shall:

- a. be based upon a current and comprehensive inventory and analysis of the Pinelands natural resources. The Commission's natural resource inventory may be used as a basis for this purpose;
- b. set forth the character, location and magnitude of development within the Pinelands;
- c. be adequate to ensure that all development of land in the Pinelands is carried out in conformance with Articles 5 and 6 of this Plan; provided, however, that alternative or additional techniques may be included if consistent with the goals and objectives of this Plan;
- d. prescribe standards for capital improvement siting, design, and construction, including those necessary to ensure that adequate and necessary support facilities will be available to serve permitted development and proposed uses of lands;
- e. identify resource management practices which conform to the objectives of this Plan, the Pinelands Protection Act, and the Federal Act;
- f. be compatible with surrounding land uses and certified municipal and county master plans; and
- g. be otherwise consistent with and contain all provisions necessary to implement this Plan.

2. Upon Commission approval of such plan, the Commission shall review any proposed development in accordance with the standards of this Plan as modified by specific provisions of the approved agency plan.

3. Each agency and the Commission may propose amendments to an approved plan from time to time. Such amendments shall be approved in the manner provided in this part and such amendments shall not require the revision or approval of the plan as a whole.

Page 383, Section 4-505 - Standards

E. The waiver is the minimum relief necessary to: relieve the extraordinary hardship, which may include the granting of a residential development right to other lands in the Protection Area that may be transferred or clustered to those lands in accordance with Section 5-310 of Article 5 (MINIMUM STANDARDS FOR TRANSFERRING AND CLUSTERING RESIDENTIAL DEVELOPMENT RIGHTS IN PROTECTION AREA MUNICIPALITIES); or to satisfy the compelling public need; and

Page 386, Section 4-703 B - Notice of Filing

Notice of filing of any application for development shall be given by mail within seven days following such filing and shall contain the following information:

1. The name and address of the applicant;
2. The legal description and street address, if any, of the property which the applicant proposes to develop;
3. A brief description of the proposed development, including uses and intensity of uses proposed;
4. The docket number of the Certificate of Filing issued by the Executive Director and the date on which it was issued;
5. The date on which the application was filed and any docket or other identifying number assigned to such application by the state agency;
6. The state agency with which the application was filed; and
7. The nature of the approval or approvals being sought.

Page 386, Section 4-703 C - Notice of Hearings and Meetings.

Notice of any hearing, public meeting or other formal proceeding at which the filing or disposition of any application for development in the Pinelands Area is to be considered shall be given by mail no less than five days prior to such meeting or hearing and shall contain the following information:

1. The name and address of the applicant;
2. The docket number of the Certificate of Filing issued by the Executive Director and the date on which it was issued;
3. The date, time and location of the meeting or hearing;
4. The name of the state agency which will conduct the meeting or hearing;
5. Any written reports or comments received by the state agency on the application which have not previously been submitted to the Commission; and
6. The purpose for which the meeting or hearing is to be held.

Page 386 - 387, Section 4-703 D - Notice of Grant of Final Determination

Notice of any final determination by any department board, bureau, official or other agency of the state with respect to any application for development in the Pinelands Area shall be given by mail within five days of the grant or denial of such approval and shall contain the following information:

1. The name and address of the applicant;
2. The legal description and street address, if any, of the property which the applicant proposes to develop;
3. The docket number of the Certificate of Filing issued by the Executive Director and the date on which it was issued;
4. A copy of the permit, approval, or authorization which was issued; and
5. A copy of any approved site plan or plat.

Page 392, Section 5-206 - Guidelines for Delineation of Boundaries of Pinelands Villages

In the preparation of municipal master plans and land use ordinances municipalities shall designate the boundaries of Pinelands Villages; provided that the designated village area shall maintain its existing character and does not contain more vacant land than built land, nor provide for an additional increment of development which is greater than the number of non-accessory structures that currently exist in the village. For the purposes of this requirement, built land for residential structures shall be calculated as the existing lot size or 3.2 acres, whichever is less, and built land for non-residential structures shall be calculated as the lot size required by existing zoning at the time of adoption of this Plan. Municipalities should also consider the following guidelines in designating village boundaries to the greatest extent practicable:

- A. The village area should include the center of the village, typically located at or near the intersection of two roads, the developed lands contiguous to the village center, and other cleared lands not in active agricultural use.
- B. In the Preservation Area District and Forest Areas the village area should not contain more than 50% forested land.
- C. In Agricultural Production Areas and Forest Areas the village area should not include active agricultural lands except for isolated areas of less than 10 acres.
- D. Village boundaries along roads leading to and from the village center should not be extended more than 1/2 mile from the village center.
- E. Village delineations should not intrude into wetlands vegetation associations.
- F. Villages should include areas of high septic suitability . (Hydrologic Soil Group B) contiguous to developed lands.

Page 396, Section 5-303 - Minimum Standards Governing the Distribution and Intensity of Development and Land Use in Forest Areas

Add B. 9. Fish and Wildlife Management

Page 398, Section 5-305 - Minimum Standards Governing the Distribution and Intensity of Development and Land Use in Special Agricultural Production Areas

Add A. 5. Forestry

Add A. 6. Fish and Wildlife Management

Page 400-401, Section 5-310 - Minimum Standards for Transferring and Clustering Residential Development Rights in Protection Area Municipalities

Each municipality with land in the Protection Area shall establish within said area a mechanism to transfer or cluster development rights granted pursuant to Section 4-505 of Article 6 (STANDARDS) provided, however, that Forest Areas and Agricultural Production Areas shall not be designated to receive rights transferred from other management areas. No municipality shall be required to plan for or accept such rights emanating from beyond its jurisdiction. If a municipality elects to institute a clustering program, the areas in which clustering is to occur must contain at least 500 acres of contiguous land which is accessible to areas of existing growth and development and which does not exhibit any of the following characteristics:

1. Wetlands as defined in Part 1 of Article 6;
2. Somewhat excessively and excessively drained soils as delineated on Plate 9;
3. Lands which recharge to ground water aquifers as identified by a depth of the unsaturated zone of 20-30 and 30-40 feet on Plate 4, except as underlain by clay aquiclude;
4. Extreme fire hazard as depicted on Plate 11;
5. Active agricultural use with a preferential tax assessment under the provisions of the Farmland Assessment Act of 1964;
6. Depth to seasonal high water table of less than 5 feet as delineated on Plate 7;
7. Drainage basins of first order streams as identified on USGS 7-1/2' maps;
8. Basins of streams entering public lands which are managed for resource protection or recreation;

9. Active cranberry bogs and areas which drain to active cranberry bogs;

10. Unique plant communities or the minimum forest corridor area as delineated on the Special Areas Map (Figure 7.1); and

11. Flood-prone areas designated under the federal flood insurance programs.

Page 402, Section 5-403 - Pinelands Development Credits Established

D. Notwithstanding the provisions of subsections B and C hereof, the owner of record of .1 or greater acres of land in the Preservation Area District, Agricultural Production Areas, and Special Agricultural Production Areas, as of February 7, 1979, shall be entitled to at least .25 Pinelands Development Credits provided that the parcel of land is vacant and was not in common ownership with any contiguous land on February 7, 1979.

Page 409, Section 6-203 F - Vegetation Removal Standards

3. Native Pinelands trees and shrubs are utilized for landscaping; provided, however, that non-native tree and shrub species may be used for foundation plantings provided that species not of the Heath Family (Ericaceae) comprise no more than twenty percent of the plantings. Native plants include:

- (a) Pitch pine;
- (b) Short-leaf pine;
- (c) Black oak;
- (d) Southern red oak;
- (e) White oak;
- (f) Blackjack oak;
- (g) Scrub oak;
- (h) Post oak;
- (i) Chestnut oak;
- (j) Scarlet oak;
- (k) Black huckleberry;
- (l) Dangleberry;
- (m) Sheep laurel;

- (n) American holly;
- (o) Lowbush blueberry;
- (p) Mountain laurel;
- (q) Virginia pine
- (r) Atlantic white cedar
- (s) Red cedar
- (t) Grey birch
- (u) Sweetbay magnolia
- (v) Sassafras
- (w) Trident red maple
- (x) Blackgum
- (y) Red chokeberry
- (z) Black chokeberry
- (aa) Shadbush
- (bb) Bayberry
- (cc) Sweetfern
- (dd) Inkberry
- (ee) Winterberry
- (ff) Sweet pepperbush
- (gg) Arrowwood
- (hh) Swamp azalea
- (ii) Sand myrtle
- (jj) Swamp leucothoe
- (kk) Staggerbush
- (ll) Teaberry
- (mm) Trailing arbutus

- (nn) Bearberry
- (oo) Dwarf huckleberry
- (pp) Highbush blueberry
- (qq) Black highbush blueberry
- (rr) Cranberry
- (ss) Rhododendron maximum

4. Other than in association with areas dedicated for public recreational purposes, native Pinelands grasses (such as little bluestem, deertongue, red top, and switch grass), species adapted to droughty, nutrient poor soils (such as tall fescue, sheep fescue, chewings fescue, red fescue and smooth brome grass) and species used for temporary cover (such as ryegrass and oats) shall be utilized unless mulch is used to stabilize soil; provided, however an area not to exceed 2,000 square feet per building may be planted with other grasses.

Page 416, Section 6-606 - Resource Extraction Standards

8. Will be carried out in accordance with an extraction schedule which depicts the anticipated sequence, as well as anticipated length of time that each 20 acre unit of the parcel proposed for extraction will be worked;

Page 418 - Section 6-704 - Existing Landfills

3. Landfills in Agricultural Production Areas or Forest Areas are terminated on August 8, 1990, or when the disposal capacity authorized as of January 14, 1981 is exceeded by twenty-five percent, whichever occurs first.

Page 419, Section 6-801 - Purpose

An essential element of the overall ecological value of the Pinelands environment is its extensive surface and ground water resources of exceptional quality. The Pinelands Protection Act provides that the Plan protect and maintain the quality of surface and ground water through the control of development and land use, and close cooperation and coordination with local, state and federal agencies of government. This management program is intended to protect and preserve surface and ground waters of the Pinelands and to ensure that random and uncontrolled growth and development will not degrade the Pinelands environment. Nothing in this Part applies to agricultural activities except as otherwise provided by state or federal regulation.

Page 419, Section 6-803 - Minimum Standards Necessary to Protect and Preserve Water Quality

A. All development permitted under this Plan, or under a certified county or municipal master plan or land use ordinance, shall be designed and carried out so that the quality of surface and ground water will be protected and maintained. For the purpose of this Part, agricultural use shall not be considered development.

Page 421, Section 6-807 - Prohibited Chemicals and Materials

A. Use of the following substances is prohibited in the Pinelands to the extent that such use will result in direct or indirect introduction of such substances to any surface or ground water or any land:

1. Septic tank cleaners; and
2. Waste oil

Page 421, Section 6-807 - Prohibited Chemicals and Materials

D. No hazardous, toxic, chemical, petroleum (including oil spill pollutants), or nuclear waste shall be discharged or disposed of on any land in the Pinelands. Septic waste and liquid sludge may be applied only as part of a land application program for agricultural purposes when approved by the New Jersey Department of Environmental Protection.

Page 427, Section 6-1103 D-3 - Fire Hazard Mitigation Standards

(b) no pine tree (*Pinus* spp.) is closer than 25 feet to another pine tree;

Page 428, Section 6-1203 - Minimum Housing Standards in Uncertified Municipalities

B. In developments of 100 or more dwelling units, 25% of the dwelling units shall be affordable to low, moderate and middle income households as follows:

1. At least 10% of the dwelling units shall be affordable to low income households;
2. At least 10% of the dwelling units shall be affordable to moderate income households; and
3. At least 5% of the dwelling units shall be affordable to middle income households.

Page 428, Section 6-1203 - Minimum Housing Standards in Uncertified Municipalities

F. If an applicant can demonstrate that dwelling units required under this Section cannot be provided, the applicant may satisfy the housing requirements of this Section by dedication of land suitable for development of an equivalent number of required

housing units, by payment in lieu thereof to a qualified public housing agency or by other alternative actions which meet the intent of this Section.

Plates 1, 21 and 28

Thirteen changes to reflect the jurisdictional boundaries of the Pinelands Area, including the Preservation and Protection Areas, have been made. These changes will reconcile the precise language of the Pinelands Protection Act with these three maps and result in minor mapping adjustments. All of the changes consist of adjusting the Preservation or Protection Area boundaries to conform with state or federal land holdings.

In three instances because of the configuration of public land holdings, small privately owned parcels have been reflected within the Pinelands Protection Area and/or Pinelands National Reserve rather than the Preservation Area. In one other instance, a parcel of privately owned land is removed from the Pinelands Area and Pinelands National Reserve. All other revisions affect only state or federal land holdings. The townships in which the adjustments occur are Bass River, Hammonton, Jackson, Manchester, Mullica, Pemberton, New Hanover, North Hanover, and Waterford. Detailed maps are available for public inspection at the Pinelands Commission office.

When the Comprehensive Management Plan is reprinted, these changes will be incorporated into the full text. Until then, we hope this proves helpful.

The Pinelands Commission

APPENDIX 2 - ENDANGERED PLANT SPECIES

APPENDIX 3 - WILDLIFE

APPENDIX 4 - UTILITIES

APPENDIX 5 - LETTER OF INTERPRETATION # 361

APR 09 1986

New Jersey Natural Heritage Program

Office of Natural Lands Management

109 W. State Street, Trenton, New Jersey 08608

April 4, 1986

Mr. Robert A. Zampella (609) 984-1339
 The Pinelands Commission
 P.O. Box 7
 New Lisbon, N.J. 08064

Dear Bob:

This is in response to your request for information on rare plants within several proposed municipal industrial sites in the Pinelands.

In reference to the Egg Harbor site, the N.J. Natural Heritage Program has records for Lygodium palmatum (1932) along Union Creek. Extant occurrences of Rhynchospora krieskernii (1985) have been documented within 1.5 miles from the site, potential habitat may exist for this plant within the proposed site, and should be searched for. There is also a historic record for Eupatorium resinosum (1896) in the vicinity. Wetland habitats should be searched for this species on site.

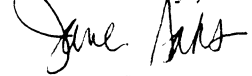
Helonias bullata occurs (1925) in the wetlands along Mill Creek, northeast and southeast of the Stafford Twp. site. It is essential that an adequate buffer zone be maintained to prevent disturbance of the wetlands.

In regard to the Woodbine site, Calamovilfa brevipilis (1975) and Gentiana autumnalis (1924) have been recorded along the railroad west of Mt. Pleasant. This is the only record reported for Calamovilfa brevipilis in Cape May county. Eupatorium resinosum (1920) has been documented in the vicinity and should be searched for in the wetland habitats of the proposed site.

The Hamilton Township area has a high concentration of rare plants. Gentiana autumnalis (1888) has been recorded along the railroad in Mays Landing and Eupatorium resinosum (1893) has been recorded from wetlands in Mays Landing. The following plants occur (1985) south of the proposed site, along the powerline, and there is a high potential for these species to occur within the proposed site. They include Calamovilfa brevipilis, Carex barrattii, Eupatorium resinosum, Peanathes autumnalis, Rhynchospora krieskernii, Rhynchospora microcephala, and Rhynchospora pallida.

It is recommended that a field search be made in the appropriate habitats to determine if the above plant species or any additional rare species occur within the proposed sites. Please contact the program if you have any questions.

Sincerely,



Jane Saks
 Data Manager

cc: Thomas Hampton, Administrator
 Office Of Natural Lands Management

New Jersey Natural Heritage Program

Office of Natural Lands Management
109 W. State Street, Trenton, New Jersey 08608
(609) 984-1339

CAUTIONS AND RESTRICTIONS ON NJNHP DATA

The quantity and quality of data collected by the New Jersey Natural Heritage Program is dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the database. Since data acquisition is a dynamic, ongoing process, the New Jersey Natural Heritage Program cannot provide a definitive statement on the presence, absence or condition of biological elements in any part of New Jersey. Information supplied by the New Jersey Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for onsite surveys required for environmental assessments.

Information provided by this database may not be published without first obtaining the written permission of the New Jersey Natural Heritage Program. In addition, the New Jersey Natural Heritage Program must be credited as an information source in any publication of data.

**State of New Jersey****DEPARTMENT OF ENVIRONMENTAL
PROTECTION**

DIVISION OF
FISH, GAME AND WILDLIFE
RUSSELL A. COOKINGHAM
DIRECTOR

PLEASE REPLY TO:
CN 400
TRENTON, NEW JERSEY 08625

June 11, 1986

Mr. Terrence Moore
Executive Director
The Pinelands Commission
P.O. Box 7
New Lisbon, New Jersey 08064

Dear Mr. Moore:

Following is the information you requested concerning the presence of various wildlife species at sites under consideration as municipally owned industrial parks in Egg Harbor City (Atlantic Co.), Hamilton Township (Atlantic Co.), Stafford Township (Ocean Co.), Chesilhurst (Camden Co.) and Woodbine (Cape May Co). Surveys conducted by our research projects indicate important wild-life species are currently or were historically found in the areas adjacent to all of the industrial park sites listed.

There are documented sightings of pine snakes (T) from 1953 in the Egg Harbor City area. No precise location is given in the sighting report. Sightings of pine barrens treefrogs (E) are from 1980 on Route 563 near Landing Creek, 1981 southwest of Clarks Landing and also from 1981 in Egg Harbor City Lake.

The Egg Harbor City area has historically had beaver in Indian Cabin Creek and Elliots Creek which also has a dense (7 muskrats/acre) muskrat population.

At the Mays Landing site, pine barrens treefrogs have been documented at and around the site. A 1980 sighting recorded voice identification from Gravelly Run, between Route 40 and Route 559, 0.25 miles south of the Penn Central railroad tracks.

Pine snakes (T) have been documented in the general area.

Harvest and historical records indicate both beaver and otter are found in the Great Egg Harbor River and Gravelly Run near the Hamilton Twp. site. A major concern of the Bureau would be any degradation of the valuable Great Egg Harbor River/Tuckahoe River ecosystem part of which encompasses our Tuckahoe Wildlife Management Area. Otter, muskrat and various waterfowl all utilize this ecosystem including 3,000 wintering black ducks.

At the Chesilhurst site, pine snakes (T) and pine barrens treefrogs (E) have been documented in the general area, however, none at or adjacent to the proposed site. Pine snakes have been found at Atco and Beaverdam Lake. Pine barrens treefrogs have been documented in Atco.

In the Chesilhurst area there is some Canada goose nesting on Hobb Lake. Beaver and otter are present in the Lake of Four Fingers, Wildcat Branch and Beaver Dam Lake. The historic record, substantiated by findings of scats, slides, cuttings, etc. indicate their presence. The Woodbine Airport site supported upland sandpipers (E) in 1977. There were no observations from 1978 to 1981.

The Great Cedar Swamp is used as a beaver relocation site and otter are found throughout the entire Woodbine area. Two important drainage system, originate from the Great Cedar Swamp. Dennis Creek flows to our Dennis Creek Wildlife Management Area and Cedar Swamp Creek flows to our Tuckahoe Wildlife Management Area. The Dennis Creek system is utilized by approximately 5,000 black ducks.

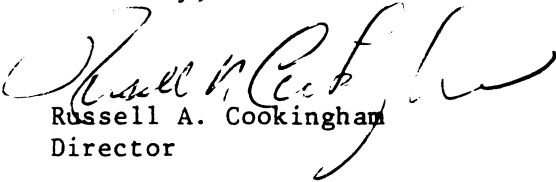
In Stafford Twp. river otter are known to be in Cedar Run, Mill Creek and probably Manahawkin Lake which is also occupied by beaver. Excellent wood duck breeding habitat exists in the headwater area of Mill Creek. Mill Creek is an important tributary to the Little Egg Harbor Bay ecosystem which is utilized by over 15,000 waterfowl. Nesting species include Canada geese, wood duck, black duck and mallard. Scaup, 6,000-7,000 black duck, brant and others winter in this area.

Landing Creek and Elliots Creek are tributary to the Mullica River/Wading River complex, which is an important wintering area for waterfowl. Approximately 1,000 Tundra swans winter in this area which is also known for the sora rail that feed on its wild rice during their migration.

While deer wintering areas are found in the vicinity of most of these sites, none of the sites are specifically critical to the wintering of deer. Development of these tracts will, however, cause a net loss of habitat for deer.

Division biologists will be available to accompany Commission staff to the Woodbine site to determine wildlife impacts.

Sincerely,



Russell A. Cookingham
Director

RL:ds

c: Asst. Comm. Fenske

APR 30 1986

APPENDIX 4

SOUTH JERSEY GAS COMPANY

DANIEL A. OLDT

VICE PRESIDENT,
OPERATIONS

April 29, 1986

Mr. Peter Ylvisaker
Resource Planner
The Pinelands Commission
P.O. Box 7
New Lisbon, New Jersey 08064

Dear Mr. Ylvisaker:

As requested, the plans for the industrial park sites are being returned with the existing location and size of the gas lines in the areas indicated. The following industrial sites are covered:

1. Woodbine, Cape May County
2. Chesilhurst, Camden County
3. Egg Harbor City, Atlantic County
4. Hamilton Township, Atlantic County

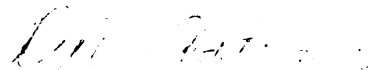
Generally, existing gas facilities are at or nearby to all the industrial sites. Gas service is essentially adequate in all areas with no major constraints existing. Naturally, the Hamilton Township and Woodbine locations have greater gas availability due to the nearness of larger size/higher operating pressure gas pipelines. The Egg Harbor City site is the farthest from our existing system and substantial gas supply.

The following manager in our organization can be contacted if further information is required:

George J. Powell
Manager, Industrial Sales
Number One South Jersey Plaza
Route 54
Folsom, New Jersey 08037
(609) 561-9000 Extension 248

I hope that this provides you with the initial required information.

Very truly yours,



cc: G.J. Powell

May 6, 1986

MAY 08 1986

Mr. Peter Ylvisaker
Pinelands Commission
P. O. Box 7
New Lisbon, NJ 08064

Dear Peter:

Attached is a set of U.S.G.S. quad maps with the Company's transmission lines indicated as well as the proposed industrial parks. All the referenced industrial parks have adjacent distribution service available. Since there are so many variables regarding industrial development which have bearing on the amount of electricity required, I would recommend you contact Mr. Robert Campbell (609) 645-4160 at 450 Tilton Road, Pleasantville, New Jersey 08232. Mr. Campbell is an Industrial Representative for the Company and will be able to answer any questions you may have about the adequacy of service at the various proposed industrial parks.

If you have any questions, please contact me at (609) 645-4534.

Yours truly,

Marilyn Booth

Marilyn Booth
Biologist

MB/clg
Attachment



The Pinelands Commission

P.O. Box 7, New Lisbon, N. J. 08064 (609) 894-9342

LETTER OF INTERPRETATION #361

January 9, 1986

Nancy Hoagland, Secretary
Hamilton Township
Industrial Commission
15 West Second Street
Mays Landing, NJ 08230

RE: App. #85-0522
Block 991, Lot 3
Atlantic Avenue
Hamilton Township

FINDINGS OF FACT

This application is for the development of Phase II of the Hamilton Township Industrial Park on the above 99.7 acre parcel in Hamilton Township. The parcel is located in a Regional Growth Area. The development will be served by public sewers. Pursuant to Section 4-602 C of the Comprehensive Management Plan, the applicant is requesting a Letter of Interpretation as to the extent of the fresh water wetlands on and adjacent to the parcel and the size of the buffer to these fresh water wetlands that will be required so there will be no significant adverse impact on the fresh water wetlands.

The parcel has been inspected by members of the Commission's staff. In addition, the appropriate resource capability maps and data available to the staff have been reviewed.

There is a pitch pine lowland located on a portion of the applicant's parcel. This pitch pine lowland continues on adjacent lands. There are small areas of hardwood swamps interspersed within the pitch pine lowlands on the adjacent parcel. The area of pitch pine lowlands on the applicant's parcel has Atsion soils. This wetlands complex located on the south site of Route 40 has been slightly disturbed by existing development in the immediate area. This is reflected by the vegetation which while dominated by species typical of undisturbed wetlands, does include a number of plants that are characteristics of disturbed wetlands. The zoning ordinance permits intense development within the industrial park.

The applicant has addressed the nine criteria contained in Section 6-107 of the Plan and the wetlands buffer delineation model has been utilized.

No public comments have been received concerning the requested Letter of Interpretation.

CONCLUSION

The pitch pine lowlands and hardwood swamps are fresh water wetlands (Section 6-105 B and C). Those areas which have Atsion soils are fresh water wetlands (Section 6-103 and Section 2-201 W3). The extent of these fresh water wetlands is delineated on the attached plan dated June, 1985 and prepared by Walker, Previti, Holmes and Associates.

Section 6-114 of the Plan requires that no development be carried out within 300 feet of any fresh water wetlands unless the applicant demonstrates that there will be no significant adverse impact on the fresh water wetlands. Pursuant to Section 6-107, the applicant has demonstrated that the proposed development will not cause a significant adverse impact on the fresh water wetlands if all development is located at least 240 feet from the fresh water wetlands. This is based on the quality of the existing wetlands and the intensity of the permitted development.

This Letter of Interpretation does not authorize the commencement of any development on this lot (Section 4-606A1). The applicant must still file a development application as set forth in Part 4 of Article 4. The proposed development must meet all requirements of Article 6 of the Plan.

This Letter of Interpretation is valid for a period of one year only unless the applicant, within that year, has received final approval and the proposed development is then diligently pursued to completion (Section 4-606B).

RECONSIDERATION

Any person who is aggrieved by this determination may seek reconsideration of the decision by the Pinelands Commission within 18 days of the date of this letter by giving notice, by Certified mail, of the request for reconsideration to the Pinelands Commission. Said notice shall include:

1. the name and address of the person requesting the reconsideration;
2. the application number;
3. a brief statement of the basis for the

reconsideration request; and

4. a certificate of service, indicating that service of the notice has been made, by Certified mail, on;
 - a. the applicant (unless the applicant is requesting the reconsideration);
 - b. Secretary, Hamilton Township Planning Board
 - c. Hamilton Township Environmental Commission
 - d. Secretary, Atlantic County Planning Advisory Board

Sincerely,



William F. Harrison, Esquire
Assistant Director

WFH/sg

cc: Secretary, Hamilton Township Planning Board
Hamilton Township Environmental Commission
Secretary, Atlantic County Planning Advisory Board
James N. Holmes