

**MASTER PLAN**

**CONSERVATION  
PLAN ELEMENT**

**for**

**Bordentown City**  
**Burlington County, New Jersey**

*Prepared by*

**Bordentown City Planning Board**  
and  
**Bordentown City**  
**Environmental Commission**

in consultation with

**DANIEL DOBROMILSKY & ASSOCIATES**  
LANDSCAPE ARCHITECTURE, PLANNING AND CERTIFIED TREE EXPERT

funded through a grant from  
Association of New Jersey Environmental Commissions

**ADOPTED OCTOBER 3, 2007**

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**Daniel M. Dobromilsky, CLA, PP, CTE**



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**BORDENTOWN CITY  
BURLINGTON COUNTY, NEW JERSEY**

**CONSERVATION PLAN ELEMENT**

**INTRODUCTION and GUIDING PRINCIPLES**

To protect public health, safety and welfare the New Jersey Municipal Land Use Law (MLUL – NJSA 40:55D) provides broad powers to municipal governments to enact local planning policy and legislative ordinances. A municipality must enact a Master Plan, reflecting the community’s vision for its future, and to enable the adoption of land use zoning ordinances. The Master Plan must consist of four basic elements – a Statement of Purposes, a Land Use Element, a Housing Plan Element, and an Analysis of Consistency with other regional plans. The Master Plan may include other optional elements including a Conservation Plan Element.

A Conservation Plan Element is described in the Municipal Land Use Law as “providing for the preservation, conservation, and utilization of natural resources, including to the extent appropriate, energy, open space, water supply, forests, soil, marshes, wetlands, harbors, rivers and other waters, fisheries, endangered or threatened species of wildlife and other resources, and which systemically analyzes the impact of each other component and element of the Master Plan on the present and future preservation, conservation and utilization of these resources.”

The Municipal Land Use Law offers fifteen purposes for planning and zoning in New Jersey communities, including the following that support efforts to conserve natural and cultural resources:

- Provide security from fire, floods or other disasters
- Provide adequate light, air, and space for agriculture, recreation and open space
- Conserve historic, cultural and natural resources and energy
- Ensure compatible land uses, densities and aesthetic designs
- Prevent sprawl and degradation of the environment

This Conservation Plan Element draws upon the input from the Bordentown City Environmental Commission, including the Environmental Resource Inventory recently adopted in 2006 by the Commission, and endorsed by the City Planning Board. The Land Use Element, Utility Plan Element, Open Space Preservation Plan Element, Municipal Stormwater Management Plan, and Bicycle/Pedestrian subelement of the Circulation Plan, recently adopted by the City have been analyzed in the creation of this Conservation Plan Element. To avoid lengthy repetition of the information provided in these documents, it is suggested that these source documents should also be considered to achieve a complete understanding of the Planning Board vision for the City. A summary of pertinent data from these source documents will be provided as appropriate to provide a complete picture and facilitate the more focused vision regarding conservation issues addressed with this element.

## **DESCRIPTION OF BORDENTOWN CITY**

Bordentown City is located in central New Jersey, Burlington County, just southwest of Trenton, on the bluffs of Crosswicks Creek near the Delaware River. The City is a complex quilt of contrasting elements that have been woven together by history, commerce, natural features, and human society as well as local and regional governments.

Crosswicks Creek serves as the municipal and county boundary that separates Bordentown City from Hamilton Township in Mercer County. Bordentown Township borders all other limits of the City to the north, east, south and southwest. Colonial settlement of the area dates to the late 17<sup>th</sup> century, when the location was chosen by early settlers because of its proximity to navigable waterways, which included both Blacks Creek and Crosswicks Creek at the time. A rich and varied history includes: the first use of a steam locomotive in New Jersey, the *John Bull*; a hotbed of revolutionary fervor; and home to many historical figures, including Thomas Paine, Clara Barton, and Joseph Bonaparte. Today, the local environment continues to be defined by water. The City boundaries are comprised of Mile Hollow Run to the northeast, Blacks Creek and Love Bridge Run to the southwest, and Crosswicks Creek to the northwest. Thorntown Creek traverses the City. It is these waterways that account for the special natural resources of Bordentown City, and it is their attributes that provide a natural buffer along the edges of the urban fabric.

The contrast of the urban and natural environments is everywhere evident within the City's one square mile, which is populated by approximately 4,000 persons. Tidal marsh and freshwater wetlands abound along the Crosswicks Creek and Blacks Creek, providing healthy wildlife habitat. Steep stream embankments, or bluffs, that offer dramatic views, occur along Thorntown Creek and Crosswicks Creek. Portions of Blacks Creek, Mile Hollow Run, Thorntown Creek, and Love Bridge Run, flow through heavily wooded areas. These natural areas are contrasted by the grid of City streets, with a traditional diversity of housing, and a pedestrian oriented, Main Street business district lining Farnsworth Avenue.

Modern transportation, in the form of two State Highways, Route 206 and Route 130, defines the edges of Bordentown City, and has contributed to the creation of a suburban land use pattern along the highway edges that dramatically differs from the village land use patterns in the center of the city. The new light rail transit line (Riverline) that traverses the community is expected to refocus future development and redevelopment within the City.

The residents have a strongly knit sense of community reflecting pride and respect for the history and diversity of the City. The government of the City has embraced the contrasts and unique character of this community to weave a livable, prosperous and healthy place. This document is another step in the continued vision of the community to improve and grow by nurturing its resources. The same natural resources that helped settle the City, and nourished its economy throughout its history, are crucial to the sustenance and regeneration of the economic, environmental and social health of the City now and for future generations.

## PART 1: PURPOSES AND GOALS

It is with the following purposes that Bordentown City adopts this Conservation Plan Element, striving to implement the recommendations contained herein to affect a sustainable interaction with the resources of the community:

- **Improve local knowledge of natural and cultural resources.**
- **Investigate present and potential issues and impacts related to natural and cultural resources.**
- **Implement strategies to conserve natural and cultural resources.**
- **Balance growth, renewal and preservation by promoting sustainable daily activities.**
- **Provide a basis to defend community laws, policies and actions in conservation.**

It is with these purposes in mind that the following Conservation Plan Element goals are offered. Some of these goals are adaptations of goals stated in other elements of the Master Plan, re-stated here in a manner that emphasizes the conservation aspects of the goal.

An analysis of existing conditions and issues will follow the statement of goals to provide a basic understanding of the resources of the community. The goals are then re-enumerated with corresponding strategies, recommendations and indicators proposed to strive for achievement of each of the stated goals.

It is noted that the terms *conserve* or *conservation*, *preserve* or *preservation* and *sustain* or *sustainability* are utilized throughout this document. Understanding the meaning of these terms, and the subtle differences in these terms, as used in the context of this document will be important for the reader. Therefore the following definitions are offered:

Conserve or Conservation: *To protect from loss, decay, or depletion; to protect resources for human recreational or economic use.*

Preserve or Preservation: *To keep intact, or protect from unnatural change; to protect natural resources for the purpose of retaining them in their natural or original state and condition. Historic preservation does not preclude human use of preserved structures but demands any modification must retain or respect the period of historic construction or use.*

Sustain or Sustainability: *To maintain or improve the availability and quality of resources for future generations by fostering use(s) today that are efficient, renewable or regenerative. Sustainability assumes that environmental, social and economic factors are equally balanced in resource decisions.*

## **GOALS**

The goals of this Conservation Plan Element are:

1. Protect sensitive environmental resources against degradation and restore impaired resources.
2. Provide a healthy environment in terms of providing adequate air, light, water and open space in all areas of the community.
3. Promote sustainable interaction with natural resources for recreation and education.
4. Conserve historic, small town character of the City.
5. Respect and maintain individual neighborhood character, pride and heritage.
6. Promote balanced, diverse land use with a traditional character that fits the community.
7. Sustain natural and cultural resources for future generations.
8. Encourage safe, convenient and environmentally responsible alternative modes of transportation.
9. Maintain and enhance the economic vitality and social diversity of the entire community in a sustainable manner.



## **PART 2: ANALYSIS OF EXISTING CONDITIONS AND ISSUES**

This section of the Conservation Plan Element will review and analyze existing conditions and environmental issues, extrapolated from the Environmental Resource Inventory, and organized by the resource type. This discussion is intended to provide a brief description of the community's resources and a basis for the strategies and recommendations that will follow.

### **1. Air Quality**

The air quality of Bordentown City is greatly impacted by its location in the urban expanse of the Northeastern corridor of the United States. Exposure to air toxics is a widespread problem that occurs throughout the entire state of New Jersey. These pollutants come from a wide variety of sources, including traditional industrial and utility sources, smaller manufacturing and commercial sources, mobile sources, residential activities and construction equipment. As part of Burlington County, Bordentown City is affected by all three types of air pollution: mobile, point and area.

Mobile sources include both on-road vehicles (such as cars, trucks, buses and motorcycles) and non-road equipment (such as ships, airplanes, agricultural and construction equipment) and contribute significantly to air pollution. Nationwide, mobile sources are responsible for about 75% of carbon monoxide pollution.

Point sources include major industrial facilities like chemical plants, steel mills, oil refineries, power plants, and hazardous waste incinerators. Point sources are defined as those that emit 10 tons per year of any of the criteria pollutants, or hazardous air pollutants, or 25 tons per year of a mixture of air toxics.

Area sources include small pollution sources like dry cleaners, gas stations, and auto body paint shops. Area sources are defined as sources that emit less than 10 tons per year of criteria or hazardous air pollutant or less than 25 tons per year of a combination of pollutants. Though emissions from individual area sources are relatively small, collectively their emissions can be of concern - particularly where large numbers of sources are located in heavily populated areas.

Mobile sources are the largest contributors to air toxics emissions in New Jersey, with on-road mobile sources accounting for 35%, and non-road mobile sources contributing 33%. Area sources represent 25% of the inventory. Major point sources account for the remaining 7% of the inventory.

Bordentown City is located in Burlington County, which is situated in the Philadelphia-Wilmington-Trenton, PA-NJ-DE-MD non-attainment area for failing to meet the national ambient air quality standard for the air pollutant Ozone. In 2002 Burlington County ranked among the dirtiest/worst 10% of all counties in the U.S., and 10<sup>th</sup> of the 21 New Jersey counties, in terms of non-cancer hazards from hazardous air pollutants.

Suspected non-cancer health links include cardiovascular, gastrointestinal and musculoskeletal problems. The USEPA monitors air quality through the use of the Air Quality Index (AQI) for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, the EPA has established national air quality standards to protect against harmful health effects. Air quality in New Jersey is considered good or moderate most of the time, but that pollution is still bad enough to adversely affect some people on about one day in ten. In 2002 for Burlington County, there were 100 “Good” days, 0 were “Moderate”, 0 were considered “Unhealthy”, and none were rated “Very Unhealthy”. This indicates that air quality in the county is considered good to moderate most of the time.

In terms of cancer related risks, Burlington County ranks 10th highest for total estimated air toxic emissions in New Jersey. The approximately 420,000 people living in Burlington County face a cancer risk more than 100 times the goal set by the Clean Air Act. Mobile sources contribute to 81% of the air cancer risk. Point sources contribute to 11% of the air cancer risk. Area sources contribute to 8.4% of the air cancer risk.

Bordentown City is located in the bend of the Delaware River, nestled between Mercer County to the north, Bucks County to the west and Burlington County to the south and east. These counties are home to power plants, army and air force bases, and a wide array of industry which are point sources of air pollution. Furthermore, emissions from the hundreds of thousands of cars and trucks that pass by Bordentown City are a primary cause of mobile source pollution for our community. The vicinity of our community to the New Jersey and Pennsylvania Turnpikes, Interstates 295 and 195, and Routes 130 and 206, has a detrimental impact on the local air quality. Additional factors, such as local businesses like dry cleaners, auto body shops, and gas stations, poorly affect the air. When all of these sources are taken in to consideration, the quality of the air that residents breathe can be considered in jeopardy and potentially a health risk for some.

Air quality is a significant, yet mostly unperceived, factor affecting the quality and length of life in the City. However, since air quality is impacted by regional sources, strategies must be largely tailored to modify and influence activities outside the City in order to have any real impact upon the air in the City.

## 2. Water Quality

Water is essential to almost all life and must be available in sufficient quantity and quality to provide a healthy environment for human habitation. In a healthy environment the water quality will support a rich and varied community of organisms and enable the maintenance of public health. Water quality also influences the way in which communities use water for drinking, recreation, sanitation or commercial purposes. Water quality can be viewed from the different vantage points that water is used or impacted.

- Ground Water and Drinking Water
- Surface Waters
- Stormwater
- Sanitary Waste Water

These vantage points occur as water moves through the hydrologic cycle. The continuous movement of water between the atmosphere and the earth's surface, and beneath the surface, is called the hydrologic cycle. Water from the earth's surface is evaporated into the atmosphere, where it condenses and falls back as precipitation. A small part of this precipitation is intercepted by vegetative cover or lost through evaporation. The water that reaches the surface either runs off as stormwater or infiltrates below the surface. A small portion of the water that infiltrates is taken up by plants and is released back into the atmosphere as transpiration. Water infiltrating deeper into the earth accumulates between soil particles and rock as ground water. Ground water very near the surface will create wetlands. Ground water deeper beneath the surface can create an aquifer. Surface water bodies and streams are fed from groundwater and stormwater run off. Water is taken up from water bodies and aquifers for use as drinking water, sanitation, or manufacturing. Waste water from homes and businesses is returned to the earth's surface via septic systems or sanitary treatment plants.

Through the entire hydrologic cycle, water can and is polluted and filtered. Pollution can be from soil erosion, waste added by homes or businesses, and pollutants carried by stormwater from roads and structures. Water is filtered by vegetation, soils, and treatment plants.

Conservation of the quality of the water resource should consider efficient use, reduction in pollution and effective filtration.

**Ground Water and Drinking Water** - Bordentown City's water supply is drawn from ground water at four unconfined wells along the north bank of Crosswicks Creek just east of Route 206 in Hamilton Township, Mercer County. Water is used for consumption and fire fighting in Bordentown City. Most of the source, or infiltration, area for these wells is located northeast of the wells in Mercer County, which is predominantly a residential area.

In 1976 a new water treatment plant was built in Hamilton Township, on property owned by Bordentown City, along Crosswicks Creek between Rt. 206 and South Broad Street. A NJDEP Water Allocation Permit allows the Water Department to divert up to 90 million gallons per month at a maximum rate not to exceed 4 million gallons per day (mgd). The source of the drinking water is ground water taken up from wells.

Three wells have undergone major maintenance upgrades in the last 10 years and one well is only 8 years old. All of the wells are between 160 and 280 feet deep.

Average daily water demand is about 2.0 mgd. The maximum daily demand is 2.7 mgd. The overall capacity of the plant is 4.2 mgd. The plant operates 12 to 14 hours per day. The treatment process for incoming water is as follows:

1. Pre-chlorination with chlorine gas;
2. Pre-limed with calcium oxide;
3. Greensand filtered, air-stripped, and filtered again for removal of iron and manganese;
4.  $\text{KMnO}_4$  (potassium permanganate, an oxidizer, is added for removal of sulfides
5. Lime added again
6. Backwash lagoons then discharge to Crosswicks Creek (average 30,000 to 50,000 gpd).

The pH of incoming water is 4.2 (acidic) and is adjusted to 6.6 (neutral).

The local ground water level, or water table, has remained steady over past several years. Water quality is tested at QC Labs in Pennsylvania. Water is tested for coliform, Pb (lead), Cu (copper), Fe (iron), Mn (manganese), As (arsenic), pH, Cl (chlorine), radionuclides, and trihalomethane.

The condition of each of the four wells is good to excellent.

Water is distributed via an underground piping system, which is owned, operated, and maintained by the City of Bordentown Water Department. The Water Department currently owns and maintains about 70 miles of water mains in the City and Township. In the late 1980s and early 1990s, the Water Department undertook a major cement re-lining program to restore the carrying capacity of transmission mains from the water filtration plant into the City and Township. The effect of this cement re-lining program improved flow and available pressure, especially in the City and northern portion of the Township.

**Surface Waters** - Although a predominately urbanized municipality, Bordentown City contains a variety of surface water, the majority of which is freshwater wetlands (including tidal areas), wetlands and marshy areas, as well as waterways ranging from seasonal streams to major rivers. The City is within NJDEP's Watershed Management Area (WMA) 20. The major water bodies include Crosswicks Creek, forming the northwestern boundary of the City; Blacks Creek, which forms the southwestern boundary of the City; Mile Hollow Run, a stream that forms the northeastern boundary; Thorntown Creek, which intersects the City at a roughly east to west direction; and Love Bridge Run, a seasonal stream that loosely follows a portion of the southern boundary of the City. A small portion of the Delaware River channel, where it meets the mouth of Crosswicks Creek, lies adjacent to the City boundary. Wetlands include large areas associated with the Blacks Creek channel and the mouth of Thorntown Creek (partially due to a vestigial dike built by Joseph Bonaparte to create an artificial lake on the adjacent Point Breeze estate in the 1820s), as well as other smaller areas.

Documented water quality reports exist for only two portions of the City's surface water, Blacks Creek and Crosswicks Creek

**Blacks Creek (below Bacons Run)**- According to 2006 *NJDEP Integrated Water Quality Monitoring and Assessment Report*, Blacks Creek is classified as a Freshwater Non-Trout (FW2-NT) waterbody. The Biological Impairment rating is "Moderately Impaired," according to samples taken at Route 130 in Bordentown Township. Medium levels of impairment are indicated for dioxin, PCBs, phosphorous, and a low level of impairment for total suspended solids.

**Crosswicks Creek (below Doctors Creek)** - According to 2006 *NJDEP Integrated Water Quality Monitoring and Assessment Report*, Crosswicks Creek is classified as a Freshwater Non-Trout (FW2-NT) waterbody. The Biological Impairment Rating is "Moderately Impaired," according to samples taken at Point Breeze (Divine Word Missionaries property). Medium levels of impairment are indicated for dioxin, mercury, PCBs, and phosphorous, and a low level of impairment for total suspended solids.

According to the Delaware Riverkeeper Network web site, for both Crosswicks Creek and Blacks Creek, "[T]he results of the monitoring to date indicate that pH, dissolved oxygen (DO), and DO saturation are in the range generally considered acceptable to support wildlife and are similar to neighboring tributaries. The nitrates and phosphate, however, are the highest observed in the region. Nitrate is the principal form of nitrogen in most surface waters, but high concentrations of nitrate may be related to heavy fertilizer applications to lawns and crops and reflect unsanitary conditions because human and animal wastes are major sources of nitrate. Nitrate concentrations are correlated with phosphate concentrations, indicating similar sources for both nutrients." Regarding Blacks Creek, the Riverkeeper reports that "[T]he volunteers have confirmed what you already know - Blacks Creek has its problems, but is still a viable ecosystem worth protecting and restoring. It supports wildlife and offers tranquility and recreation. Blacks Creek needs continued monitoring so that field-tested stream conditions can be used as input to devise strategies for improving water quality and streamside habitat. Continued monitoring is also important to ensure the problems are identified early and corrected before significant degradation occurs."

**Sources of Water Pollution** - Pollution of surface waterways include “point” source and “nonpoint” source pollution. Point source, or piped, pollution, refers to industrial and municipal wastewater discharges of pollutants into surface water. Within the City, industrial point source pollution originates from Ocean Spray (Thorntown Creek). Immediately adjacent to the City, municipal point source pollution originates from the Bordentown Sewerage Authority (Blacks Creek, just upstream from Route 130). Further, there are other industrial and municipal point sources of pollution upstream along the Delaware River, Crosswicks Creek, Blacks Creek, and Thorntown Creek. Point source pollution is generally regulated by NJDEP, which issues permits for known point sources and sets standards for pollution levels. Nonpoint source pollution refers to the diverse, widespread and unregulated sources, including erosion and chemical runoff from lawns and farms; automotive fluids and road salts from parking lots and roads; leaking chemicals from septic tanks, underground tanks, and airborne pollutants; and fecal pathogens from pet waste, farm animals, and wildlife. Due to its amorphous origins, standards or regulations for nonpoint source pollution are difficult to implement. However, a variety of protective ordinances and public education programs may help reduce the impact of nonpoint source pollution.

Several other facilities upstream are point sources of pollution of waterways that flow through Bordentown City, including the Bordentown Sewerage Authority (Blacks Creek) and the Bordentown Water Department (Crosswicks Creek). A number of hazardous waste sites in the upper reaches of the watershed may contribute to contamination of surface waters, including McGuire Air Force Base, Hopkins Farm site (volatile organics), Wilson Farm site (volatile organics), and Goose Farm site (volatile organics). *Nonpoint sources* of pollution include agricultural runoff, suburban/urban surface runoff, and roadways and housing construction. The lower reaches of Crosswicks Creek receive herbicides, pesticides, fertilizer and silt from agricultural runoff. Stream bank erosion from pasture land also contributes to silt loads. Runoff from suburban developments, storm sewers and road maintenance, as well as local septic systems, has also resulted in nonpoint source pollution of waterways. Some common nonpoint source pollutants include:

- Nutrients (nitrates and phosphates)
- Sediments
- Pesticides and herbicides
- Pathogens (viruses and bacterias)
- Heavy Metals
- Automotive Fluids
- Road Salts

According to NJDEP, the waterways in Watershed Management Area 20 (in general) either partially support or fail to support the “aquatic life” designated use. In addition, Crosswicks Creek specifically fails to support primary contact recreation (swimming) based upon the fecal coliform bacteria levels recorded at the monitoring stations. Specifically, NJDEP reports that “[P]ortions of Crosswicks Creek and tributaries will meet the fish propagation/maintenance goal, but swimmable status can not be assigned to the watershed.”

**Stormwater** – Run off from rainwater is a nonpoint source of a variety of pollutants that travel from lawns, roads, parking lots and other impervious surface areas into local waterways. Stormwater drains to all waterways in Bordentown City through a number of outfall pipes, which are connected by more than 100 storm drains throughout the City. Stormwater initially flows into the stormwater system through a storm drain. These are frequently located along the curbs of parking lots and roadways. The grate that prevents larger objects from flowing into the storm sewer system is called a catch basin. Once below ground, the stormwater flows through pipes that lead to an outfall where the stormwater enters a stream, river or lake. In most areas of New Jersey, including Bordentown City, the stormwater sewer goes directly to a local waterway without any treatment.

In some older urban areas of the state, the stormwater and sanitary sewer systems may be combined. Here both stormwater and sewage from households and businesses travel together in the same pipes. Both stormwater and sewage are treated at sewage treatment plants, except during heavy rains. During these occasions, both the stormwater and untreated sewage may exceed the capacity of the treatment plant. In this case, overflow is directed into local waterways.

The City of Bordentown is located adjacent to the Delaware River. Topography for the City slopes gently from east to west (towards the Delaware River). Precipitation falling in the City runs off to water-courses that flow to the Delaware River (primarily Blacks and Thorntown Creeks). The precipitation events generate stormwater which, until 2003, was not required to be permitted. As a result of the United States Environmental Protection Agency's (USEPA) Phase II Rules, the NJDEP has developed the Municipal Stormwater Regulation Program. This program addresses pollutants entering our waters from certain storm drainage systems owned or operated by local, county, state, interstate or federal government agencies. These systems are called "municipal separate storm sewer systems" or MS4s. Bordentown City received its general permit No. NJ0088315 in October 2004. The City is considered a Tier A Municipality.

Thirteen municipal outfall pipes have been identified in Bordentown City, at the following locations (with evidence of scouring noted): Pine Street (scouring present), Thorntown Creek (no scouring), East Park Street (no scouring), Bank Street (no scouring), Stoney Hill (no scouring), RiverLINE Light Rail bridge (some scouring), Walnut Street (no scouring), Federal Street (no scouring), Blacks Creek (no scouring), West Union Street (no scouring), West Chestnut Street (scouring present), Oliver Street (scouring present), and Love Bridge Run (scouring present). Additionally, a NJDOT outfall pipe is located on East Chestnut Street.

Bordentown City has maintained a street sweeping program, mapped stormwater outfall pipes, installed drain markers, and adopted stormwater ordinances, as required by NJDEP.

**Sanitary Waste Water** - In 1986 the Bordentown Sewerage Authority (BSA) was formed to provide a centralized wastewater treatment system for Bordentown City, Bordentown Township and Fieldsboro. A 3.0 million gallon per day (mgd) treatment plant was constructed along Blacks Creek at the intersection of Route 206 and Farnsworth Avenue in Bordentown Township. The collection system is approximately 60 miles long and at present contains 13 pumping stations.

There is also an additional wastewater treatment facility located in the City. It is the Ocean Spray Cranberries, Inc. pretreatment plant located on Park Street in the City. It treats industrial wastewater prior to discharging into the BSA's collection system. The Ocean Spray facility is regulated under NJDEP's indirect industrial discharger regulations and meets the BSA pretreatment standards.

Almost the entire City is serviced by the BSA, with only the following few locations still utilizing septic systems:

- 356 Park Street
- 200 Lime Kiln Alley
- 215 Lime Kiln Alley
- 216 Lime Kiln Alley
- Water Street (no address)
- 100 Walnut Street (Shipps Coal Yard)
- Bordentown Yacht Club
- Yapewi Yacht Club
- Riverview Studios (end of Farnsworth Avenue)

The BSA has a hydraulic design of 3 mgd. The plant can be expanded to 4.5 mgd (ultimate design capacity) if the need arises. The raw sewage enters the facility from the collection system where it is pumped (lifted) up to the treatment units via the screw pump lift station. The forward flow then moves by gravity through the rest of the treatment units, which include (in order): bar screen and grit removal process, primary clarifiers (2), oxidation ditch treatment process, secondary clarifiers (2), and the final disinfection and metering process prior to final discharge of effluent to Blacks Creek. The waste sludge processing train includes sludge thickening and dewatering units prior to offsite sludge disposal. The wastewater treatment plant is operated efficiently and economically.

The Bordentown Sewer Authority Waste Water Treatment Plant has received the highest USEPA award for operations excellence.

The City of Bordentown's wastewater flow is approximately 1.8 million gallons per day and continues to slowly increase as commercial and residential development continues in the approved public sewer service area of the Township. There is very little flow increase attributable to the City since almost all developable land has already been developed. There is no reservation of capacity for future development specifically in the City.



#### **4. Solid Waste Management**

Solid waste management includes the production, collection, re-use and disposal of materials other than air and water by residents of a community. Although a majority of the materials are created from resources outside of Bordentown City, management of the solid waste will maintain and improve the quality of resources within the City. Striving for more sustainable waste management will reduce the regional impacts of pollution and resource degradation that ultimately affect City residents.

##### **Refuse disposal**

The City of Bordentown provides refuse collection services for residents and small businesses within the municipality. Larger commercial entities or those that require more frequent disposal contract for these services privately.

The County's Solid Waste Division plans for, implements, and operates facilities located at the 522-acre Resource Recovery Complex for the environmentally sound management of residential and commercial solid waste, the recycling and reuse of tires, construction material and old appliances, and the processing of sewage sludge into compost fertilizer.

The Burlington County Office of Solid Waste Management and Recycling is located on the 2nd floor of the EcoComplex at 1200 Florence-Columbus Road in Mansfield. It is one-half mile east of the Resource Recovery Complex.

The inclusion of recyclable items in regular trash is an ongoing concern that will likely require continuous monitoring.

**Hazardous Waste** - Burlington County operates a permanent facility, open year-round, to collect hazardous waste from County residents and small businesses.

At the Household and Small Quantity Hazardous Waste Facility, oil based paints, pesticides, thinners, household and car batteries, anti-freeze, used motor oil, fluorescent lights, and other items that contain hazardous substances are accepted from Burlington County residents and conditionally exempt small businesses.

**Recycling** - The Office of Solid Waste Management and Recycling oversees operation of the regional recycling program that provides for collection of recyclables at the curb and at drop-off sites located throughout the county. It also provides assistance to businesses, institutions, and multi-family complexes in establishing recycling programs.

Burlington County Regional Recycling Program offers curbside pickup of household recyclables every second Monday. Accepted materials include paper (including cardboard), aluminum and steel/tin food and beverage cans, glass bottles and jars, and plastic bottles (only those with a neck and #1 or #2 on the bottom) .

Bordentown City Public Works Department accepts drop-off of recyclable materials at its Recycling Center at the Gilder Field Complex. The hours are Wednesday, noon-4pm and Saturday, 8am-noon. Accepted materials include used motor oil, household paint (oil-based and latex), cans, bottles, paper/cardboard, grass, leaves, branches and stumps, appliances and scrap metal. No commercial contractors are permitted. Proof of City residency is required.

Additionally, the City offers curbside pick-up of yard waste (except grass clippings).

Burlington County has no way of differentiating between City and Township's recycling.

## **5. Topography, Geology, and Soils**

Topography, geology and soils are closely interrelated aspects of the physical environment of an area. These aspects play an important role in how humans and other life forms interact with the earth. Soils are the generally outermost expression of the earth and thereby present the closest and most frequent interface. Geology and topography may determine the type and condition of soils in an area and present factors to be considered for conservation of these resources.

Soils perform essential functions in maintaining environmental health and quality, including:

- Sustaining biological activity, diversity, and productivity;
- Regulating and partitioning water and solute flow
- Filtering, buffering, degrading, immobilizing and detoxifying organic & inorganic materials
- Storing and cycling nutrients and other elements
- Providing support for socioeconomic structures.

As soils vary in their physical, chemical, and mineralogical properties, their capability to perform these important functions also varies. Soils can also be degraded, e.g., through erosion, contamination, and compaction, which can affect their ability to function. Knowledge of soil distribution patterns and soil properties can help to put our soils to their best use and keep them functioning optimally.

**Topography** - Most of Bordentown City is nearly level to gently sloping, with elevations between 50 and 100 feet above sea level. Steep slopes are found along stream channels cut by Thorntown Creek, Mile Hollow Run, Love Bridge Run, and Blacks Creek, and on 50 foot bluffs above Crosswicks Creek. Tidal marsh deposits along the Crosswicks and Blacks Creeks are less than 10 feet above sea level.

**Geology** - Regionally, Bordentown City is located in the Inner Coastal Plain sub-province, characterized by higher elevations, more local topographic relief, and generally finer textured deposits than found in the Outer Coastal Plain.

The New Jersey Coastal Plain is composed of a wedge of sediments that can be divided into units or formations. The geologic formations comprising the older basal beds beneath Bordentown City were deposited 70 to 100 million years ago, during the Upper Cretaceous Period. In general, these formations are exposed at the surface according to age (older to younger), traversing from west to east. The *Potomac Formation*, also referred to as the *Raritan Formation*, comprises the substratum of the alluvial/tidal marsh deposits in the Delaware River channel at the mouths of Blacks and Thorntown Creeks, and Mile Hollow Run. Near Bordentown this unit consists largely of thick beds of light-colored sands and massive to thick-bedded variegated (red, white, yellow) silty clays, although exposures are rare because of the widespread cover of surface sediments.

**Soils** – In general, soils of the coastal plain are formed in unconsolidated deposits of sand, silt, clay, and gravel, predominantly of fluvial and marine origin. A soil survey for Burlington County was issued by the USDA Soil Conservation Service in 1971, and updated slightly upon digitization in 2003. Five soil series and seven miscellaneous areas were originally mapped in Bordentown City. Soils in a series generally have the same sequence of horizons, have the same drainage class, are formed from the same type of parent material, and have similar physical and chemical properties.

Two soil series make up most of the area of residential Bordentown City: Sassafras fine sandy loam, clayey substratum, 0 to 2 percent slopes (SaekA); and Freehold fine sandy loam, clayey substratum, 2 to 5 percent slopes (FrmkB). The approximate acreage and proportional extent of the soils and miscellaneous areas mapped in Bordentown City are described in the Environmental Resource Inventory.

Relative to the developed nature of the City, the most significant factors regarding the conservation of soils are erosion control and pollution.

**Erosion / Steep Slopes** - In general, landscapes of the Coastal Plain exhibit less relief than those in the piedmont regions of northern New Jersey. Unlike areas of exposed bedrock, the highly erosive nature of unconsolidated sandy sediments precludes the formation of steep slopes.

According to the USDA Soil Survey, slopes in most of residential Bordentown City are characterized by nearly level A (0 to 2%) and gently sloping B (2 to 5%) classes, where Sassafras and Freehold soils are underlain by the clayey substratum of the Merchantville formation. Strongly sloping (5 to 10%) Tinton and Freehold soils are found in wooded areas along Mile Hollow Run, above the Magothy formation. The steepest slopes in the City are along streams where the clayey substratum has been exposed, and, due to the cohesive forces of the clay, can hold the banks together to resist erosion. Strongly sloping (5 to 10%) and very strongly sloping (10 to 20%) Keyport soils are found along Thorntown Creek in both the Magothy and Merchantville formations, and along Blacks Creek and Love Bridge Run in the Magothy. Keyport soils along Crosswicks Creek are even steeper (20-30%), with slope in some areas reaching 50% or more, highlighting the cross-bedded strata of the Magothy.

The type and density of development must be closely regulated in areas of steep slopes to limit soil erosion that can lead to safety concerns for structures and inhabitants and degrade the stream corridor.

**Pollution** – Considering the long history of development in the City of Bordentown it is inevitable that some pockets of contaminated soil are present. Soil contamination tends to occur in areas previously utilized for industrial or petroleum related retail activities.

The sites below have been identified by the NJ Department of Environmental Protection - Site Remediation Program as having on-site source(s) of contamination. The source of contamination has been identified in soil and/or groundwater at the location identified in the listing. Remedial activities are either underway or required.

Site Name	Address	Status
Clare Estates	201 Crosswicks St.	Active
Auto Body Shop (abandoned)	1 1/2 Crosswicks St.	Active
PSE&G Coal/Gas	Walnut Street	Active
Exxon Service Station	Rt. 130/Crosswicks St.	Active
Sunoco Service Station	Rt.130/Rt.206	Active
Mercantini Ford	Rt. 206/Lucas Dr.	Active
Mobil Service Station	Rt. 130/Farnsworth	Active
Ocean Spray Cranberry	104 East Park St.	Active

## 6. Wetlands and Floodplains

Traditionally, bogs and swamps were considered unnecessary by-products of oceans, rivers and streams--at worst, symbols of death and decay, sources of methane, breeding grounds for noxious odors and mosquitoes; at best, they were considered a nuisance. If unusable by humans, wetlands were commonly assumed to be worthless to nature. In New Jersey and throughout the United States, laws and regulations often encouraged developers to fill in wetlands and make them "useful."

However, it is now understood that wetlands and floodplains help maintain balance in the ecosystem. By filtering sediment and pollutants from the water flowing through them, wetlands protect water quality. During periods of heavy rainfall, wetlands act as a natural flood-control device. Wetlands provide habitat for many species of birds, mammals, reptiles, amphibians and fish and a rich diversity of plant life. Wetlands help regulate the water level in streams and rivers by retaining water during wet periods and releasing it during dry periods. They help stabilize the water table by holding surface water and letting it seep into the groundwater supply. Wetlands and floodplains along a shoreline or stream bank help stabilize the land, buffering it from erosion.

Draining wetlands and filling floodplains, for urban development, results in greater runoff and probability of flooding, destruction of wildlife habitat, and elimination of the natural buffers in the hydrologic cycle. Significant natural wetlands and floodplains have been destroyed by past practices and development, resulting in the degradation of natural resources. The State of New Jersey recognized these practices as a crisis and undertook the regulation of wetlands from the Federal Army Corps of Engineers, imposing stricter land use regulations. As a result, upland buffers or setbacks along wetland areas are now required. Filling of wetlands is stringently controlled and under some circumstances remediation is required to mitigate unavoidable disturbance.

Wetlands can be classified based on plants, soils, and frequency of flooding. The highest level of classification is a system, a broad category sharing similar hydrology, geomorphology, chemistry, and biology. Most of the wetlands in Bordentown City are classified as palustrine, which includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, and all such wetlands in freshwater tidal areas. The class of a particular wetland describes the general appearance of the ecosystem, generally in terms of the dominant vegetation. The wetland classification of Bordentown City:

*PEM1B: Palustrine, Emergent, Persistent, Saturated*

These wetlands make up a small area along Thorntown Creek south of Elizabeth Street.

*PEM1C: Palustrine, Emergent, Persistent, Seasonal*

These wetlands occupy a small area along Thorntown Creek southeast of Park Street.

*PFO1A: Palustrine, Forested, Broad-leaved Deciduous, Temporary*

These wetlands occur at the mouth of Blacks Creek, the area commonly known as "Bordentown Beach." This area was created from dredge spoils from the Delaware River.

*PFO1B: Palustrine, Forested, Broad-leaved Deciduous, Saturated*

These are the most extensive type of wetlands in the City. They are found primarily along Thorntown Creek, including the portion below Park Street, and between Park Street and the freight railroad line by Ocean Spray, as well as a portion behind Gilder Field (between Elizabeth Street and Routes 206/130). Another area is found along Crosswicks Creek just south of the mouth of Mile Hollow Run. Finally, wetlands of this type occur at the mouth of Love Bridge Run and north along Blacks Creek.

*PFOIC: Palustrine, Forested, Broad-leaved Deciduous, Seasonal*

This type of wetlands occurs in two areas: along Thorntown Creek between the freight railroad line and Elizabeth Street, and along Ridgeway Brook southeast of Park Street.

*PSS1B: Palustrine, Scrub-Shrub, Broad-leaved Deciduous, Saturated*

A small section of these wetlands is found adjacent to the forested wetlands north of Thorntown Creek and northwest of Park Street.

*PSS1B/PEM1B: Palustrine, Scrub-Shrub, Broad-leaved Deciduous, Saturated/ Palustrine, Emergent, Persistent, Saturated*

A small area of this compound type of wetlands is found along Blacks Creek just north of West Burlington Street.

*PSS1C: Palustrine, Scrub-Shrub, Broad-leaved Deciduous, Seasonal*

Several small areas of these wetlands are found along Blacks Creek between West Burlington Street and Route 130.

*Tidal Marsh:* These are also very extensive, found in both Crosswicks and Blacks Creeks. They are very productive and diverse tidal emergent wetlands, found predominantly in the middle and south Atlantic coast of the United States.

New Jersey Department of Environmental Protection regulation of wetlands has effectively preserved the remaining sensitive wetland areas within the City of Bordentown. However, all land development must be continually monitored to minimize secondary impacts that can occur from the discharge of stormwater, creation of windborne debris or pollution, and the introduction of invasive plant species.

## 7. Wildlife

From estuarine wetlands to grassy back yards, Bordentown City provides a small but diverse cross-section of wildlife habitats. Because it is an urbanized area, the built-up area provides a different wildlife habitat than surrounding suburban and rural townships. Shade trees along streets and in backyards provide roosting spots for birds and small mammals. Back yard feeders provide winter food for birds and squirrels.

Geography contributes to an abundant number of wildlife species that can be found in and around Bordentown. The City is part of the Atlantic Flyway, with birds and monarch butterflies passing through Bordentown from points as far north as the Arctic Circle to tropical regions of the southern United States, Central America, or South America. Bordentown is not far from the Atlantic Ocean, with its abundance of seabirds and other marine life. The City is near the upper estuary of the Delaware River, which also fosters an abundance of habitat types. Finally, the City is bordered by forests and freshwater tidal wetlands, further contributing habitat and food.

Because of the proximity of the City to the Hamilton-Trenton-Bordentown Marsh, many wildlife species associated with that wetland system may also find refuge in Bordentown's other natural areas. Many species may spend part of their lives within these marshes, and occasionally venture into the City's built up landscape in search of food or shelter. Fox, Hawks, Wild Turkeys, White-tail Deer, Raccoons, Rabbits, and Groundhogs have been observed in residents' yards.

**Open Water Habitat** - Although the City is miles from the Delaware Bay, the tides on the Delaware River influence the City's portions of Crosswicks Creek, Blacks Creek, Thorntown Creek and other smaller channels. The tidal waters support fish, including Killifish, Catfish, Shad and Yellow Perch. The fish populations, in turn, support fish-eating birds such as Mergansers, Cormorants, Osprey, Egrets, and Herons. Great-blue Herons, Green Herons, Ring-necked Ducks, and Wood Ducks are frequently observed in ponds and slow-moving stream areas. River Otter have recently reestablished the Hamilton/Trenton Marsh as home, and evidence of Otter has been found along the banks of Crosswicks and Blacks Creeks. Rivers and ponds also provide habitat for amphibians, such as Bullfrogs and Green Frogs, and turtles, including Eastern Painted, Red-bellied, and Snapping. There is evidence of Beaver and beaver dams along Crosswicks, Thorntown and Blacks Creeks.

**Marsh Habitat** - Marshes provide habitat for Muskrats, Marsh Wrens, Least Bitterns, Yellowthroats, and Red-winged Blackbirds. Waterfowl that could be found in the wetlands, as well as creeks, might include Canada Geese, Great Blue Heron, Herring Gull, and Mallard Ducks. Snapping Turtles and Muskrats, especially in winter, have been sighted in the general area of the Trenton-Hamilton-Bordentown Marsh, as well as around the marshy areas of Blacks Creek.

**Wetland Habitat** - Shrub forest wetlands are characterized by woody species of vegetation and occur at the edges of marshes adjacent to upland areas. They also occur at the edges of marshes where they grade into swamps, with trees forming a distinct canopy, which in turn grade into wet forests and then to upland. Among the animals observed have been Baltimore Butterflies, Woodchuck, Red Fox, Willow Flycatchers (nesting), Eastern Kingbirds, Cardinals and Brown Snake.

**Forest Habitat** - Upland forests and the built environment, through the course of the year, are frequented by a great variety of birds, especially during spring and fall migrations. Brown Thrashers, Song Sparrows, and Carolina Chickadees are common. Tufted Titmice and White-breasted Nuthatch frequent winter bird feeders. Blue Jays, Cardinals, Grackles, House Sparrows, Morning Doves Woodpeckers and Starlings are wide-ranging throughout the year.

Other birds commonly found in upland forests, transitional areas and the built environment include American Goldfinch (New Jersey's State Bird), White-throated Sparrows, and Indigo Bunting. Wintering birds frequenting bird feeders include Tufted Titmouse, Carolina Chickadees, Red-Wing Blackbird, Crows, Ravens, Starlings, Blackbirds, Pigeons and White Breasted Nuthatch. Some song birds that might be summer residents or spring-fall migrants could include Goldfinch, Common Flicker, American Robin, and various species of warblers.

**Urban Habitat** - Mammals commonly found in Bordentown's built environment and adjoining natural areas include Gray Squirrel, Raccoon, Opossum, Eastern Cottontail, Stripped Skunk, Groundhog, White-footed Mouse, and Microtus. Chipmunks, House Mice, Norwegian Rat, and Bats are frequently found in and around buildings. Relying on the upland and wetland forests for cover and food, White-tailed Deer can be found within the City, although they are not that numerous, due to limited habitats.

**Federal and State Threatened and Endangered Species** – These include those species whose prospects for survival are in immediate danger. Threatened species are those that might become endangered if surrounding conditions begin to deteriorate. Both Federal and State-listed species and their habitats are offered levels of protection by various levels of government. The most notable protection measure is afforded listed species in terms of development controls. Any development infringing on wetlands that are part of a listed species habitat are subject to increased controls, which can range from wider vegetative buffers or construction prohibitions during nesting periods for a species, to outright prohibition of any development. Based on information from the New Jersey Natural Heritage Database and also the Landscape Classification System, the Bordentown area (generally corresponding to the Trenton West USGS Survey quadrangle) contains either habitat for, or observed listing for, nine listed species. Nearly all of the listed species are riverine or tidal marsh species associated with the Delaware River and its tributaries. The following endangered or threatened species may be present or could be present based upon the habitat within the prescribed areas of the City.



**Bald Eagle** - NJ status: endangered; Federal status: threatened

The Hamilton-Trenton-Bordentown Marsh is a nesting and wintering habitat of the Bald Eagle. A nesting pair of eagles has been observed on Newbold's Island in Bordentown Township. Bald Eagles require a nesting location safe from human disturbance, typically a "supercanopy" tree with a high crown above the surrounding trees, enabling them to arrive and depart from the nest with ease. Bald Eagles are mostly fish eaters, although given the opportunity, will eat almost anything of a similar nature, including carrion. The NJDEP Landscape Project has identified specific areas along Crosswicks Creek, Thorntown Creek, Blacks Creek, Mile Hollow Run and Love Bridge Run, consisting primarily of emergent wetlands, which serve as critical foraging habitat for Bald Eagles.

**Cooper's Hawk** - NJ status: threatened; Federal status: not listed

This hawk is generally found in woodlands and mixed riparian or wetland forests. About the size of a crow, they prey on smaller birds such as morning doves, sparrows, and starlings. They are commonly found to breed in remote wooded wetlands.

**Pied-Billed Grebe** - NJ status: endangered; Federal status: not listed

A small, brown diving bird, it nests in wetlands throughout New Jersey. It both breeds and winters in New Jersey. The diet consists of a variety of aquatic organisms, including fish, crustaceans, insects, and vegetation.

**Bog Turtle** - NJ status: endangered; Federal status: threatened

The Bog Turtle is the smallest native species of its type in the United States, measuring only 3-4 inches long as adults. Their habitats are wetlands with soft, muddy bottoms.

**Wood Turtle** - NJ status: threatened; Federal status: not listed

Noted for its sculpted shell, the Wood Turtle is found throughout eastern North America, south to Virginia, and mostly in northern New Jersey. Adults range from 5.5 to 8 inches in length. They reside in both aquatic and terrestrial environments.

**Short-Nose Sturgeon** - NJ status: endangered; Federal status: endangered

Once found almost clogging the Delaware River and estuarine streams, sturgeon are now almost unheard of in our region. However, as an anadromous fish, they were prominent in the Delaware River and creeks in the Bordentown area.

**Eastern Pondmussel** - NJ status: threatened; Federal status: not listed

The Eastern Pondmussel can be found in the tidal Delaware River and its tributaries.

**Tidewater Mucket** - NJ status: threatened; Federal status: not listed

Like the pondmussel, the Tidewater Mucket is found in the Delaware River, although it has been located in both tidal and freshwater portions of the river.

**Yellow Lampmussel** - NJ status: threatened; Federal status: not listed

The Yellow Lampmussel prefers large rivers, like the Delaware River where it has been found, and makes its home in sand/silt substrates.

## 8. Vegetation

The Inner Coastal Plain is often characterized by botanists as a transition area between the Mixed Oak forest to the north and the Pine-Oak forest of the Outer Coastal Plain. Many species of northern affinity reach their southern limit in this region, and southern species their northern limit.

**Upland Forest** - The natural vegetation community that predominated Bordentown City prior to development was deciduous upland woodland that is generally called a Beech-Oak Forest. Once covered by Chestnut and Beech trees, these areas have been cut repeatedly since European settlement. The upper canopy is dominated by American Beech, White and Red Oaks, along with Tuliptree. Understory trees in a Beech-Oak Forest include American Holly, Dogwood, Ironwood, and Sassafras. The shrub layer will include Maple-Leaved Viburnum, Witch hazel, Spicebush, and Arrowwood. Rhododendron, more generally associated with cool, moist sites in North Jersey, reach considerable size on north-facing slopes along Thorntown and Blacks Creeks. Vines include Virginia Creeper and Poison Ivy. May Apple, Jack in the Pulpit, and Fake Solomon's Seal are the common herbaceous plants.

**Lowlands** - Lands that have been preserved from development tend to be low or wetlands associated with streams and rivers. These areas would have been smaller than the upland areas prior to development and therefore the vegetation in this would have been less frequent. However, deciduous wooded wetlands now make up a significant portion of the existing natural vegetation. These areas are found along stream channels, occurring primarily on alluvial deposits in the floodplain. Dominant canopy trees include Box Elder, Silver Maple, Red Maple, Sweetgum, White Ash, and Sycamore. The understory includes Spicebush, Elderberry, and the invasive Privet, Multiflora Rose, and Japanese Barberry. Jewelweed and the invasive Garlic Mustard and Japanese Stiltgrass are found in the herbaceous layer. Some wetlands can not support vegetation taller than 20 feet in height and the vegetation will be void of mature canopy trees noted above.

**Marshes** - Freshwater tidal marsh wetlands are found along Blacks and Crosswicks Creeks. Submerged vegetation such as Spatterdock, Waterweed, and Water Milfoil grow in the streams and permanent ponds. High marsh is the most widespread habitat, dominated by a mixture of annuals and perennials, including Arrow Arum, Tearthumb, Cattail, Reed Canary Grass, Pickerelweed, Arrowhead, Giant Ragweed, and Wild Rice. As of 2003, botanist Mary Leck of Rider University had identified 850 species of plants, including 28 endangered, threatened, or rare for New Jersey, in the Hamilton-Trenton-Bordentown tidal marsh.

**Transitional Landscape** - A transitional or disturbed deciduous woodland or shrubland occurs in areas that have been disturbed or timbered more recently. The less mature canopy trees in these areas consist of Sweet Gum, Tuliptree, Black Locust, and Black Cherry. Poison ivy and invasive trees and shrubs may be common, including Callery Pear, Multiflora Rose, Japanese Honeysuckle, and Winged Euonymus.

**Endangered or Rare Plant Species** - A considerable number of State Endangered and Rare Plant Species have been observed in Bordentown City, predominately in the Hamilton-Trenton-Bordentown Marsh. These herbaceous species include - Indian Plantain, Low Flatsedge, Wafer Ash, Rare Purple Giant Hyssop, Frank's Sedge, Smartweed Dodder, Toothed Tick-trefoil, Wild Rice, American Starwort, Tall Thoroughwort, Mud Plantain, River-bank Quillwort, Narrow-panicked Rush, Torrey's Rush, Winged Monkey Flower, Eastern White Water Crowfoot, Subulate Arrow Head, Smith's Bulrush, Black Woolgrass, Wild Pink, Smooth Hedge-nettle, Humped Bladderwort, Flat-leaved Bladderwort, and Pickerelweed. Star Chickweed was found in the woodlands along the lower reach of Thorntown Creek.

## 9. Noise

**Noise Factors:** Noise negatively affects human health and well-being. Problems related to noise include hearing loss, stress, high blood pressure, sleep loss, distraction and lost productivity, and a general reduction in the quality of life and opportunities for tranquility.

**Traffic Noise** - Most areas of Bordentown City's one square mile are exposed to above-average noise levels, due primarily to the local topography and proximity of residential housing to major roads. Particularly affected are the residential streets on the edges of the City. The most significant noise comes from automobile and, especially, truck traffic on the I-295 bridges over Burlington Street and Crosswicks Creek, as well as noise from Rt. 130 on the southern and eastern edges of the City.

**Rail Noise** - In addition, there are noise issues related to local passenger and freight train service. New noise issues were created with the introduction of the RiverLINE light rail service in 2004, particularly in the north/northwestern quadrants of the City. The train car rings a bell as it stops at the station located at the end of Park Street, and blows its horn once at the grade crossing at the end of Farnsworth Avenue. Noise from the RiverLINE train is not currently a factor midnight - 6:30am on weekdays, and 1am - 6:30am on weekends, as the train does not operate during these hours. The CSX freight train that runs through the City along a roughly northeasterly axis (paralleling Railroad Avenue) during the early morning hours also presents a noise issue. It blows its horn at the grade crossing at the Second Street Alley. This train has no set schedule, but its early morning operation effects nearby residences.

## 10. Land Use and Open Space / Recreation

Land in Bordentown City is used in many different ways, with many different uses adjoining or proximate to each other. The chart below shows how the land is used (from 2005 data):

Land Use Categories	% of City
Residential: Single Family Detached	25.0
Residential: Single Family Attached	3.8
Residential: Two-Family	2.1
Residential: Three-Family and Up	7.6
Downtown Commercial	1.4
Local Commercial	2.5
Highway Commercial	3.9
Industrial	6.0
Public/Quasi-Public	28.3
Railroad	0.9
Open Space/Parks	6.3
Environmentally Sensitive	8.0
Vacant	4.2
<b>TOTAL</b>	<b>100.0%</b>

**Residential** - Residential housing accounts for the largest share of land use, 38.5%, in the City, comprising of a wide range of housing types. Single-family attached and detached houses, multi-family houses, apartment complexes, age-restricted and assisted living facilities, carriage houses/granny flats, and apartments above retail stores offer a mix of housing opportunities to a wide range of household incomes.

**Commercial** - There are three commercial areas within Bordentown City, comprising 7.8% of land use, including the Downtown and Local Commercial Districts and the Highway Commercial District along Routes 206 and 130.

A small portion of mixed use properties are located mainly in the Downtown District along Farnsworth Avenue, comprising buildings that contain retail shops, restaurants or offices on the ground floor and apartments on the second and third floors.

**Industrial** - Industrial land use, comprising 6% of the City, consists primarily of the Ocean Spray processing plant located on Park Street. Other small light industrial operations are scattered throughout the City.

**Public/quasi-public** - These land uses comprise 28.3% of the City, including churches, schools, municipal/government offices, and other tax-exempt properties. A large portion of Public/Quasi-Public land use is the Divine Word Missionaries property.

**Rail** - The RiverLINE light rail and freight rail lines account for 0.9% of City land.

**Open Space** - Open space accounts for 6.3% of the land and is owned and managed by a variety of entities. City property includes local parks, such as the Bordentown Beach/Boat Ramp area, Gilder Field, Hilltop Park, and Second Street Park. A few small City-owned properties are undeveloped as parkland and unmanaged. School playgrounds are located at the Clara Barton School and off East Burlington Street.

**Environmentally Sensitive** – This land encompasses 8.0% of City land, primarily along Thorntown and Blacks Creeks, and is undeveloped floodplain and wetlands that serve as vital habitat, flood control, and natural buffers to the urbanized areas of the City.

**Vacant** - A small percentage (4.2%) of City land is vacant. Small vacant building lots are scattered throughout the City, with some of the significant or environmentally valuable vacant parcels proposed for acquisition as passive open space. For more details on open space in Bordentown City, see the Bordentown City Open Space Plan.

**Recreation** - Public open space within the City is limited to several parks and playgrounds, as well as the Bordentown Beach. Proposals for future open space acquisition and trail networks include the Railroad Avenue Promenade, Lime Kiln Alley Park, Oliver Street Park, Thorntown Creek Greenway, and Blacks Creek Greenway.

*Railroad Avenue Promenade* will consist of a linear park immediately adjacent to (and above) the freight rail line from Prince Street to Second Street, facilitating off-road pedestrian movement within the central business district and providing the most centralized open space area within the City to date.

*Lime Kiln Alley Park* is planned for an area along Blacks Creek at the base of Lime Kiln Alley. It will consist of several small parcels, including an area recently subjected to remediation by PSE&G (formerly a coal-gasification plant at the turn of the century), and offer a non-motorized boat launch area, as well as opportunities for fishing, wildlife viewing, and environmental and historical education for local residents and school children.

*Oliver Street Park* is proposed for a three-acre site at the southern end of Oliver Street, providing a passive open space area in the southern section of the City and access to Blacks Creek and the proposed Blacks Creek Greenway trail.

*Thorntown Creek Greenway* envisions a preserved natural corridor along the creek floodplain, with a pedestrian trail extending from Gilder Field to the mouth of Thorntown Creek where it meets Crosswicks Creek.

*Blacks Creek Greenway* is an ambitious open space effort, planned jointly with Bordentown Township, and includes property on both the City and Township sides of the creek. A loop trail is envisioned to extend from the Bordentown Beach area, across Blacks Creek to the Township side, traversing the upland side of the creek in a southerly direction, and re-entering the City across Blacks Creek at the location of the remnant bridge abutments across Mill Street (with a connection to Oliver Street Park). This will also link with the regional Delaware River Heritage Trail, a 60-mile recreational corridor traversing New Jersey and Pennsylvania.

Both greenways will provide recreational opportunities, including walking, jogging, wildlife viewing, plant identification, and quiet reflection. They will also provide ecological benefits, including: protecting wildlife habitat corridors; providing a critical buffer zone for the protection of water quality; controlling soil erosion and sedimentation; fostering cleaner air through the preservation of mature trees and vegetation; providing an outdoor classroom for environmental and historical education opportunities; and enhancing the ability of residents to travel within the City in a non-motorized fashion.

## **11. Demographics**

The rise and fall of Bordentown City's population has been greatly influenced by its geography and history. According to the U.S. Census Bureau, the population of the City in 2000 was 3,969, and with a total square mileage of land area only .92 miles (one square mile total including water), Bordentown's density is 4,137 people per square mile, or four times the New Jersey average of 1,134.

A small geographic area and housing stock largely built up to the mid 20th century have influenced small changes in either population growth or decline in the city. In 1990 the population of the City was 4,341. The 2000 population represented an 8.6% decrease since 1990. Estimates for 2003 supplied by the New Jersey Department of Labor and Workforce Development indicate a 1% increase to 4,013.

With its founding in 1682, the City was the center for northern Burlington County's services and industry. It also was a transportation hub, being located at the most southerly point of the Delaware and Raritan Canal. This created a population center that led to its early residential and commercial development, and the older housing stock reflects growth in the 19th and early 20th century. Although not built-out, there is little suitable land remaining for residential development. These combined forces have influenced little population change in the City. The median year housing structures were built in Bordentown City is 1939, compared to 1960 for New Jersey. Within the City, of the total 1,884 housing units, only 52% are owner-occupied units, compared to the state average of 61%, which is close to the national average.

The demographic makeup of the City of Bordentown shows similarities and differences from the New Jersey norm. The racial composition of the City is largely white – 81.3%, compared to the New Jersey average of 72.6%. Blacks, or African Americans, make up 13.1% of the population, close to the New Jersey average of 13.6%. However, the City has few other race and ethnic groups, such as American Indians and Asians, comprising a combined 2% of population, compared to the state average of 5.9%. Year 2000 median household income of \$47,279 was below the state average of \$55,146.

High density of population and in turn high density of residential units, in a small area can lead to certain environmental problems, such as increased amounts of run-off, non-point source pollution and increased demand on storm sewers. An aging housing and building stock means a higher proportion of service utilities that are also aged and subject to eventual leakage into ground and surface waters. Thus, it is crucial for City officials to monitor and maintain infrastructure. However, with incomes that are below the New Jersey average, Bordentown City has limited financial resources for costly repairs to its utilities.

## **12. Historic and Aesthetic Resources**

**Historical Overview** - The City of Bordentown encompasses a one square mile area, tucked onto the bluffs of the Delaware River approximately 45 miles upstream from Philadelphia. With New York City 75 miles to the north, it is understandable that this small city became a colonial transportation hub. The City started its existence in 1682 with a log cabin on the riverbank and the name Farnsworth Landing. Settled by Quakers, the town was a trading point in colonial America. In 1717 a farmer from Freehold named Joseph Borden settled here, bought up a substantial part of the land and changed the town's name to Borden's Town. He started a packet line from Philadelphia to Bordentown, where travelers would stop to rest and then proceed on Borden's stage line to Perth Amboy, where they would make their connections to New York.

Many of the founding fathers of the country passed through Bordentown, which had become a bustling city of trade by the late 1700s. Francis Hopkinson, signer of the Declaration of Independence, lived in town. His son, Joseph, author of the song “Hail Columbia”, resided here as well. Thomas Paine, through his friendship with Col. Joseph Kirkbride, a veteran of the Revolutionary War, became enchanted with Bordentown and spent much time here, eventually buying a house in town. Bordentown's importance as a crossroads was not lost even on the British. The town was occupied by British forces on three separate occasions during the American Revolution, including in 1778 when two Continental frigates were burned and sunk in Crosswicks Creek as British troops attacked and briefly shelled the City.

Bordentown's historical significance did not end with the Colonial period, as it continued to play a major role in transportation. The first movement by steam on rails in the United States occurred in 1831 on the outskirts of town by the steam engine *John Bull* (now part of the Smithsonian Collection). Bordentown was an important stop on the railroad line between Philadelphia and New York.

American Presidents and notables passed through town and some stayed, including Clara Barton, the founder of the Red Cross, who in 1852 established in Bordentown City the first successful free public school in New Jersey. The exiled King of Spain and Naples, Joseph Bonaparte, elder brother of Napoleon, also resided in Bordentown, in the early 1800s. Given the convenient location to cultural centers and the abundance of unspoiled property, Joseph Bonaparte purchased large tracts of land from Bordentown to Trenton, naming it “Point Breeze”, and built his mansion in Bordentown on the bluffs overlooking the Delaware River valley. Bonaparte brought a European influence to the town. While residing in Bordentown he hosted many important contemporary figures, including the Marquis de Lafayette, John Adams, Henry Clay and Noah Webster among others.

Bordentown's location on the Delaware River, just south of the state capital of Trenton, made it an important river port during the 18<sup>th</sup> and 19<sup>th</sup> centuries. Shipbuilding and river trade were prosperous industries. The opening of the Delaware & Raritan Canal in 1834 also played a significant role in the town's growth. But throughout these changes and commercial boom times, Bordentown remained small. The City was incorporated as a borough in 1849 and as a city in 1867. As the town has grown, the architecture has evolved as well. Buildings of Federal, Victorian, and Arts & Crafts styles, from bungalows to stately mansions, document the architecture of the 18th, 19th, and 20th centuries. Today, much of the City's square mile is a designated Historic District, and numerous properties are on the State and National Historic Register.

**Areas of Scenic Value** - There are several viewsheds within Bordentown City that merit special recognition for their scenic qualities.

*Point Breeze Viewshed:* The viewshed along Park Street adjacent to the Divine Word Missionaries property (looking west) is valuable both in terms of its natural beauty and historical significance. The landscape consists of both open lawn and mature forest, very similar to the landscape as it existed during the time of Joseph Bonaparte's Point Breeze Estate.

*Hilltop Park Viewshed:* The viewshed at Hilltop Park is valuable both in terms of its natural beauty and historic significance. From this spot on top of the bluffs, a panoramic view of the mature vegetation of Duck Island, Crosswicks Creek and the Hamilton-Trenton-Bordentown Marsh can be seen in one sweeping gaze. The view also encompasses the Lock #1 area of the Delaware & Raritan Canal and the area that contained the locktender's house, as well as the location of sunken Revolutionary War-era ships.

*Blacks Creek Viewsheds:* Various viewsheds of Blacks Creek are accessible within Bordentown City. These views provide an intimate glimpse into the ecology and wildlife of a tidally influenced stream and marsh. The tidal zone, which is exposed by as much as eight feet twice each day offers a dramatic view of the stream channel, changing stream flow, and the rich variety of vegetation and wildlife that exist in this dynamic area. The area is frequented by numerous bird species and is a critical foraging habitat for the Bald Eagle.



### **PART 3: GOALS, STRATEGIES, RECOMMENDATIONS AND INDICATORS**

For each of the goals enumerated at the beginning of this document the following strategies, recommendations and indicators are proposed to strive to attain articulated conservation goals.

**Strategies**, also called objectives, are specific means of achieving the goal.

**Recommendations** are particular tasks, policies or efforts that are suggested to affect the stated strategy and goal.

**Indicators** are measurements that enable monitoring of progress made toward achievement of the intended goal. Potential indicators or data that could be recorded and monitored are offered for consideration. To assist with the consideration of sustainability strategies offered in this plan, the indicators listed for each goal could be monitored. Part of this monitoring would include establishing base line or existing data for each indicator and setting targets. However, it is beyond the scope of this effort to provide the research to establish base line data for these indicators.

It should be expected that some of these strategies will promote improvement for more than one goal, but each strategy and recommendation is listed only once under the goal that seems most affected. Recommendations relating to municipal government are listed first followed by those that relate to other government entities and the private sector.

**GOAL #1 - Protect sensitive environmental resources against degradation and restore impaired resources.**

**STRATEGIES**

- Protect critical wildlife habitat.
- Protect steep slopes.
- Protect urban forest.
- Protect waterways with buffers.
- Protect against light pollution.

**RECOMMENDATIONS**

1. *Implement Conservation Restricted Overlay zoning to protect environmentally sensitive areas.*
2. *Explore enactment of Integrated Pest Management (IPM) programs for City properties and schools.*
3. *Encourage creation of stream corridor buffers. Enact tree removal restrictions, and steep slope and stream buffer ordinances. Couple these efforts with education of residents.*
4. *Monitor for enforcement of NJDEP environmental regulations.*
5. *Investigate funding sources, including creation of local Open Space tax, in order to protect environmentally sensitive areas from development impacts through purchase of property or easements.*
6. *Promote dedication of property or easements to protect environmentally sensitive areas associated with land use applications.*
7. *Investigate the creation of greenways of preserved open space around and through the City, linking environmentally sensitive areas, parks and trails. Evaluate opportunities to create greenways along the Delaware River and local tributaries.*
8. *Integrate and coordinate local environmental preservation with County, State and non-profit initiatives.*
9. *Employ best management practices in the design and modification of utility systems including potable water supply, wastewater treatment, stormwater control and treatment, and groundwater use. Develop programs, policies and projects to mitigate impacts upon natural resources associated with the operation, management, maintenance and expansion of municipal facilities.*
10. *Adopt plans and regulations to improve the quality of stormwater runoff in accordance with NJDEP regulations.*

11. *Produce an Environmental Impact Statement for all large development projects, including an evaluation of impacts upon woodland, water quality, wildlife, air quality, and other resources.*
12. *Investigate and protect any critical habitat area identified within the City by NJDEP. Continue to monitor NJDEP designations regarding critical habitat areas.*
13. *Enact a Dark Sky ordinance and work , through education, to expand compliance to those who might be “grandfathered in”.*
14. *Encourage “green” street cleaning and snow removal.*
15. *Encourage registration, development and certification of Bordentown City as a Community Wildlife Habitat.*
16. *Acquire properties listed in the Bordentown City Open Space Plan Element for preservation.*

## **INDICATORS**

- Acres of environmentally sensitive lands in the City placed into conservation or preservation restrictions.
- Acreage of City property dedicated to or restored for environmental conservation.
- Water quality testing of local waterways for nitrates/nitrites, phosphates, dissolved oxygen, pH and other pollutants associated with stormwater runoff.
- Number of public and private spaces that are certified National Wildlife federation certified Wildlife Habitats.

**GOAL #2 - Provide a healthy environment in terms of providing adequate air, light, water and open space in all areas of the community.**

**STRATEGIES**

- Reduce vehicular circulation in conventional vehicles and the resultant air pollution.
- Prevent water pollution at the source.
- Carefully scrutinize development of pervious pavements, emphasizing efficiency.
- Provide open space and landscape planting at an appropriate scale with all public and private land development.

**RECOMMENDATIONS**

1. *Promote land use that minimizes or reduces vehicular movements and the resultant air pollution.*
2. *Encourage compliance with anti-idling laws. Support enforcement efforts and add signage at appropriate schools and businesses.*
3. *Promote use of fuel-efficient, hybrid or alternative fuel vehicles. Consider pilot programs for vehicle(s) in the City fleet. Research school bus options and transmit findings to Board of Education. Increase use of fuel-efficient and hybrid/clean fuel vehicles in municipal fleet and amongst residents, including Neighborhood Electric Vehicles and electric bikes. Review ordinances to remove any local impediments.*
4. *Educate and inform residents and school children about air and water quality issues to encourage environmentally literate decision-making.*
5. *Promote shared parking arrangements with businesses and NJ Transit parking lots.*
6. *Preserve and create open space in appropriate locations through acquisition, and the pattern of development/redevelopment approved with land use applications.*
7. *Promote groundwater re-charge in association with all private and public land development/redevelopment proposals.*
8. *Continue to monitor and maintain the integrity of groundwater supply to wells utilized for potable water.*
9. *Investigate the integrity of septic disposal systems in the City.*
10. *Maintain and increase municipal tree planting, and encourage residents to plant trees where appropriate.*
11. *Ensure future utility lines are installed underground.*
12. *Improve overall cleanliness of the City in terms of litter, pet waste, etc.*

13. *Monitor decibel levels at various locations within the City. Investigate noise reduction measures at local, County and State level with regard to noise from nearby highways.*
14. *Review current situation regarding environmental justice issues and work to ensure that access to all conditions for healthy environment are available to all residents, regardless of age, ethnicity or income.*

## **INDICATORS**

- Asthma rates amongst children in school district or City.
- Monitor water quality reports from Bordentown Water Department.
- Number of new development projects that employ groundwater recharge stormwater controls.
- Percentage of residents within 10-minute walk of open space.
- Number of vehicles operated by City and school district.
- Water quality testing of City streams on a regular basis to assess reductions in non-point source pollution.

**GOAL #3 - Promote sustainable interaction with natural resources for recreation and education.**

**STRATEGIES**

- Provide adequate parkland for all residents.
- Promote easy access to open space and waters.
- Link schools to local parks.
- Promote environmental education in schools and at community events.

**RECOMMENDATIONS**

1. *Provide parks, open space, waterfronts and outdoor recreation facilities to all residents appealing to a variety of age and user groups.*
2. *Develop and maintain “urban” and “nature” interpretive trails parks and greenways throughout the community, with linkages to one another, throughout the community and to neighborhoods outside the community. Strengthen and promote community involvement in planning, creation, and stewardship of these places.*
3. *Inventory all existing parks, open space and recreation areas for size and facilities.*
4. *Develop Oliver Street Park, Lime Kiln Alley Park, Thorntown Creek Greenway, and Railroad Avenue Promenade.*
5. *Enhance Bordentown Beach area with landscaping and facilities, improve water access, and delineate park area.*
6. *Protect and repair stream banks – particularly at stormwater outfalls.*
7. *Continue to improve Hilltop Park, Gilder Field, and local playgrounds.*
8. *Convert some paved areas to green spaces.*
9. *Create stream identification signage.*
10. *Create interpretive signage describing natural resources.*
11. *Install bird boxes on parkland.*
12. *Promote access to outdoor recreation and nature observation equipment for canoeing, kayaking, biking, hiking bird-watching, and other outdoor activities (sales and rentals) within the City.*
13. *Develop and maintain public water access areas and facilities.*
14. *Create maps showing natural habitat.*

15. *Encourage outdoor classroom sessions in schools and at community events to teach awareness, respect, understanding and stewardship of local natural resources.*
16. *Explore development of an Environmental Education Center in the community.*
17. *Develop Bordentown City “Green Map”, a guide to sites, organizations, businesses, and facilities that help promote a sustainable environment.*
18. *Develop local “Tree Tour” .*
19. *Integrate organic gardening and schoolyard habitats into school curricula.*
20. *Publicize opportunities for interaction with natural areas – trails, etc.*
21. *Develop programs to encourage interaction with natural areas.*
22. *Promote and publicize activities and programs of the Environmental Commission and other local conservation organizations.*
23. *Promote and expand Environmental Commission web page to disseminate information.*
24. *Develop community bulletin board or kiosk.*
25. *Investigate Wireless Internet access for the entire City.*
26. *Integrate conservation efforts with local schools and children.*
27. *Encourage local schools and colleges to partner with the City as source for environment-based education across subject areas, including service learning projects and career exploration.*
28. *Consider development of a school adopt a park program.*
29. *Develop non-motorized boating launch along Blacks Creek/Lime Kiln Alley.*

## **INDICATORS**

- Maximum and average distance between parks or trailheads and all residences in the community.
- Number and type of community education events conducted.
- Percentage of residents who are within 10-minute walk of park or open space.
- Number of hours, number of students, and/or number of classes involved each year in environment-based education outside classrooms or in City parkland.

**GOAL#4 – Conserve the historic, small town character of the City.**

**STRATEGIES**

- Conserve and expand the historic district within the City.
- Strengthen local historic preservation review and controls.
- Respect existing architectural styles.
- Preserve local historic landmark buildings and historic places.
- Record history for future generations.
- Educate residents about history of Bordentown City.

**RECOMMENDATIONS**

1. *Inventory and study existing structures and development patterns to explore potential expansion of the historic district or designations in the City.*
2. *Develop and adopt a Historic Preservation Plan Element to the Master Plan.*
3. *Examine zoning ordinance provisions that pertain to Historic Preservation to strengthen requirements to maintain and refurbish significant elements.*
4. *Explore creation of a Landmarks Preservation Commission.*
5. *Require a thorough analysis of historic structures and activities on properties that are the subject of land development applications and/or public projects.*
6. *Develop guidelines for new construction that encourages or requires architectural design that fits or complements historical structures and streetscapes within the community.*
7. *Develop guidelines or ordinances that require historically appropriate signage in association with Historic Districts and Structures.*
8. *Preserve Old City Hall, Gilder House, and other historically and architecturally significant structures within the City.*
9. *Investigate and secure funding for the preservation of historic sites.*
10. *Promote historic walking tours.*
11. *Identify/gather details of City's history from founding to the present, including all aspects-economic, social, environmental-of daily life.*
12. *Develop oral history project-interview current and former residents; many families have lived in town for several generations and have detailed knowledge that would otherwise be lost.*



13. *Gather and distribute historic pictures of Bordentown City. Follow up with in-depth research. This information would form the basis of historic/eco-tourism industry that could be developed.*
14. *Promote historically sensitive retrofitting of energy conservation measures.*
15. *Ensure a variety of housing types, and discourage teardowns and McMansions on small lots.*
16. *Provide education for all ages concerning the history of Bordentown City, including roles of geography and natural resources.*

## **INDICATORS**

- Number of structures, landmarks or locations registered on State or Federal Historic Preservation Registries.
- Number of structures, landmarks or locations refurbished utilizing Historic Preservation criteria.
- Number of structures, landmarks or locations placed under restrictions to protect the Historic character or integrity.
- Number of historic walking tours available, and number of people attending them.
- Number of books, newspaper articles and other media written or produced on some aspect of the history of Bordentown City.

**GOAL #5 - Respect and maintain individual neighborhood character, pride and heritage.**

**STRATEGIES**

- Preserve and create distinctive civic spaces.
- Scrutinize environmental aspects of land development regulations and land use applications to establish appropriate density, height, impervious coverage and use that will enhance environmental conditions in City neighborhoods.
- Promote and encourage maintenance and improvement of structures throughout the City.
- Promote and encourage maintenance and improvement of landscape areas throughout the City.

**RECOMMENDATIONS**

1. *Adopt Visual Design Code that provides guidelines for building and architectural styles and patterns that complement the existing streetscapes, and encourage development proposals to follow its recommendations.*
2. *Enforce building codes in order to preserve and maintain residential and commercial structures, especially in the historic districts.*
3. *Implement streetscape improvements, including benches, lighting, sidewalks, bicycle parking racks, bus shelters and other street furniture.*
4. *Create context-sensitive way-finding and interpretive signage.*
5. *Encourage public art initiatives.*
6. *Schedule neighborhood and local stream clean-up events.*
7. *Create neighborhood alliances and associations.*
8. *Create and sustain a local farmer's market.*
9. *Encourage creation of community gardens, and designate areas for their potential location.*
10. *Promote block parties in various neighborhoods.*
11. *Encourage participation and representation from each neighborhood in citywide events such as Holiday House Tours, Spring Garden Tours, Halloween Decorating Contests, Citywide Yard Sale and other events.*
12. *Provide new homeowners with information on street tree maintenance.*
13. *Establish a "heritage tree" program.*

14. *Promote backyard wildlife habitat.*

15. *Install flower boxes and planters at strategic locations within neighborhoods.*

**Indicators**

- Number and species of street trees planted each year.
- Participation at community events, gardens and other programs.
- Number of public art projects initiated
- Areas of public landscaping created

**GOAL #6 - Promote balanced, diverse land use with a traditional character that fits the community.**

**STRATEGIES**

- Promote Smart Growth initiatives locally that reflect NJ State Land Use Plan.
- Promote mixed-use land development.
- Promote adaptive re-use of sound existing structures that convert to new uses.
- Require architectural design standards for new and re-construction that is compatible with the historical character of the property and/or neighborhood, in terms of style, scale and detailing.
- Encourage efficient land use that shares access and parking, while promoting pedestrian movements.

**RECOMMENDATIONS**

1. *Examine land use patterns and consider ordinance modifications that will encourage and promote mixed-use development of home businesses, commercial enterprises, and appropriate small scale industry, where appropriate to efficiently place residences with commerce, transportation and employment and reduce impact upon natural resources.*
2. *Consider ordinance modifications that promote conformance with Smart Growth principles and the NJ State Plan.*
3. *Establish guidelines or codes for the development of new buildings to have appropriate scale and massing, utilizing natural or traditional building materials, that respect and relate to existing development.*
4. *Adopt a Redevelopment Element into the Master Plan.*
5. *Promote shared parking arrangements with businesses and NJ Transit (RiverLINE parking lot).*
6. *Promote creation of shared municipal parking lots where appropriate.*
7. *Retain and expand affordable housing.*
8. *Discourage housing teardowns and development of McMansions.*

## **INDICATORS**

- Number of parking stalls in shared parking lots.
- Miles of pedestrian paths created in the community.
- Number of new mixed-use development projects or conversions.
- Number of home-based businesses.
- Number of residences above first floor in downtown business district.

## **GOAL #7 - Sustain natural and cultural resources for future generations.**

### **STRATEGIES**

- Acknowledge effects of global warming and climate change.
- Reduce climate changing emissions.
- Improve air quality locally.
- Minimize water use and maximize water conservation.
- Minimize stormwater runoff, promote groundwater recharge and improve water quality.
- Ensure sustainable supply of drinking water.
- Adopt a sustainable approach to governance.
- Promote a sustainable approach to facility development and management in the private sector.
- Promote sustainable land use and redevelopment within the City.
- Educate residents about environmental and conservation issues.

### **RECOMMENDATIONS**

Overview: Create an ecologically sustainable, socially just and vibrant local economy as the basis for City's future economic prosperity, environmental health and high quality of life.

1. *Review and evaluate the economic, social and environmental aspects of government practices to determine appropriate modifications to policies, duties, facilities and equipment that will implement a more sustainable approach and result.*
2. *Encourage residents to manage their households with products and services that are produced in an ecologically sustainable manner; maximize recycling, minimize energy use; minimize use of toxics; and eliminate the release of toxic material into the environment.*
3. *Enforce local, and promote enforcement of County or State, environmental regulations.*
4. *Explore and implement regionalization of services amongst neighboring municipalities.*
5. *Encourage application of Leadership in Energy and Environmental Design (LEED) certification criteria to the evaluation of future public facility development, expansion and rehabilitation.*
6. *Use all material and energy resources with the highest possible efficiency. Create guidelines for more sustainable municipal purchasing (e.g. recycled paper products, recycled ink cartridges, Energy Star appliances, etc.).*
7. *Conduct an energy audit of municipal facilities and develop a plan to improve energy efficiency.*
8. *Explore participation in energy conservation incentives offered by New Jersey Board of Public Utilities and local utility service providers (PSE&G).*

9. *Explore the purchase of renewable energy credits (NJ Clean Power program) for municipal facilities.*
10. *Establish a policy that encourages City staff to conserve energy use by turning off lights, equipment and computers or other machinery or vehicles when not in use.*
11. *Explore the use of bio-fuels for municipal vehicles or equipment.*
12. *Replace regular lighting elements with more efficient compact fluorescent or LED fixtures.*
13. *Encourage the replacement or retrofitting of street and traffic lighting with higher efficiency fixtures, luminaries or bulbs.*
14. *Encourage and promote integration of “green” building practices into private site and building construction.*
15. *Encourage all new public buildings, and the major redevelopment of any existing building, public or private, to be built to green building standards.*
16. *Encourage use and purchase of renewable energy for City buildings and amongst residents, including geothermal, wind, solar electric and solar thermal energy systems, and BPU Clean Power program.*
17. *Investigate solar power initiatives on City-owned buildings.*
18. *Investigate the potential for capturing methane from Bordentown Sewerage Authority and re-directing into the energy grid.*
19. *Maintain and improve the efficiency of the City water utility by implementing appropriate repairs, upgrades and maintenance tasks.*
20. *Enforce local littering and illegal dumping ordinances.*
21. *Expand municipal composting program.*
22. *Clean storm drain catch basins on a regular basis.*
23. *Create signage that educates residents about non-point source pollution and its effects on local waterways.*
24. *Create signage identifying local waterways.*
25. *Establish regular water quality monitoring of local streams.*
26. *Promote use of native plants, including creation of a list of native, wildlife-friendly plants and creation of native plant demonstration gardens.*

27. *Monitor for the presence of invasive exotic plant species in environmentally sensitive open spaces in the City.*
28. *Discourage planting of invasive species by residents and City.*
29. *Investigate bulk “green” purchasing for City supplies.*
30. *Develop inter-municipal agreements to control point and non-point source pollution from existing and new site development throughout the watershed inclusive of the City.*
31. *Encourage water and stormwater control/recharge systems partnerships with Bordentown Township.*
32. *Require pervious paving wherever possible, in order to recharge stormwater.*
33. *Educate residents, businesses and students about natural resource and conservation issues.*
34. *Encourage installation and retrofitting of more efficient water fixtures.*
35. *Ensure/improve quality of water that cycles through City as it recharges local streams and groundwater.*
36. *Educate/encourage public about non-toxic alternatives for weed control, pest control, cleaning products, home repair/construction, etc.*
37. *Educate/encourage public about the value of individual sustainable choices and environmentally preferable purchasing*
38. *Provide hands-on activities for resident stewardship, including native plant propagation, ecological monitoring, and invasive plant removal.*
39. *Encourage solar access initiative.*
40. *Promote sustainable energy practices in hotels, restaurants and other businesses.*
41. *Promote residential energy conservation.*
42. *Encourage and expand residential, commercial and municipal recycling.*
43. *Install public recycling containers.*
44. *Develop and promote local Freecycle network.*
45. *Encourage backyard composting.*
46. *Plant trees to maintain and grow the community forest, decrease urban “heat island” effect, conserve energy, and clean the air.*



47. *Encourage roof-top gardens, urban gardens, and urban farming.*
48. *Enforce local littering and illegal dumping ordinances.*
49. *Identify and protect wildlife corridors.*
50. *Encourage wildlife-friendly landscapes on public and private land.*
51. *Establish a Community Wildlife Habitat program.*
52. *Implement recommendations of Open Space Plan.*
53. *Educate public about spaying, neutering and keeping pets indoors.*
54. *Encourage municipal use of “green” cleaning supplies, paints and pest control measures.*
55. *Modify policies, laws and regulations to require the reduction of synthetic chemical use.*
56. *Initiate program for pesticide/chemical free zones, with outreach/education campaign.*
57. *Incorporate environmental concerns into all municipal mission statements.*
58. *Create a volunteer network and establish regular volunteer activities pertaining to environmental initiatives.*

## **INDICATORS**

- Track and publicize data reflecting the reduction in use of resources by the City including, to the extent practical, a correlation to cost and pollution reductions. The following resources should be considered:
  - Water
  - Energy (Electric and Fuel)
  - Paper
- Number of volunteer hours dedicated towards managing and monitoring local biodiversity.
- Recycling rate as a percentage of total solid waste generated. Perform survey of residents, businesses and institutions that participate in recycling program.

**GOAL #8 - Encourage safe, convenient and environmentally responsible alternative modes of transportation.**

**STRATEGIES**

- Reduce dependence on automobiles by City residents.
- Increase use of trains, buses and carpooling by City residents.
- Promote growth focused upon the train station.
- Provide pedestrian and bicycle linkages along all streets and as appropriate between adjoining land uses throughout the community.
- Provide facilities and furnishings that support and encourage pedestrian and bicycle transportation.

**RECOMMENDATIONS**

1. *Obtain “Transit Village” designation from NJDOT.*
2. *Promote use of the RiverLINE light rail and #409 bus service amongst area residents.*
3. *Provide secure bicycle parking in business district, at schools, and at the RiverLINE station.*
4. *Promote location efficient mortgages to residents, which offer a lower interest rate for homes within transit zones*
5. *Reduce parking requirements, or institute parking maximums.*
6. *Create and promote shared parking arrangements within the City, especially at the RiverLINE parking lot.*
7. *Study additional parking and improved access to RiverLINE station. Consider BurLink shuttle to RiverLINE train station.*
8. *Explore possibility of Electric Shuttle Bus (city-owned or licensed) from RiverLINE throughout City, and/or to another central parking area to reduce automobile use within City by both residents and visitors. Explore possibility of similar shuttle to certain shopping districts outside of City to make it easier for residents, especially seniors, youth, and disabled, to live/work without an automobile.*
9. *Require bicycle parking on all new non-residential development.*
10. *Install or improve pedestrian amenities, including sidewalks, benches, and transit shelters.*

11. *Implement recommendations of Bicycle/Pedestrian Plan, including traffic calming, crosswalk enhancements and gateway treatments.*
12. *Create Circulation Element of Master Plan.*
13. *Educate residents about financial/environmental benefits of alternative transit.*
14. *Educate residents about auto/bicycle/pedestrian rules of the road.*
15. *Implement auto-free zones on a regular basis (monthly and during festivals).*
16. *Keep alleys open for rear access and safe children's play areas.*
17. *Institute events to promote alternative transportation, including Bike to Work day/week, Walking School bus, and other programs.*
18. *Advocate for reserving Camden-Amboy Railroad right of way for either future use as rails to trails path or extension of light rail.*
19. *Develop more pedestrian / bicycle friendly routes along and crossing highways. Interact with Bordentown Township bicycle / pedestrian planning efforts.*
20. *Support and promote Delaware & Raritan Canal towpath as a recreational and commuting facility.*
21. *Develop pedestrian connection from Park Street Apartments to the main business district through or along the Divine Word Seminary property.*
22. *Increase use of bicycle police patrols.*

## **INDICATORS**

- RiverLINE and bus ridership from and to the City.
- Average commute time from the City.
- Number of bicycles parked at schools and in business district.
- Number of bicycle parking spaces within the City.

**GOAL #9 - Maintain and grow the economic vitality and social diversity of the entire community in a sustainable manner.**

**STRATEGIES**

- Promote historical character and features at all community events.
- Promote growth of community festivals and continue exposure of environmental topics at each event.
- Promote eco-tourism and cultural/historic tourism opportunities in the City.
- Explore interaction between opportunities in public arts and conservation initiatives.
- Promote and encourage a sustainable approach and initiatives for private land development.
- Promote commerce, services and cooperatives within the City that support more sustainable practices in the daily lives of City residents.
- Seek opportunities to share vehicular parking throughout the business district and with the rail station or marina.
- Ensure that populations of all ages and cultural backgrounds within the City are able to live sustainably.

**RECOMMENDATIONS**

1. *Create an ecologically sustainable, socially just and vibrant local economy as the basis for City's future economic prosperity, environmental health and high quality of life.*
2. *Provide a diverse and affordable range of housing for residents, including all ages and special needs.*
3. *Create a campaign, including appropriate stakeholders, to attract appropriate businesses to the City.*
4. *Preserve and enhance local retail establishments.*
5. *Develop and promote eco-tourism and cultural/historic tourism initiatives.*
6. *Enhance local civic design standards.*
7. *Provide public art, stylish lighting, pocket parks and public/event space for celebrating the City's history and culture.*
8. *Create a public database of local sustainable agricultural resources.*
9. *Encourage distribution of excess food from restaurants to local food banks.*
10. *Encourage development of local farmers markets selling local produce. Investigate possible lease/co-habitation of Divine Word property as Agricultural Headquarters/Organic Community-Supported Agriculture farm, community garden &/or farm market.*

11. *Investigate the potential of creating an organic food cooperative for and by residents of the City.*
12. *Promote community and rooftop gardens in every neighborhood and business district, allowing sufficient access for all residents.*
13. *Develop a collaborative school gardening program between the school district and non-profit organizations and/or volunteers who provide training and on-going supervision.*
14. *Identify and make available appropriate vacant space (temporary or permanent) for edible gardens.*
15. *Encourage roof-top gardens, urban farming, and urban gardens.*
16. *Identify and catalogue all public vacant properties for ecological purposes, including greenhouse and food producing activities.*
17. *Attract a new grocery store to take place of vacant Acme at corner of Farnsworth Avenue and Rt. 130.*
18. *Encourage redevelopment and infill projects within the City. Establish new and flexible environmental initiatives, such as brownfield redevelopment.*
19. *Develop and distribute a database of properties suitable for redevelopment.*
20. *Seek to retain a US Post Office within the City that is within walking distance for residents and/or downtown.*
21. *Develop a Community Directory, containing information regarding local government, churches, civic groups, businesses, schools, recycling, trash pickup, parking, etc., with annual distribution to all households.*
22. *Provide public restrooms for visitors and tourists.*
23. *Promote “green” B&Bs to accommodate tourists.*
24. *Ensure that senior population and children are involved in multiple aspects of the community and economy.*
25. *Employ City residents whenever possible, especially for emergency services.*
26. *Develop and promote “Buy Local, Buy Bordentown” initiative.*
27. *Present and publicize awards for sustainable businesses, neighborhoods, city agencies, and community leaders.*

## **INDICATORS**

- Number of public gardens.
- Number of subscribers to local Community Supported Agriculture farms.
- Percentage of Bordentown City residents who are employed in the City.
- Business district vacancy rate.
- Percentage of locally-owned businesses.
- Economic diversity (household income of City residents).
- Average monthly rents for two bedroom apartments.
- Percentage of registered voters casting ballots in local, State and Federal elections.