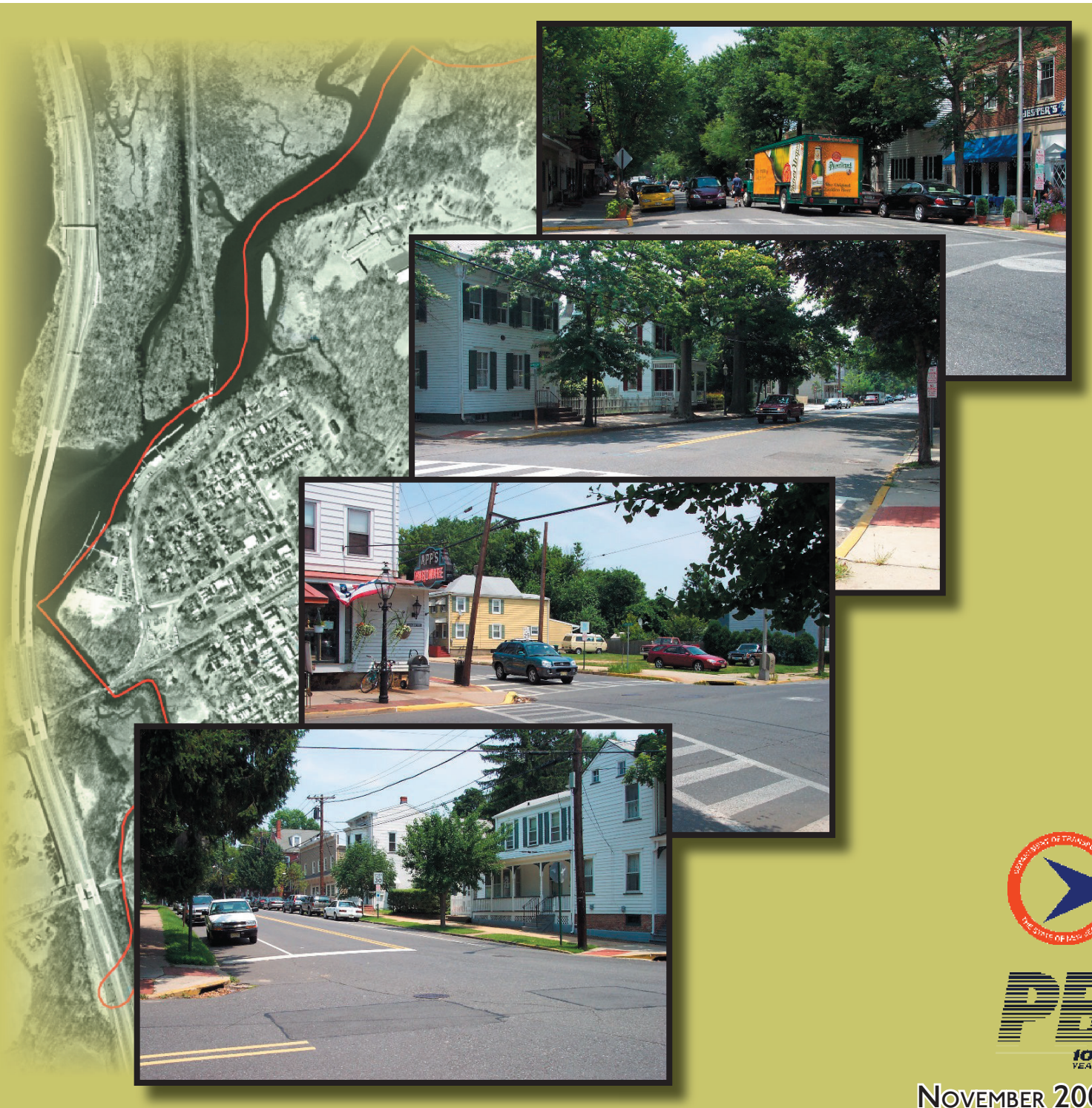
Bordentown City Bicycle and Pedestrian Circulation Study

Technical Memorandum - Bicycle Conditions



PB 100 YEARS

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Introduction

Wayfinding Signage in RiverLINE Parking Lot

The City of Bordentown has undertaken the development of a Bicycle and Pedestrian Circulation Plan. The purpose of the plan is to promote bicycle and pedestrian circulation within Bordentown that accommodates access within the city, and provides access to key destinations, trails, and facilities that connect to and pass through Bordentown. This technical memorandum (the second generated for this study) describes the bicycle facility inventory and assessment; and outlines initial findings and recommends actions to improve bicycle circulation and provide connectivity to adjacent facilities and trails. Prioritized recommendations will be coordinated with recommendations related to pedestrian conditions and traffic calming outlined in the first technical memorandum generated for this study, as well as traffic calming conepts outlined in the third technical memorandum.

Study Background

Bordentown is a compact city located in northern Burlington County, between Routes 130 and 206, and the Delaware River. Bordentown has maintained its older residential neighborhoods and taken advantage of its historic assets as well as its proximity to major statewide corridors, including Routes 130 and 206, Interstate 295, and the New Jersey Turnpike. One unique aspect of Bordentown's location is the lack of through traffic within the city, as it is located off of major statewide through-routes. Traffic volumes within Bordentown are therefore fairly low in comparison to similar communities within Burlington County. The city is currently in the middle of a redevelopment plan, and seeks to improve the circulation of non-motorized traffic not only throughout Bordentown, but to connections bordering Bordentown as well.

In order to improve the bicycle and pedestrian conditions within Bordentown, the city, with assistance from the New Jersey Department of Transportation (NJDOT), is assessing bicycle and pedestrian conditions throughout the city. Along with the inventory of existing conditions, improvements are being identified that will help create an accommodating environment for non-motorized traffic throughout Bordentown.


Second Street Looking East

Guidance

This report examines the bicycle compatibility of the city's primary and secondary streets, and this section describes the guidance utilized to analyze the bicycle compatibility in Bordentown City, and asses the need for bicycle parking. This guidance may be utilized to plan future expansion of bicycle compatible facilities.

Bicycle Compatible Facilities

Bicycle activity can be accommodated through the use of shoulders and wide outside lanes, signed shared roadways, dedicated bike lanes within the right-of-way, or off-street bike paths separated from the roadway. Each of these


Park Street at Third Street, looking North

facilities is described in more detail in a technical appendix. The choice of an appropriate facility type depends on factors that include roadway conditions, local origins and destinations, and projected users.

Low volume, low-speed roadways require no special facilities for bicyclists, while high volume, high-speed roads typically require a separate facility. All roadways in between rely on an assessment of the many factors that make a roadway particularly bike-friendly or unfriendly. The primary focus of this assessment has been on-street facilities, and recommendations are limited to determining appropriate locations for shared-use lanes or along delineated shoulders that are deemed bicycle compatible. Off-street facilities have been considered only within the context of connections between city streets and the proposed network of off-street trails and paths.

Within the city of Bordentown, almost all of the streets can be considered urban in character, and virtually no city streets are wide enough to accommodate dedicated bike lanes without restriping existing on-street parking or shoulders for dedicated bicycle use. This report makes no such recommendations.

Bicycle Parking

The availability of safe and convenient parking is as critical to bicyclists as it is for motorists and yet it is frequently overlooked. Providing good quality bicycle parking goes well beyond providing isolated racks at random locations and expecting cyclists to find and use them. Indeed, many agencies are now adopting specific requirements for bicycle parking design, location, and installation. The technical appendix includes detailed description of a comprehensive program of municipal bike parking, including location, type and signage.

Methodology

The assessment and recommendations outlined in this technical memorandum are based upon field inventories, field tours of key bicycle routes and locations throughout the city, input from a locally represented Steering Committee, and input from community members via a widely distributed bicycle and pedestrian circulation survey. During the bicycle facility inventory, the following factors were analyzed:

1. Corridors leading to and from the city
2. Primary through-travel routes
3. Connections to proposed trails and trail systems
4. Evaluation of bicycle compatibility
5. Bicycle racks, lockers, and supporting infrastructure
6. Access to significant destinations and trip generators
7. Other notable observations

The study methodology was similar to that employed in the analysis of pedestrian conditions for Technical Memorandum 1. An overall examination of bicycle conditions was drawn from the pedestrian street inventory. This

included the identification of major travel corridors, connections to adjacent and compatible facilities (both existing and proposed), and relevant activity generators.

Major corridors, trails, connections, and destination points are summarized in the figures included as appendicies following the document.

The observations and recommendations contained within this memo adhere to NJDOT and other applicable guidelines for bicycling and shared access to streets and highways.

Conditions Assessment: Bicycles, Trails, and Bicycle Parking

An analysis of overall bicycle conditions was performed to identify deficiencies and critical needs, with particular attention paid to connections between on-street bicycling and proposed (primarily) off-street trail facilities. Bicycling trip purposes in the study area include recreation, shopping, school trips, local and long distance travel, and commuting.

This assessment includes primary and secondary focus areas. The primary focus areas comprise the principal through-travel corridors while the secondary focus areas provide access between city streets and proposed trails rather than through-travel.

The primary corridors include Farnsworth Avenue, Park Street, Crosswicks Streets and Burlington Street. Beyond those major corridors, several secondary roads serve as significant thoroughfares for bicycling, including Prince, Second, and Elizabeth Streets. Related activity generators include downtown destinations within the Bordentown CBD, the RiverLINE station (light rail transit), schools, parks, shopping centers, and recreation areas.

Bicycle conditions in Bordentown are generally adequate; among the positive and negative attributes are the following:

- Bordentown is a self-contained city, situated in a manner that isolates it from high volume through-travel. The adjacent U.S. Route 130 and nearby U.S. 206 pass nearby, but not through the city, so travel in Bordentown generally has a local origin or destination, or both. These conditions tend to keep heavy traffic volumes and large trucks outside of the city.

- No large destinations or traffic generators are located within the downtown area. The Ocean Spray facility on Park Street can be accessed without passing through the city.

- With the exception of Park Street, northeast of Third Street, virtually all city streets have a posted speed limit of 25 mph.

- These factors also help to keep speeds at a low to moderate level, although some street segments are recognized as being in need of traffic calming.

- Bordentown has an active bicycling community and requests for bicycle accommodation have been expressed to city officials.

- The main negative consideration for cyclists is that most city streets are relatively narrow with parallel parking, leaving little room for dedicated bike facilities. Bicycles must therefore share almost all Bordentown City streets with vehicular traffic. Further compounding this problem is the presence of many driveways.

In addition to having to share the road, bicycles must also be alert for turning vehicles.

- As noted in the pedestrian assessment, a major deterrent to bicycle activity is increasingly aggressive motorist behavior, which is especially prevalent at the five routes leading into and out of Bordentown: Park Street, Elizabeth Street, Crosswicks Street, Farnsworth Avenue, and Burlington Street. The most common complaints of those that responded to the bicycle and pedestrian questionnaire included the high speed of vehicular traffic, motorists failing to yield the right-of-way as state law requires, and motorists parking vehicles too close to intersections.

Bordentown is however a generally desirable location for bicycling and part of the purpose of this assessment is to identify improvements to accommodate bicycling within the parameters of established standards for safe design and use. Bordentown has been recommended as a location of the Delaware River Heritage Trail, which would pass through the town and connect Bordentown to adjacent municipalities and recreation resources. A network of trails has been proposed as part of the city's master planning process, and Bordentown also boasts numerous parks, historical sites, D&R canal access, and river access at the Bordentown Beach and Marina.

The following paragraphs summarize the existing conditions, and describe the critical issues and problems.

Primary Streets

This section describes conditions for Bordentown's primary streets. These streets link Bordentown City with adjacent municipalities, accommodate through-travel for vehicles, pedestrians, and bicycles, and provide access to Bordentown's downtown business district and major destinations, parks, and proposed trails and trail links.

Farnsworth Avenue

Farnsworth Avenue (County Route 545) serves as the city's main street and host to the Central Business District and commercial area. Farnsworth is Bordentown's busiest street with significant traffic volumes, numerous driveway access points to both private and commercial activities, and active parallel parking turnover in support of the city's many restaurants, galleries, and shops. The posted speed limit of 25 mph and 36 foot cross section are consistent with the goal of calming traffic through the city and creating a safe, walkable downtown environment that welcomes and encourages pedestrian traffic and street life.

Farnsworth Avenue is proposed to serve as the city's primary alignment for the Delaware River Heritage Trail. The Trail has been conceived as a 50-mile loop along both sides of the river from Morrisville PA/Trenton NJ to Palmyra NJ/Tacony Bridge in northeastern Philadelphia, whose goals include re-connecting waterfront communities with the river and turning industrial lands into an attractive multi-use riverfront trail. The Trail's proposed alignment would be along Farnsworth Avenue, beginning at the terminus of the D&R Canal at the Bordentown Marina, continuing along the Marina's Ramp and then along Farnsworth Avenue before turning south to Burlington Street and continuing along to Fieldsboro and points south. Several problems bring into question the viability of this alignment:

- Given the level of traffic and parking activity, the width of Farnsworth Avenue is too narrow to support three potentially conflicting uses safely (parallel parking on both sides, 2 lanes for vehicular travel, and the proposed on-street trail), particularly during periods of peak demand.

- The alignment would begin at the base of the marina ramp, and then lead directly to Farnsworth Avenue.

This ramp may be too steep and narrow for some pedestrian traffic; there is no dedicated sidewalk, pedestrian right-of-way, or shoulders. The ramp rises approximately 40 feet at an average grade of 10% from the base of the Marina to the foot of Farnsworth Avenue and is just 20 feet wide, with high retaining walls on either side that preclude any ability to widen the roadway.

Compatibility Assessment: Based on its width, the presence of on-street parking, and the estimated AADT, the downtown section of Farnsworth Avenue is not bicycle compatible.

Park Street

Park Street (County Route 662) is an east-west oriented roadway that serves as the principal access route between downtown Bordentown City, U.S. Route 206, Bordentown Township east of Route 206, and the local station and parking lot for the RiverLINE. The proposed Thorntown Creek Trail would cross Park Street at a location between Third Street and the Ocean Spray Property. East of the Third Street intersection, in the vicinity of the proposed gateway treatment, Park Street changes in character from a 30 mph urban street with parallel parking to an arterial roadway with a posted speed limit of 40 with shoulders and no parking. Park Street presents a consistent cross-section of 30 feet with 7 ½ foot shoulders.

There is currently one bicycle rack at the RiverLINE station parking lot.

The Park Street Apartments at the eastern end of the City near U.S. 206 represent a large concentration of residents. This residential area is not currently served by any existing or proposed pedestrian or bicycle amenities, including sidewalks, paths, or trails. The sidewalks along Park Street currently extend only from the downtown area to Third Street.

Compatibility Assessment: The eastern section of Park Street, because of its shoulder width, is bicycle compatible. West of Third Street, Park maintains a similar roadway width, but the shoulder is used for on-street parking so it is not bicycle compatible.

Crosswicks Street

Crosswicks Street (County Route 528) is oriented east-west and connects the downtown area at Farnsworth Avenue to U.S. Route 130 and Bordentown Township to the east. Crosswicks Street hosts many of the city's principal destinations and traffic generators include the MacFarland Junior and Clara Barton Elementary Schools, Clare Estate Senior Housing, Carslake Community Building, and Gilder Park and Field. The posted speed limit is 25 mph; the street width is 38 feet near Farnsworth Avenue and 40 feet in front of the schools and the Clare Estate; east of Burlington Street, on-street parking is provided at most locations outside of the schools. A bicycle rack is provided at the side entrance of the MacFarland Junior School; the rack is unlit and uncovered.

The proposed Thorntown Creek Trail would traverse Gilder Park and Field, intersect with Crosswicks Street on the eastern edge of the Park, continue on-street east along Crosswicks Street and across Route 130 to Bordentown Township to the east.

Compatibility Assessment: Because of its width, the presence of on-street parking, and the estimated AADT, Crosswicks Street is not bicycle compatible between Farnsworth Avenue and Second Street. East of Second Street, Crosswicks is bicycle compatible.

Burlington Street

Burlington Street (County Street 662) is a north-south oriented roadway that connects Bordentown City with Fieldsboro before continuing on to its terminus at Route 130 to the south. Burlington Street intersects several primary city streets, including Crosswicks and Prince Streets, and Farnsworth Avenue. Along with Park Street and Prince Street, Burlington is signed as County Route 662. Between Crosswicks and Pine Streets, Burlington Street is posted at 25 mph, increases to 30 mph to Blacks Creek, and then to 40 mph as it leaves the city. Over this section, Burlington Street begins as a relatively narrow, 35 foot wide, urban street with parallel parking; south of Pine Street, Burlington follows a downward sloping grade and land uses becomes more sparse with deeper setbacks and lower densities, supporting the higher posted speed limit and presenting fewer disruptions to through travel by bicycle. At the city limits, the roadway travels over Blacks Creek and under I-295.

The geometric alignment of the Burlington Street and Prince Street intersection is poor and contributes to visibility problems and turning difficulties. The north and south approaches of Prince Street are offset and a wide radius is currently provided at the southwest corner of the intersection. These geometric shortcomings, combined with large trees and on-street parking located too close to the intersection significantly limit visibility, particularly on the southbound approach of Prince at Burlington. The offset alignment of Prince Street also creates very long crosswalks that further limit both bicycle and pedestrian mobility at this location.

An existing bus shelter is located on the eastbound side of Burlington Street east of the Burlington Street intersection.

The proposed Delaware River Heritage Trail would traverse the southern portion of Burlington Street and continue along to Fieldsboro and points south.

Compatibility Assessment: The western section of Burlington Street, because of its sufficient shoulder width and the lack of on-street parking, is bicycle compatible. East of Pine Street the shoulder is used for on-street parking so the roadway is not bicycle compatible.

Secondary Streets

This section describes a series of streets of lower functional classification that provide access to Bordentown's primary streets, schools, parks, and proposed trails and trail links.

Prince Street

Prince Street is a north-south oriented street located parallel to, and one block west of Farnsworth Avenue. Prince Street is 34 feet wide with on-street parking at Farnsworth Street, and 36 feet at Burlington Street; the posted speed limit is 25 mph. Most land uses are residential and the level of traffic and parking turnover are significantly lower than that experienced on Farnsworth, presenting less disturbance and conflict to on-street bicycling.

The intersection of Prince Street at Burlington Street has sight distance limitations that obscure the ability to see Burlington Street traffic from southbound Prince Street (see Burlington Street, above). As discussed in the first technical memorandum, the intersection of Prince and Burlington Streets should be reconfigured so that the northwest corner has a reduced radius, enhancing bicycle and pedestrian safety at the intersection.

Compatibility Assessment: Prince Street is not bicycle compatible due to its width and the presence of on-street parking.

Second Street

Second Street connects Crosswicks Street to Bank Street at Hilltop Park above the Bordentown Marina, and also crosses Park Street and the proposed Thorntown Creek Trail Link along an existing rail bed. At Hilltop Park, Second Street provides access to a pedestrian staircase leading down towards the Marina area with potential access to both the Delaware River Heritage Trail and the proposed Thornton Creek Trail. Second Street is a narrow, 24 feet wide, 25 mph city street with on-street parking on the western side of the street.

Hilltop Park (also called Flynn Park) is a small linear park located between a row of detached homes along McKnights Avenue and the bluffs overlooking the Bordentown Marina and Crosswicks Creek, and spanning the area between Second Street at Bank Street and the northern terminus of Farnsworth Avenue near Courtland Street. A walkway, varying from 10 to 14 wide, traverses the length of the park. The walkway and safety fencing are in need of repair and replacement. The McKnights Avenue homes actually front on the Park, and the street serves as an alley that accesses the rear of the properties. Hilltop Park is an underdeveloped asset among the City's open space and parklands, which has the potential to be a focal point linking the City with the Marina and recreational opportunities along the Delaware River, Crosswicks Creek, and Thorntown Creek Trail.

The park includes several benches, the Point Breeze Garden and Franklin Carr Memorial Iris Garden. Currently, some sections are currently being repaired and rehabilitated by the city. A pedestrian staircase connects Hilltop Park to a property directly adjacent to the Marina, RiverLINE railbed and a proposed connection between the Delaware River Heritage Trail and Thorntown Creek Trail. The staircase is unlit and in need of some repairs and clearing of overhanging vegetation.

An existing city park with children's playground is located on the eastern edge of Second Street, between Thompson and Park Streets. Although parking is provided, there are no bicycle racks.

Compatibility Assessment: Based on its low level of traffic volumes, Second Street can be considered bicycle compatible.

Mill Street

Mill Street is a short dead-end street connecting the Blacks Creek Trail Link to Farnsworth Avenue. Mill Street has a limited number of residences along its western edge and faces a shopping center along its eastern edge. A chain link fence separates the shopping center from Mill Street. Mill Street is narrow with a posted speed limit of 25 mph. Mill Street terminates at an old Mill property which is currently abandoned, and several adjacent parcels are proposed for open space purchase. The Blacks Creek Trail Link is proposed to provide access across open space property to the Blacks Creek Trail.

Compatibility Assessment: Mill Street is not bicycle compatible due to its width.

Elizabeth Street

Elizabeth Street is an east-west oriented local city street with its western terminus at Second Street and its eastern terminus at U.S. Route 206. Elizabeth Street provides access to southbound Route 206 only via a right-in right-out T intersection. Elizabeth Street is 36 feet wide with a posted speed limit of 25 mph, and has predominantly residential land uses which transition to industrial property closer to Route 130. Between Route 130 and Spring Streets on-street parking is sparse as most properties provide for off-street parking; between Spring and Second Streets, there is a mix of on- and off-street parking.

The proposed Thorntown Creek Trail would cross Elizabeth Street near Pine Street East. This crossing would link Gilder Park and Field with a proposed 11 acre proposed open space acquisition parcel adjacent to the Ocean Spray facility. The Proposed trail would link Gilder Field to the Delaware River Heritage Trail and Bordentown Marina area near the railroad trestle over Crosswicks Creek.

Compatibility Assessment: Based on its low level of traffic volumes and the mix of on-and off-street parking, Elizabeth Street can be considered bicycle compatible.

Spring Street

Spring Street provides one-way access between Crosswicks and Elizabeth Streets. Adjacent residential properties include a mix of on and off-street parking. The speed limit is 25 mph and the width is 28 feet. Spring Street provides adjacent access to the MacFarland School.

Compatibility Assessment: Because it is a one-way street with low traffic volumes and the mix of on-and off-street parking, this portion of Spring Street can be considered bicycle compatible.

Open Space Plan, Bicycling, and Proposed Trails

The preceding assessment of bicycle conditions and facilities includes numerous references to a network of trails that will lie within or pass through Bordentown City. These proposed trails will make use of the City's numerous historic and natural assets and will help link the city with the surrounding communities, rivers, creeks, and canal towpath facilities. Bordentown's Open Space Plan, as adopted on February 2, 2005, recommends the creation of the following trails:

Bicycle Rack at RiverLINE station

Delaware River Heritage Trail – a bi-state regional trail that extends from Trenton to the Tacony-Palmyra Bridge in Palmyra Borough in New Jersey and across the Delaware River north along the river in Pennsylvania and back to Trenton.

Blacks Creek Trail – a bi-municipal trail that links Bordentown City and Bordentown Township along Blacks Creek.

Blacks Creek Trail Link – a bi-municipal trail that links Bordentown City and Bordentown Township intersecting the Black Creek Trail.

Thorntown Creek Trail – an intra-municipal trail that originates at Gilder Field and Crosswicks Street and connects the Delaware River Heritage Trail near the railroad trestle over Crosswicks Creek.

Thorntown Creek Trail Link – an intra-municipal trail that links Thorntown Creek Trail at the southern railroad spur, travels along the rail line to the southwest to the light rail station stop and follows the northern railroad spur to the Delaware River Heritage Trail at the foot of Farnsworth Avenue.

The Open Space Plan further states that "the development of these trails will require the collaboration and cooperation of state, county, and municipal entities. Funding for the creation and maintenance of these trails has not been determined at this point in time."


Park Street at proposed Thorntown Creek Trail Crossing

The Open Space Plan also includes a series of recommendations following recommendations specifically related to bicycling:

- Create/establish biking and walking trails, improve access to the waterfront for boating opportunities, and provide bicycle parking.
- Upgrade Hilltop Park with landscaping, walkway, fencing and lighting.
- The parking lot for the light rail station should be utilized for dual-purpose parking, accommodating light rail passengers, residents and patrons of the Downtown Commercial District.

Recommended Improvements: Bicycles, Trails, and Bicycle Parking

The following recommendations are proposed to improve bicycle accommodation on Bordentown City streets, provide connections to the proposed trail network, and create improved facilities for bicycle parking.

Farnsworth Avenue

- Relocate the proposed alignment of the Delaware River Heritage Trail from Farnsworth Avenue to the adjacent parallel roadway, Prince Street. Prince Street is similar in design to Farnsworth, but experiences lower traffic volumes, less parking turnover, and is primarily residential.
- Provide two starting points for the Heritage Trail to accommodate pedestrians and bicyclists of varying skills and interests. The first would use the existing staircase facility to climb the bluffs from the Marina to Hilltop Park and then access the Trail at the foot of Farnsworth Avenue. (This recommendation may have ADA compatibility implications). The second would use the existing marina ramp, despite its steep grade. The two would then merge and then turn to Courtland Street and proceed to Prince Street. This realignment of the starting point would provide a safer and more convenient facility for trail users, and would also make advantageous use of the underutilized Hilltop Park. Appropriate "Share the Road" signage would be provided on the Marina Ramp.
- The proposed Blacks Creek Trail Link has a terminus on Mill Street which itself terminates at Farnsworth Avenue, near Route 130. Signage and crosswalk treatments should be located near the intersection of Farnsworth Avenue and Mill Street to direct bicyclists and pedestrians to the Blacks Creek Trail Link Trailhead. This signage would be located near the proposed gateway treatment on Farnsworth Avenue. This crossing should be integrated with the proposed Farnsworth Avenue gateway treatment presented in

Technical Memorandum 1 – Pedestrian Conditions.

- Bicycle racks should be installed adjacent to Veterans Memorial on Farnsworth Avenue (at a location that does not detract from the memorial), and at the shopping center adjacent to Route 130.

- Provide lighted covered bicycle racks at the Bordentown City Hall, 324 Farnsworth Avenue.

Burlington Street at Farnsworth Avenue

Park Street

- For bicycle travel between Bordentown City and points north and east of the city, Park Street is the recommended travel route. Bicycles can be accommodated along the existing roadway shoulder on Park Street between Route 206 and Third Street.

- Between Third Street and the RiverLINE train station parking lot and Bordentown Beach, "Share the Road" signs should be provided. Although this section of Park Street is not bicycle compatible, planning guidelines indicate that shared roadways are appropriate where they connect bicycle lanes, trails, or other facilities even though the travel lane is narrow and bicycle traffic must "take the lane." In this case, the shared roadway would be provided on a section of Park Street that connects the bicycle compatible portion of Park Street with the Delaware River Heritage Trail crossing, the RiverLINE train station parking lot, and Bordentown Beach.

- A marked trailhead and crossing treatment and related signage are recommended at the Thorntown Creek Trail crossing of Park Street, northeast of Third Street; this crossing should be integrated with the proposed Park Street gateway treatment.

- The Delaware River Heritage Trail is proposed to cross Park Street at Farnsworth Avenue. This study recommends Prince Street as the preferred route for the Heritage Trail through Bordentown City and the installation of a crossing treatment and signage across Park Street at Prince Street.


Prince Street at Park Street

Crosswicks Street

- Provide an awning to cover the existing bike rack at the RiverLINE Station or replace the rack with bike lockers to support long-term parking at this intermodal facility.
  Provide "Share-the Road" signage on Crosswicks Street between Second Street and Route 130.

- A marked trailhead, crossing treatment, and signage are recommended at the Thorntown Creek Trail crossing of Park Street; this crossing should be integrated with the proposed Park Street gateway treatment.

- Replace the existing racks at the MacFarland School with a lighted, covered facility that has better visibility from the street and which is closer to the building. Provide a shared area for bike racks at the adjacent Gilder Park and Field and Carslake Community Center.

Burlington Street

Burlington Street and Prince Street Intersection
Traffic Calming Concept

- For bicycle travel between Bordentown City and points south, Burlington Street is the recommended travel route. Bicycles can be accommodated along the existing roadway shoulder.

- The Delaware River Heritage Trail alignment is proposed to be sited along Burlington Street to connect Burlington City with Fieldsboro and points south. The proposed location of this facility is acceptable given the geometrics, traffic volumes, and character of Burlington Street. Although the initial portion is somewhat narrow, the lower levels of traffic and roadway character are acceptable as a connection for the Heritage Trail.

- Provide on-street makings indicating location of the Delaware River Heritage Trail along Burlington Street.

Prince Street

- Prince Street should serve as the primary alignment of the Delaware River Heritage Trail through Bordentown City. Although this section of Prince Street is not bicycle compatible, planning guidelines indicate that shared roadways are appropriate where they connect bicycle lanes, trails, or other facilities even though the travel lane is narrow and bicycle traffic must "take the lane."

- Provide "Share-the-Road" signage on Prince Street between Park and Burlington Streets. Provide on-street markings indicating the location of the Delaware River Heritage Trail along Prince Street.

- Provide crossing treatment and related signage across Park Street at Prince Street to support safe use of the Delaware River Heritage Trail.

- Provide one or more bicycle racks at the Bordentown City Post Office. This location also supplements parking needs for adjacent Farnsworth Avenue and the downtown business district.

Second Street

- Provide trailhead signage at Hilltop Park to indicate adjacent proposed trails

- Rehabilitate and replace degraded pathways and safety fencing in Hilltop Park

- Provide lighting, repair safety railings, and clear overhanging vegetation at the pedestrian staircase between Hilltop Park and the Marina area.

- Prioritize open space purchases that support use of the pedestrian staircase between the Marina and Hilltop Park.

- Provide "Share-the-Road" signage on Second Street between Hilltop Park and Crosswicks Street.


Second Street Park

- Provide bicycle racks at Second Street Park.

Mill Street

- A marked trailhead is recommended at the Mill Street entrance to the proposed Blacks Creek Trail Link.

- Vehicle parking should be provided at the trailhead either in the form of an off-street parking lot or via a cul-de-sac to accommodate U-turn movements and on-street parking at the end of Mill Street, or investigate a shared-parking arrangement with the adjacent lumber yard.

- Signage should be provided on Farnsworth Avenue indicating the adjacent location of the Blacks Creek Trail Link trailhead.

Elizabeth Street

- Provide crossing treatment and related signage across Elizabeth Street near Pine Street East to support safe use of the Thorntown Creek Trail. This crossing should be integrated with the proposed gateway treatment on Elizabeth Street to enhance bicycle and pedestrian crossing safety.

Additional Bicycle Parking

- Provide lighted, covered bicycle racks at the Bordentown City Public Library located on Union Street.

- Provide a paved cul-de-sac and bicycle racks at the Ann Street ball fields.

Appendix

This appendix describes the guidance utilized to analyze the bicycle compatibility in Bordentown City, and assess the need for bicycle parking. This guidance may be followed to plan future expansion of bicycle compatible facilities, and was developed based on guidelines provided by the American Association of State Highway and Transportation Officials (AASHTO).

Bicycle Compatible Facilities

Bicycle activity can be accommodated through the use of shoulders and wide outside lanes, signed shared roadways, dedicated bike lanes within the right-of-way, or off-street bike paths separated from the roadway. The choice of an appropriate facility type depends on factors that include roadway conditions, local origins and destinations, and projected users.

Low volume, low-speed roadways require no special facilities for bicyclists, while high volume, high-speed roads typically require a separate facility. All roadways in between rely on an assessment of the many factors that make a roadway particularly bike-friendly or unfriendly. The primary focus of this assessment has been on-street facilities, and recommendations are limited to determining appropriate locations for shared-use lanes or along delineated shoulders that are deemed bicycle compatible. Off-street facilities have been considered only within the context of connections between city streets and the proposed network of off-street trails and paths.

The following paragraphs describe appropriate conditions for on-street bicycle facilities; these will serve as a guide for recommending appropriate facilities.

On-Street Facilities

Shoulders

Shoulders should be at least 5 feet wide to provide an adequate degree of bicycle compatibility and to be designated a bikeway. A 4-foot minimum width may be permissible, but the 4-foot clear width should not include gutters or rumble strips. It is recommended that higher widths be considered with higher bicycle usage, when motor vehicle speeds exceed 50 miles per hour, and/or where there is a high percentage of heavy vehicle traffic.

The highest posted speed limit in the city is a 40 mph section of Park Street between U.S. Route 130 and Third Street.

While most shoulders are not designated as official bikeways, they can be useful to guide bicyclists to a particular route or to connect two individual bicycle trails.

Wide Outside Lanes

Striping to create wide outside lanes may be applicable in urban areas where shoulders are not normally provided; these facilities permit motorists to safely pass bicyclists within the existing roadway width. This treatment allows multiple users to use the same roadway, and is especially appropriate for skilled bicyclists. It is recommended that the following widths be adhered to for outside lanes:

- A minimum 14-foot width is recommended in order for the lane to be acceptable for shared use. This measurement should be taken from the outside edge line or edge of gutter to the inside lane line.

- In some instances where extra space is needed, such as on steep grades or where on-street parking or other obstacles are present, a 15-foot outside lane width is preferable.

Among the factors to consider with longer stretches of wide outside lanes is that cars may begin to use the single wide lane as two lanes. This can be addressed through careful enforcement or the utilization of striping techniques.

All streets within the city of Bordentown are just two lanes (one in each direction), and virtually no locations provide a roadway width (exclusive of parking) of 14 feet or more, so the city has no applicable locations for the wide outside lane treatment.

Signed Shared Roadways

Shared signed roadways are designed to allow bike and vehicular traffic to share the same right-of-way. Signage is provided to alert drivers as to the presence of bikes within the roadway and to exercise caution. Shared signed roadways are generally called for in cases where the 5 foot minimum shoulder is not available, thus creating the need to "share" the roadway.

According to AASHTO guidelines, signed shared roadways, better known as bike routes, are those roadways that have been identified as preferred routes because they:

- Connect bicycle lanes, trails, or other facilities;
- Designate a common route used by high volumes of bicyclists;
- Identify low-volume roadways with adequate shoulders;
- Provided direction to important bicycle destinations.

It is important to note that signed roadways are usually only effective when they provide a convenient alternative to other roadways, or serve bicycling destinations.

The AASHTO guide identifies the following the factors to consider when deciding whether or not to designate a bike route:

- Does the route provide through and direct travel?
- Does the route connect discontinuous segments of a bicycle network?
- Are bicyclists given greater priority on the signed route compared to the unsigned route?
- Is the surface smooth, well-maintained, and clean?
- Does the route feature wider shoulders or outside lanes than alternative roads?
- Are shoulders are at least four feet wide?

The AASHTO Guide recommends that in all cases, shared-use roadways should include distance, direction and destination information, and should not lead to barriers such as narrow bridges or unsafe intersections. Routes should be signed ever quarter mile and at every turn.

Dedicated Bike Lanes

Bike lanes, through striping or pavement marking treatments, are designed to be used exclusively by bicyclists. This can help improve bicycle safety, improve visibility, and result in more predictable motorists' and bicyclists' behavior.

Certain guidelines for designing bike lanes should include the following: (1) bike lanes should be one-way, carrying bicyclists in the same direction as the adjoining travel lane, (2), they should be located on the right side of the roadway, and (3) if applicable the lane should be located between the parking lane and travel lane.

In terms of bicycle lane width, the following guidelines should generally be adhered to except in unique circumstances:

- 4 feet – roadways with no curb or gutter
- 5 feet – when adjacent to parking
- 11 feet – shared bike lane and parking area, no curb face
- 12 feet, shared bike lane and parking area with curb face.

Bicycle Parking

The availability of safe and convenient parking is as critical to bicyclists as it is for motorists and yet it is frequently overlooked. Providing good quality bicycle parking goes well beyond providing isolated racks at random locations and expecting cyclists to find and use them. Indeed, many agencies are now adopting specific requirements for bicycle parking design, location, and installation. The following paragraphs describe the components of a comprehensive program of municipal bike parking, including location, type and signage.

Location

Bike Parking should be visible and convenient to use, without blocking the pedestrian right of way. Typical locations where bicycle parking is desirable include transit stations, schools, commercial centers, parks and recreational facilities, and workplaces.

Type of Rack

Racks should support the frame of the bicycle as well as the wheels, allow the use of a cable or u-shaped lock, be securely anchored to the pavement, be usable by a wide variety and sizes of bikes. A well-designed rack should:

- Support the bicycle upright by its frame in two places
- Prevent the wheel of the bicycle from tipping over
- Enable the frame and one or both wheels to be secured
- Support bicycles without a diamond-shaped frame with a horizontal top tube (e.g. a mixte frame)
- Allow front-in parking: a U-lock should be able to lock the front wheel and the down tube of an upright bicycle
- Allow back-in parking: a U-lock should be able to lock the rear wheel and seat tube of the bicycle

The inverted U type bike rack is now required or preferred by many municipalities, in favor of the more traditional forms including the wave, comb, fence, and toast racks.

Short Term vs. Long Term Parking

Short term parking usually means utilizing parking facilities for two hours or less in order to run errands or similar chores. Short term parking should well-distributed around destination centers, visible to bicyclists, and located in areas with high amounts of pedestrian activity in order to discourage bicycle thieves.

Long term parking, often for commute purposes, involves leaving a bike for most of the day, overnight, or sometimes longer. Accommodating long term parking often means providing lockers, an enclosed bike room, or sheltered racks monitored by security cameras or other means. Some cities, such as Seattle, Pittsburgh, and Chicago have begun implementing centrally located bike garages.

Spacing and Siting Standards

Municipalities should be careful to install racks that are usable and not located too close to a wall, or too far from destinations. The best location for a rack area is immediately adjacent to the use or building that it serves. Racks should not be placed so that they block the entrance or inhibit pedestrian flow in or out of the building. Racks that are far from the entrance, hard to find, or perceived to be vulnerable to vandalism will not be used by most cyclists.

Protection from elements

Bike parking areas should be lighted and, where possible, provide some sort of shelter or awning that protects bikes and bicyclists from rain and snow.

Designated signs and markings

The Manual on Uniform Traffic Control Devices (MUTCD) provides a bicycle parking area sign (D4-3) which can help lead bicyclists to these parking areas.

Amount of parking

While automobile parking ordinances are common, bicycle ordinances are less so. However, this is changing, as communities around the country begin to establish minimum parking requirements for new developments or redevelopment activity. Example communities include Madison, WI; Portland, OR, and Schaumburg, IL.