# *PEDESTRIAN & BICYCLE MOBILITY*
# *TOMS RIVER | SUMMARY REPORT*

*June 22, 2011 - Final Report*

NJTPA
NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY


*MASER CONSULTING, PA:*

*David G. Roberts, AICP/PP, LLA,*
*Nicholas Schaefer, PE*

*CH PLANNING, LTD:*

*Oliver Carley, AICP, PP*
*Jeannette Brugger, AICP, PP*
*John Madera. AICP*

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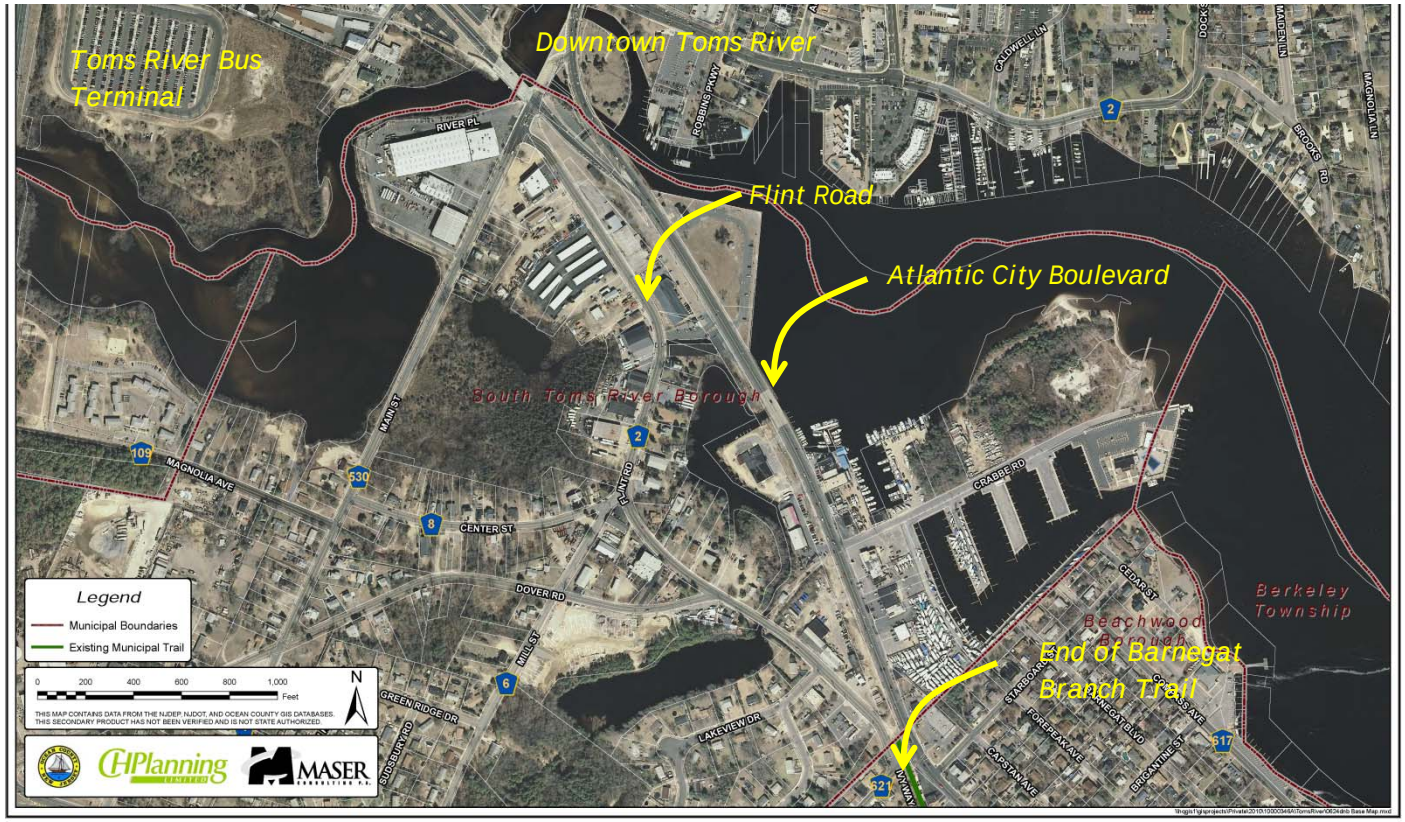
## Executive Summary

*The purpose of this study is to determine the best way by which to bring bicyclists and pedestrians safely and comfortably over the last mile between the northern end of the 15.6-mile multi-use Barnegat Branch Trail and destinations in downtown Toms River; and conversely, to bring Toms River residents from the downtown and the bus depot to the trail.*

*The plan for bicycle and pedestrian mobility between the BBT and Downtown Toms River first needed to address a gap in the old Barnegat Branch-Central Railroad rail right-of-way. The connecting segment of the former rail right-of-way between Admiral Avenue at the Beachwood and South Toms River border and the parking lot at the west end of the Herflicker Boulevard bridge, approximately 3,500 feet away, is owned by two private property owners. In order to cover that gap without the need for immediate property or easement acquisition, the project team identified and evaluated two routes along existing roads for suitability for bikeway retrofits and navigational signage. Atlantic City Boulevard has wide shoulders but also significant traffic and uncontrolled access to roadside businesses in places. Flint Road has narrow shoulders but less traffic (see map at left and Figure 8). The second issue that needed to be addressed was getting pedestrians and cyclists across Water Street from either Atlantic City Boulevard or Irons Street so that they could access the downtown. Principal streets and other connecting streets in Downtown Toms River were also evaluated for*



*inclusion in a network of routes to important attractions, including Huddy Park where the Downtown Toms River Business Improvement District (BID) sponsors many successful events during the year.*

*The principal recommendation is a signed bike route between the trailhead at Admiral Avenue in Beachwood and the Toms River business district via Flint Road, S. Main Street, Herflicker Boulevard, Water Street and Irons Street, terminating at Legion Court. Features to increase motorist awareness and acceptance of bicyclists sharing the road, as well as to increase bicyclist comfort in a shared roadway environment, are recommended for installation along the route and include bike lanes and shared lane markings. Recommendations for pedestrians are focused on the intersections on Water Street, including Irons Street, Main Street and Robbins Parkway and include an alternative crossing to Huddy Park at Main Street and Atlantic City Boulevard, additional cautionary signage for existing pedestrian crossings, especially at the free right turn lane (a right turn into a dedicated merge lane without a requirement to stop at the intersection) from northbound Main Street onto eastbound Water Street, and adjustments to existing signal phasing/timing.*

*Connector routes off the main route, intended to bring users to specific destinations (such as an extension of a Class I trail along the segment of the former rail right-of-way that runs right behind the Toms River NJ Transit Bus Depot, are recommended for treatments similar in scope to those recommended for the main route.*

*Recommendations for the enhancement of the pedestrian environment, primarily in the downtown area, address both safety and amenity and include pedestrian signal timing improvements, warning signage, complete streets, shade trees and street furniture.* A Complete Street is defined by the NJ Department of Transportation as means to provide safe access for all users by designing and operating a comprehensive, integrated, connected multi-modal network of transportation options. *Recommendations to enhance the identity of Toms River as a destination include a landscaped gateway treatment at the intersection of South Main Street and Atlantic City Avenue; and interpretive signage at key locations. Additionally, this signage acts as a traffic calming technique, alerting motorists that pedestrians and bicyclists may be present.*

*None of the report's recommendations requires right-of-way acquisition or construction of pavement. There is an opportunity to acquire the two previously mentioned privately owned vacant lots in South Toms River that were formerly a portion of the rail right of way to enable a fully separated Class 1 multipurpose path to be constructed between Admiral Avenue and the Herflicker Boulevard Bridge (see Figure 1). However, the cost is likely to be prohibitive in the short term (total assessed value is approximately $260,000) and the right of way is interrupted by the missing former rail bridge over a section of the Toms River (see Figure 2). In addition, the County is planning a pedestrian bridge on Flint Road to improve pedestrian safety along that far less traveled route, which makes Flint Road the preferred short term route.*

*Within Downtown Toms River, including Water Street and Huddy Park, existing sidewalks can be improved by bringing sidewalks and ramps into ADA compliance.*

*The pedestrian circulation system can be enhanced through additional crosswalks in strategic locations, modified pedestrian signal phases at the key intersections with Water Street of Irons Street, Main Street and Robbins Parkway, as well as the intersection of Herflicker Boulevard and South Main Street. These projects may be eligible for state or federal funding, if available.*

*The signing of bicycle routes, modification of shoulders for enhanced bicycle safety, emphasis on driver awareness of "sharing the road" and the pedestrian improvements described above offer solutions that are can be quickly implemented at a reasonable cost. Bridging the gap between the trail terminus and Downtown Toms River with safe, attractive facilities for all trail users will greatly enhance the transportation value of the BBT.*

*Figure 1: Obstacles to multipurpose path on Block 23, Lots 1 and 1.02*

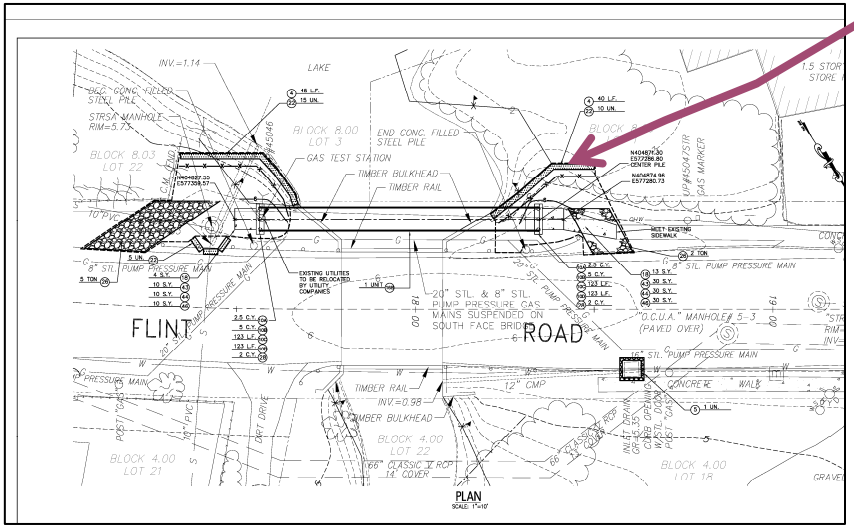



*Figure 2: Design for Pedestrian Bridge to connect two sidewalks on Flint Road. Source: Ocean County Dept of Engineering*

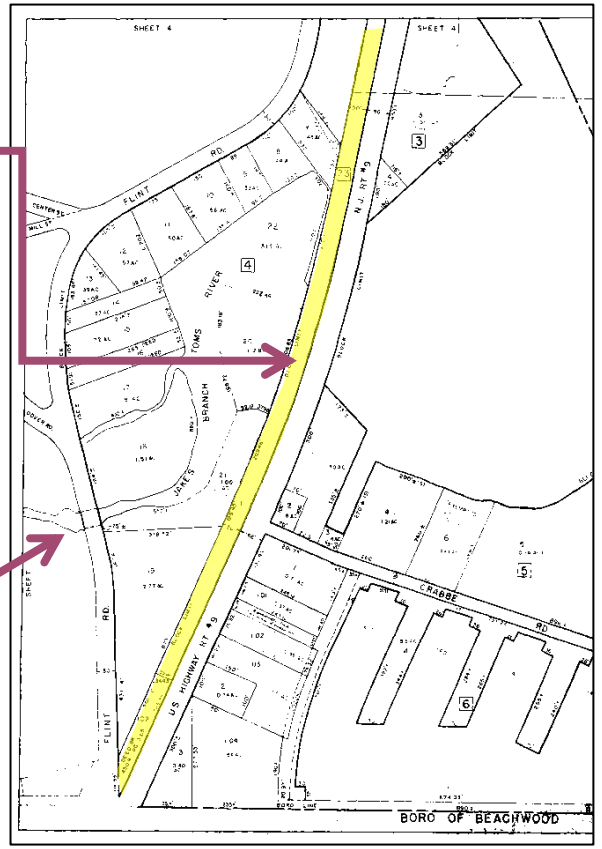



*Figure 3: Tax Map from South Toms River showing Block 23, Lots 1 and 1.02 as potential right-of-way for future multipurpose path*

## Study Purpose

*The Barnegat Branch Trail (BBT) is a 15.6-mile rail-to-trail project that will extend from Barnegat Township to South Toms River Borough along the abandoned right-of-way of the Central Railroad of New Jersey, Barnegat Branch. To date, approximately four miles of trail, including a one-mile section through Beachwood Borough terminating at Admiral Avenue's intersection with Ivy Way and Atlantic City Boulevard, are completed.*

*Although the railroad once ran through Toms River, the former right-of-way between Admiral Avenue at the Beachwood Borough line and the Herflicker Boulevard Bridge, 0.6 miles, is interrupted by commercial driveways, therefore rendering an extension of the rail trail to Downtown Toms River problematic.*

*Its shopping district, parks, institutions, county government offices and events make Downtown Toms River a major destination. Trail users who wish to continue north from the current trail terminus to Downtown Toms River face a quandary. Experienced road bicyclists who are familiar with the area will use either NJ Route 166 (Atlantic City Boulevard) to S. Main Street or Flint Road to the Herflicker Boulevard Bridge (see Figures 9-11). Bicyclists face complex traffic patterns, heavy motor vehicle traffic, and vehicles randomly moving in and out from roadside businesses. Pedestrians face a daunting, auto-oriented environment mostly devoid of sidewalks. Those who don't know the area are left standing at a busy intersection with no direction. This condition is especially acute for pedestrians trying to walk from public parking lots and businesses on Water Street to events in Huddy Park.*

*The purpose of this study is to recommend roadway retrofits to a preferred route, considering pavement markings, roadway reconfiguration, information and wayfinding signage, and access control to create a safe, attractive and easy-to-use connection for trail users between the trail's northern terminus and Downtown Toms River.*


*Figure 4: Bicycle mobility through Downtown Toms River is challenging, especially along this segment o of N. Main Street between Water Street and Washington Street.*

*Figure 5: Images from constructed sections of Barnegat Branch Trail in Barnegat Township.*
*Source: Ocean County Planning Department*

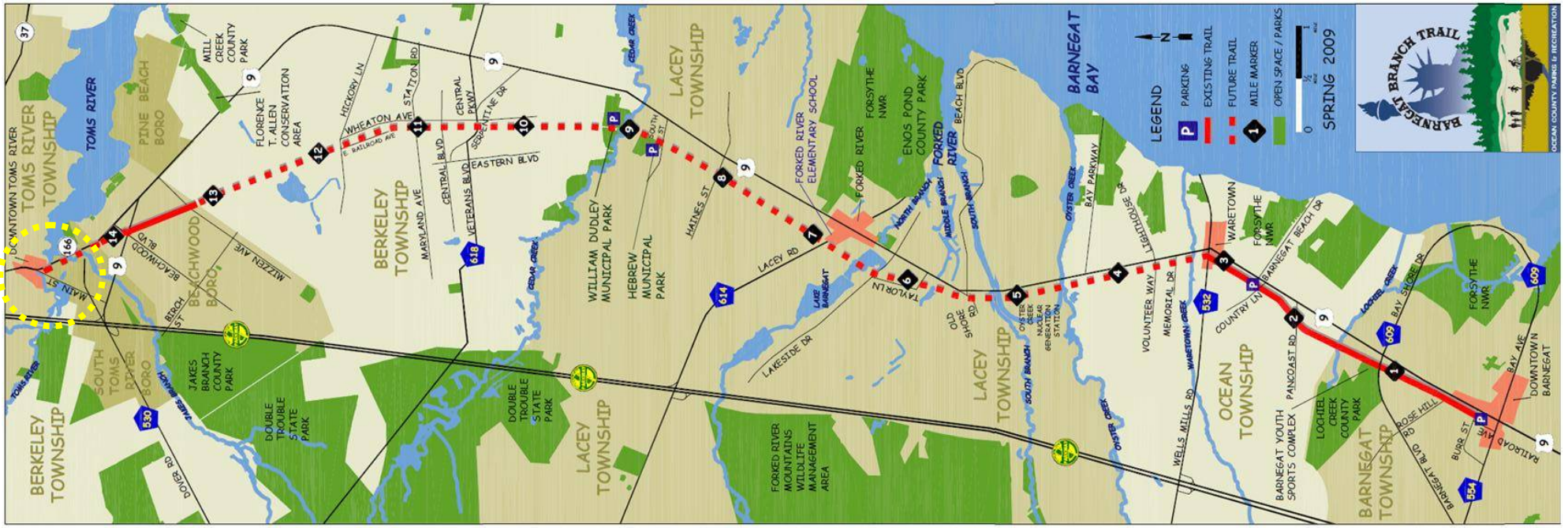



*Figure 6: Map of the Barnegat Branch Trail with Study Area circled in yellow.*
*Source: Ocean County Planning Department*

## Background

*Toms River Township is the largest municipality by population in Ocean County and the seventh largest in New Jersey[1]. It is the County Seat for Ocean County and its downtown area, located between Route 37 and the Toms River, is a center for many governmental functions (court, library, administration, county jail, etc.) as well as South Toms River High School and Monsignor Donovan High School. Downtown Toms River also serves as the hub for southern Ocean County much as Lakewood's downtown serves as the hub for northern Ocean County. Both downtowns have bus terminals, with Toms River's Bus Terminal also about a mile from a park-and-ride, both which are accessible from Exit 82 northbound and southbound on the Garden State Parkway.*

*According to the NJTPA (see Figure 5), the large majority of travel in Ocean County takes place within the county itself (87%) and that the second most frequent travel is between Ocean and Monmouth Counties (9%). With rail transportation along the New Jersey Coast Line ending at Bay Head, most of the County relies on bus transit, which is provided by New Jersey Transit and Academy commuter buses, with limited local routes provided by Ocean Ride, operated by the County.*

*With the absence of passenger rail service and availability of bus service in the area around Downtown Toms River, which is at the center of Ocean County's largest population concentration, the facilitation of bicycle and pedestrian mobility, especially with links to bus stops and the Toms River Bus Terminal are important to Southern Ocean County.*

[1] Sources: http://www.planning.co.ocean.nj.us/databook; http://tomsrivertownship.com/

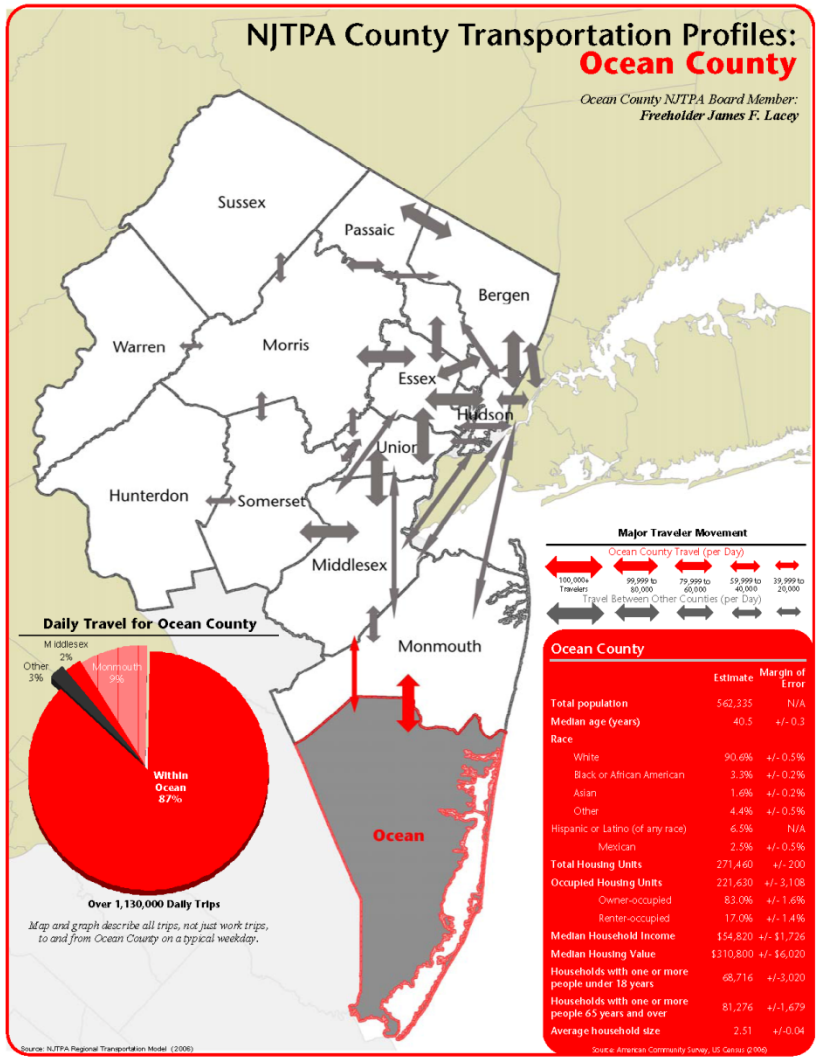



*Figure 7: NJTPA Transportation Profile for Ocean County*
*Source: http://www.njtpa.org/Plan/Subregion/Profiles*

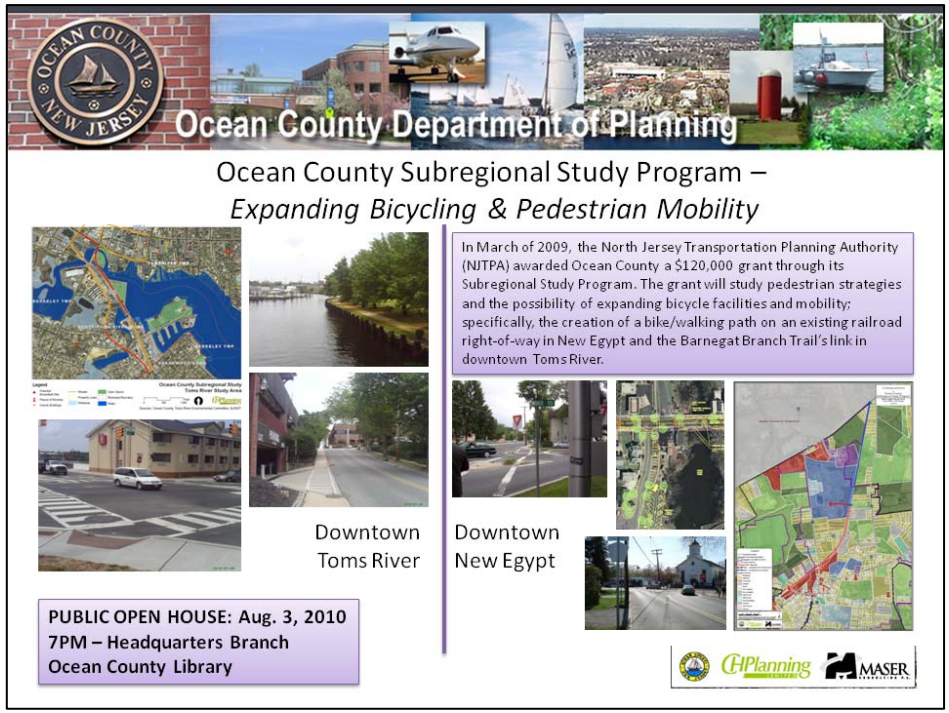
## *Study Process*

*The study team began by reviewing previously completed studies and plans for the area and meeting with stakeholders to identify critical issues and needs. Documents reviewed included the summary of a January 2008 workshop on pedestrian issues conducted by the Project for Public Spaces; a proposal for a revitalization strategy for the Toms River Waterfront produced by Rutgers University in December 2005; and downtown master plan produced in May 2005 by Phillips Preiss Shapiro Inc.*

*Study technical staff performed a field view of study area roadways, on bike and on foot, in July 2010 to experience first-hand conditions affecting bicycle and pedestrian mobility. Staff took note of constraints including high traffic volumes and speeds, intersections with multiple lanes and turning movements, signals timed insufficiently for safe bicycle and pedestrian crossing, and the roadside environment including frequent entrances/exits. They also looked for opportunities in the form of available right-of-way and excess paved width; and streets with low traffic volumes.*

*The Ocean County Planning Department included a display board (shown at right), prepared by the consultant team, at their booth at the Ocean County Fair between July 23 and July 28, 2010 to raise public awareness about the Subregional Study Program. The County's project team staff also maintained the project webpage on the Planning Department's website and updated it with photos from the field visits, PowerPoint presentations from the two Open Houses and draft Summary Reports during the term of the project.*

*Technical staff presented the findings of the existing conditions analysis and preliminary recommendations, followed by an open*




*discussion, at an Open House at the Headquarters Branch of the Ocean County Library in Toms River on August 3rd, 2010. The consultant team met with the County on September 14th, 2010 to select the preferred alternatives. A First Draft Summary Report was produced by the consultant team and reviewed with the County in December of 2010. Comments from the County and the Toms River BID were incorporated into the PowerPoint presentation given at the second Open House on February 17, 2011 in New Egypt.*

*Final Draft Summary Reports were circulated to the SSP Steering Committee on May 16, 2011 and comments were received by May 27, 2011 for incorporation into this Report.*

*Figure 8: Preliminary Analysis Map*

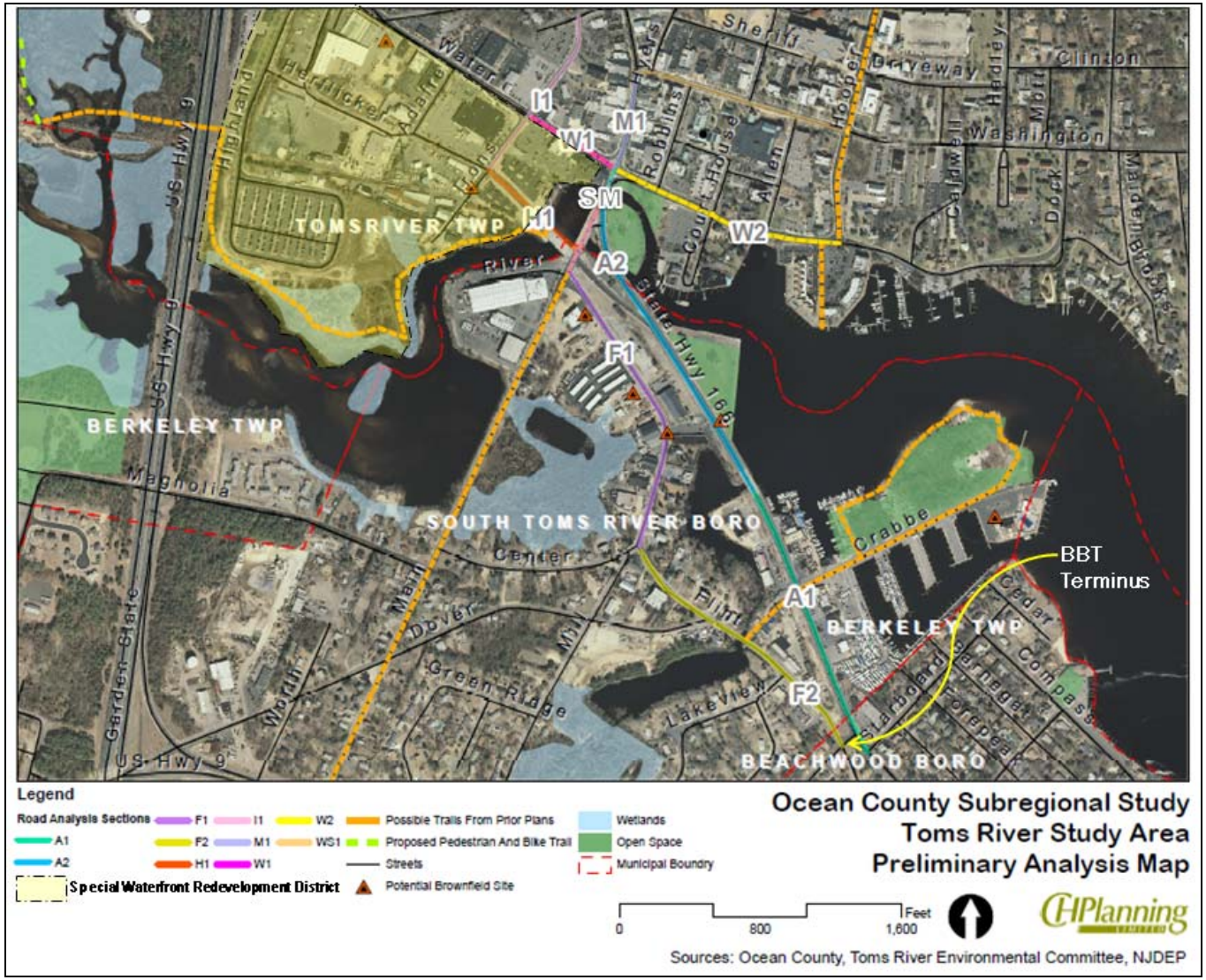


*Table 1: Toms River Bicycle Link Strengths-Weaknesses-Opportunities-Threats (SWOT)Analysis*

| | Strengths | Weakness of Existing Conditions | Opportunities | Threats (Obstacles) to Bike Facilities |
|---|---|---|---|---|
| Atlantic City Boulevard (SR166) (A1)<br><br>State Road | • Large right o f way (~60ft) could accommodate pedestrian/bike facility<br>• Large building setbacks<br>• Access to terminus of BBT<br>• Wide shoulders<br>• Underutilized lots | • Unimproved strip development<br>• High traffic volumes, major road<br>• Unpleasant and unsafe pedestrian/bicycling environment<br>• Many turning vehicles<br>• Commercial parking lots lacking defined driveways are hazardous to pedestrian/bike mobility<br>• Commercial activity creates high traffic volume<br>• Highway nature of road not conducive to on-street parking | • Space for large off-road bikeway or pedestrian path<br>• Large lots and front parking could be redesigned to include designated driveways and bike lanes<br>• Potential for separated path along former BBT ROW with property acquisition and bridge improvements | • Traffic Volumes from tourism and peak driving times |
| Atlantic City Boulevard (SR166) (A2)<br><br>State Road | • Vacant land<br>• Adjacent to Mathias Park<br>• Water views<br>• Large right of way (~60ft) could accommodate pedestrian/bike facility<br>• Wide shoulders<br>• Large lots allow for potentially fewer curb cuts | • Industrial land use/vacant land<br>• High/increased traffic volumes (roads merge)<br>• Commercial parking lots lacking defined driveways are hazardous to pedestrian/bike mobility<br>• Shoulders disappear nearing the intersection with Main/Water | • Shoulder for Path/Sidewalk<br>• Direct connection to Mathis Plaza in South Toms River | • Traffic Volumes from tourism and peak driving times |
| Flint Road (F1)<br><br>Local Road | • Wide pavement surface<br>• Low traffic volume<br>• Direct connection to the BBT | • No sidewalks<br>• industrial/light industrial land use prevalent with truck traffic<br>• Reduced horizontal sight lines | • Space for bike lanes | • Shoulders too narrow and not bike-able at some points<br>• Some truck traffic |
| Flint Road (F2)<br><br>Local Road | • Low traffic volume<br>• Wide pavement surface<br>• Direct connection to Herflicker Bridge | • Sidewalks in need of repair<br>• Multiple land uses on road (residential/industrial)<br>• Reduced horizontal sight lines<br>• Bridge creates some vehicle backup | • Travel lane consolidation<br>• Multimodal transportation improvements | • Some truck traffic<br>• Narrow shoulders |

| | Strengths | Weakness of Existing Conditions | Opportunities | Threats (Obstacles) to Bike Facilities |
|---|---|---|---|---|
| Water Street (SR166-CR527) (W1)<br><br>State & County Road | • Nearby Downtown activity<br>• Connection to redevelopment area<br>• Pedestrian facilities and crosswalks | • Lack of bicycle right of way<br>• High traffic volumes<br>• Minimal space for improvement without traffic reconfiguration<br>• Truck traffic to the post office<br>• Uncontrolled access to parking lots<br>• Drainage grates not bike-compatible | • Street tree plantings<br>• Improved Fire Company ingress and egress<br>• Increased pedestrian connections and signage to redevelopment area<br>• Gateway to residential and business areas | • Many turning lanes for high traffic volumes<br>• Lack of space for bike lane in existing configuration |
| Water Street (CR549) (W2)<br><br>County Road | • Existing pedestrian facilities<br>• Water views/access and landscaping<br>• Wide setbacks provide room for bikeway<br>• Adjacent to Huddy Park | • High traffic volume.<br>• Drainage grates not bike-compatible<br>• Lacks some pedestrian curb cuts<br>• Lacks room for ADA-compliant sidewalks<br>• High truck and car traffic | • Narrow vehicle lanes<br>• Improved Fire Company ingress and egress<br>• Street tree plantings<br>• Improved pedestrian crossings | • Traffic demand to downtown |
| S. Main Street (CR530-SR166) (SM)<br><br>County & State Road | • Pedestrian facilities<br>• Green space and bridge/water views | • Not frequented by pedestrians<br>• Vehicle-oriented | • Connecting crosswalk to Huddy Park<br>• Gateway feature<br>• Dedicated bike space | • Isolated from downtown activities |
| Main Street (SR166) (M1)<br><br>State Road | • Downtown activity<br>• Some pedestrian features | • Road cannot accommodate bike lanes<br>• Parking adjacent to in-road biking may lead to safety issues<br>• Some pedestrian crossing issues, such as long wait to cross | • Improved pedestrian crossings<br>• Sharrow or bike lanes<br>• Improved gateway features<br>• Increased crossing times | • Connects directly to busy intersection of Main/Water |

| | Strengths | Weakness of Existing Conditions | Opportunities | Threats (Obstacles) to Bike Facilities |
|---|---|---|---|---|
| Herflicker Blvd. (SR166) (H1)<br><br>State Road (partial) | • Wide road with space for bike-specific improvements<br>• Wide bridge with side path for pedestrian or bikers<br>• Potential for future trail connection | • Surrounding parking lots and related traffic<br>• Isolated and unconnected pedestrian/bike facilities<br>• Traffic volumes from Main Street bypass<br>• Side path ends abruptly | • Lighting and aesthetic improvements<br>• Improved pedestrian crossings (at Irons and Herflicker intersection)<br>• Bike lanes<br>• Bike and pedestrian facilities with future redevelopment | • Crossing areas with high traffic volume |
| Irons Street (SR166) (I1)<br><br>State Road | • Wide roadway<br>• Few curb cuts<br>• Wide shoulders | • High traffic volume from Main Street bypass<br>• One-way traffic | • Side roadway or off-road path incorporated into sidewalk<br>• Two- way bike lanes<br>• Bike and pedestrian facilities with future redevelopment | • Traffic volume from bypass |

## Existing Conditions

*This section will describe the existing conditions of the roadways likely to be options for bike-ped connections to Downtown Toms River. Existing facilities for bicycle and pedestrian mobility will also be discussed.*

### Roadways

*The Barnegat Branch Trail terminates at Admiral Avenue between its intersections with Ivy Way and Atlantic City Boulevard. Admiral Avenue terminates at a signalized intersection with Atlantic City Boulevard and commercial driveway. Flint Road meets Ivy Way at a sign-controlled intersection with Admiral Avenue. The two intersections are approximately 72 feet apart. Traffic frequently backs up at this complex intersection.*

*The entrance to the BBT, situated between Atlantic City Boulevard and Ivy Way on the south side of Admiral Avenue, is not marked. The trail is linked to marked crosswalks across Admiral Avenue at Atlantic City Boulevard, terminating on bare ground; and Atlantic City Boulevard, connecting with a short stretch of sidewalk along the east side of Atlantic City Boulevard.*

*The trail terminus presents a choice for cyclists bound for downtown Toms River to use either NJ Route 166 (Atlantic City Boulevard) to or Flint Road to South Main Street or Irons Street via the Herflicker Boulevard Bridge. A summary of existing conditions for all of the streets evaluated in this study is found in Table 1, Bicycle Link SWOT Analysis; the segments are keyed to Figure 7, Preliminary Analysis Map.*

*Atlantic City Boulevard (to the right in Figure 8) is a two-lane road lined with auto-oriented small businesses, light industry, a strip mall and marina, as well as scenic waterfront views of Toms River. Along the west side of this short segment are three parks: Mathis Plaza (a fishing park) and Huddy Park abut directly; Cedar Point is just east of the boulevard on Crabbe Road.*


*Figure 9: Barnegat Branch Trail terminus and vicinity*

*The speed limit is not posted. Between Admiral Avenue and South Main Street the roadway is generally 44 feet wide with narrow 10' travel lanes and shoulders in excess of 12' wide in each direction. However, open parking areas fronting along the road's east (northbound) side, south of Crabbe Road, and on the southbound (west) side directly across from Mathis Plaza, where vehicles may enter and exit the roadway at random, multiplies conflict points*

*and tempts less-confident cyclists to ride in the verges and through parking areas (see Figure 10, below).*

*The former Barnegat Branch right-of-way, along the west (southbound) side of the road, is open and nearly unobstructed from Admiral Avenue to Crabbe Road, but is privately owned and vacant, as was previously described. A narrow sidewalk along the east side runs from Mathis Plaza to Water Street past the entrance to Huddy Park.*


*Figure 10: Atlantic City Boulevard*

*Atlantic City Boulevard becomes one-way northbound at Herflicker Boulevard; the shoulder tapers out at the Toms River bridge before reaching S. Main Street where S. Main Street continues through Water Street to become N. Main Street and includes an exclusive right turn lane and slip ramp onto East Water Street, forcing through-bicyclists and motorists to share a narrow middle through lane through the intersection. Some bicyclists avoid this intersection by using the pedestrian pathways and footbridge in adjacent Huddy Park to reach Water Street. The water's edge on the far side of Huddy Park provides an attractive respite.*

*Flint Road (to the right and bottom in Figure 11) is a two-lane road fronted by a mix of single-family residences, light industry and vacant parcels. Shoulders vary in width from one to three feet. Flint exhibits some of the same lack of controlled property access as Atlantic City Boulevard, but carries much less traffic and is much less intensely developed, making it the safer, more comfortable route for bicycling. Flint Road connects directly to South Main Street and Herflicker Bridge in an area presenting opportunities for commercial, trail and park redevelopment.*

*Figure 11: Atlantic City Boulevard (top, left) and Flint Road (bottom, right)*

*S. Main Street is one-way northbound between Herflicker Boulevard and Water Street. Its intersection with Atlantic City Boulevard was at some point reconfigured into a sign-controlled T, granting northbound traffic from Atlantic City Boulevard continuous right of way. Wide walkways border the turfed space left over from the reconfiguration.*

*Southbound bicyclists must use Irons Street (which is one-way southbound between Water Street and Herflicker Boulevard) and Herflicker Boulevard to reach either Atlantic City Boulevard or Flint Road (via a short left jog on South Main Street). Its intersections with Herflicker Boulevard and Water Street are signalized. Irons Street carries a heavy traffic load and is fronted by a postal facility and by underutilized parcels and surface parking lots (used primarily during events) which are targeted for redevelopment.*

*The sole one-way southbound block of Irons Street places a barrier in what is otherwise an attractive northbound route to Toms River High School South, the Ocean County Library and County offices via Irons Street, Legion Court, Hyers Street and Sheriff Street.*

*The principal means of auto access between the Garden State Parkway and downtown Toms River, Water Street is a four-lane high volume urban arterial designed to accommodate downtown's highest peak-hour volumes. Fronted by surface parking lots and commercial buildings, Water Street has no on-street parking, shoulders or bike lanes. Sidewalks are generally 6' wide. Pedestrian crossings at intersections are complicated by protected left turns and, at South Main Street, by slip ramps. Only the most skilled, traffic-tolerant bicyclists would choose to mix with motor traffic on the street's narrow 11' lanes and intermittent right turn only lanes.*

*Water Street and Hooper Avenue, which share similar characteristics, are the downtown's principal access-egress routes to the regional highway system. Both are designed to clear high peak-hour volumes quickly. N. Main Street and Washington Street serve a more local function, providing direct access to downtown businesses. Each is one lane by direction with on-street parking, and each experiences significant pedestrian activity; as a consequence, traffic moves at a slow pace. Roadway widths are insufficient for retrofit with full bike lanes.*

*Residential streets typically carry low volumes at low speeds, conditions favorable for bicycling. Hyers Street, Dayton Avenue and Legion Court were examined for their desirability as low-volume, low-speed alternative connections to the Ocean County Library and Government Complex, the high school, and other attractions.*

## Bicycle facilities

*The northernmost completed section of the BBT is a one-mile long, seven-foot wide asphalt path along the abandoned Barnegat Branch railroad right-of-way through Beachwood Borough.*

*The recently-built Herflicker Bridge was designed to accommodate a future trail on a 15' wide walkway on the west (southbound) side of the roadway. Future trail traffic is separated from sidewalk traffic continuing on Herflicker by means of a railing the length of the span. The northern end of the walkway on the trail (outside) side connects with a short asphalt path that turns westward to*

*align with the former Barnegat Branch right-of-way before terminating.*

*There are no other bicycle facilities in the study area except for bicycle racks in various public plazas within the campus of the Ocean County Administration buildings, County Library Headquarters Branch, Township Municipal Building, South Toms River High School, etc.*

## Pedestrian facilities

*Sidewalks are intermittent and inadequate along the two principal routes, Flint Road and Atlantic City Boulevard, connecting the BBT with downtown Toms River. Marked crosswalks, a mix of transverse and continental types, are found at the majority of intersections in Toms River. Currently, motorists have priority over pedestrians downtown: pedestrian signals are push-button actuated at all downtown signalized intersections. Sidewalks are not compliant with the Americans with Disabilities Act (ADA) at many locations; issues include insufficient width, obstructions including utility poles, and poorly designed and missing ramps.*

## Trip attractions

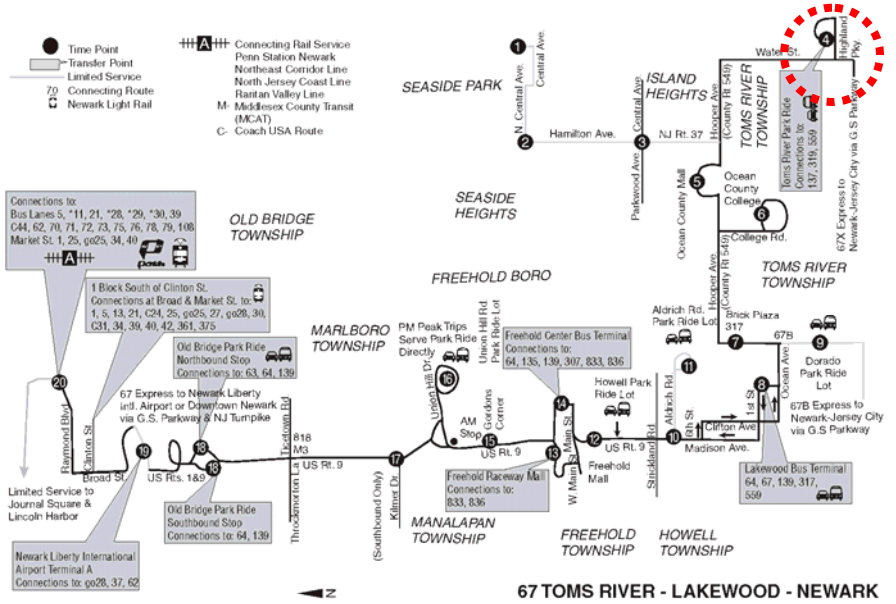
*The principal attractions for bicycle and pedestrian trips within the study area include the N. Main Street/Washington Street business and professional district, the riverfront, Riverview Pointe, parks (Huddy, Mathis Plaza and Cedar Point), museums (Waterhouse; Seaport; Ocean County Historical), Toms River High School South, the Ocean County Library, the county office complex, Saint Joseph's Parish/Monsignor Donovan High School and the bus depot.*

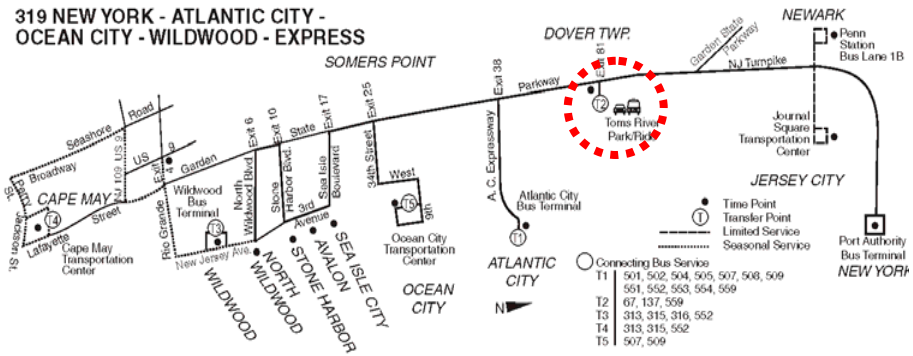
*Figure 12: Toms River Seaport Museum (Seaport website)*

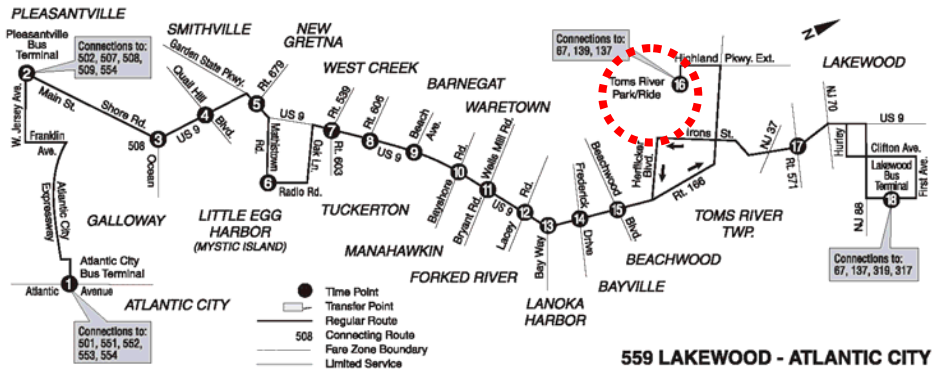
*Figure 13: The River Lady at the riverfront (River Lady website)*

## *Transit Opportunities*

*There are opportunities for connecting bicycle and transit modes, particularly bus transit. The Toms River Bus Terminal is a major hub for NJ Transit buses running north and south on the Garden State Parkway, with routes either north to Newark and New York City or south to Atlantic City passing through either the Toms River Bus Terminal or the Toms River Park and Ride at Exit 81. The Toms River Bus Terminal is proposed to be directly linked to the extension of the Barnegat Branch Trail down the continuation of the former Barnegat Branch railroad right of way, owned by Toms River Township, that runs behind the Terminal Building. The Terminal is recommended to be equipped with bicycle storage lockers to encourage the use of the bicycle pathway system for intermodal commuting.*



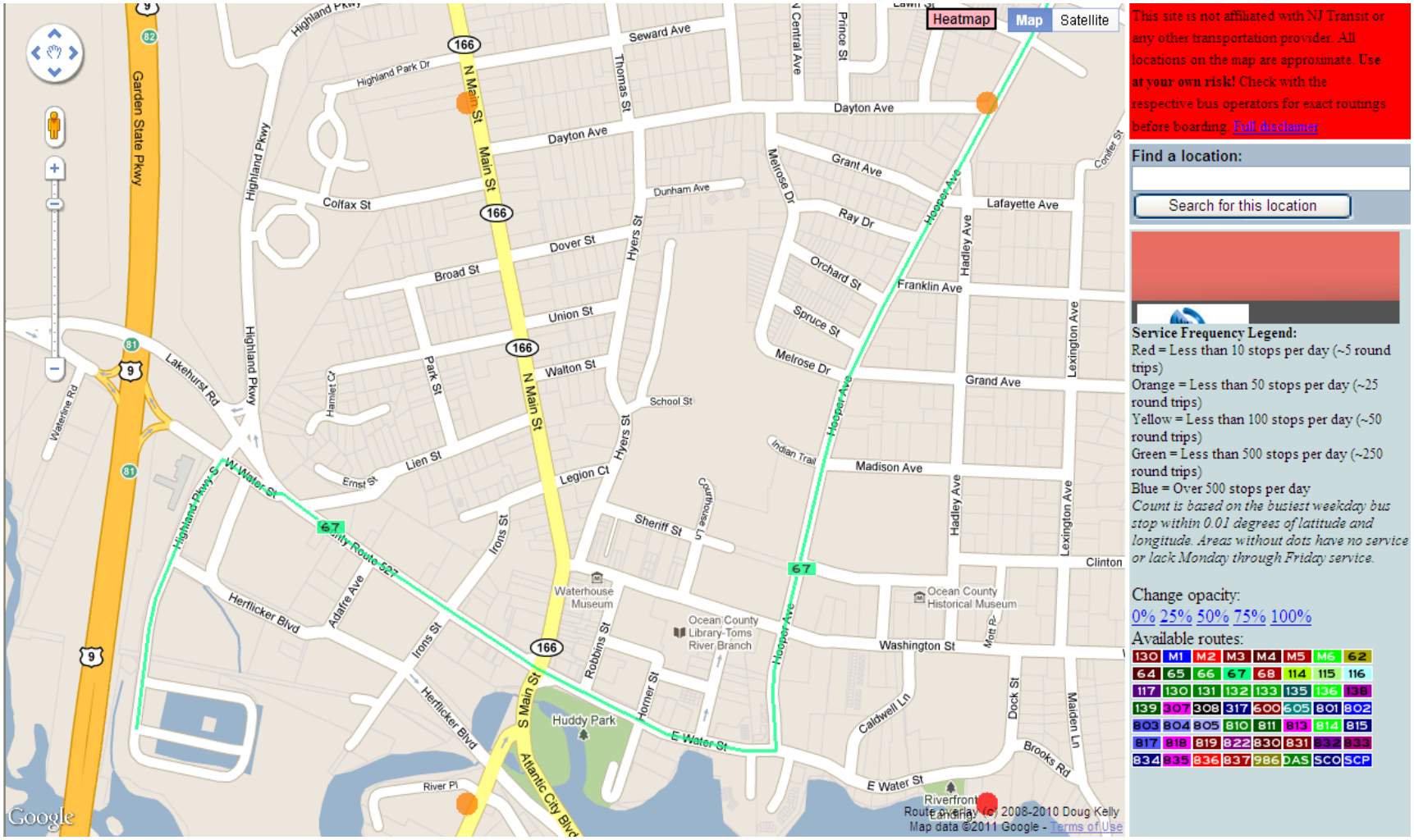



*Figure 14: Map showing route of NJ Transit Route 67, which overlaps with proposed segments of the proposed Bikepath system in Downtown Toms River. The red and orange dots indicate bus stops where data regarding round trips per day was available, excluding the Terminal.*

*Source: http://www.dougandadrienne.info/njbus/indexcnj.html*

## Recommendations

*The recommendations to follow cover the identification of routes and paths and design features for bicycle and pedestrian mobility.*

### Recommended routes

*The study team recommends a route incorporating Flint Road, S. Main Street, Herflicker Boulevard, Water Street and Irons Street as the preferred alternative to connect the Barnegat Branch Trail with downtown Toms River destinations. This route should be marked with conventional bike route signage along existing or modified shoulders and "share the road" signage or shared lane markings as appropriate; and with a system of navigational signage (see Figure 24).*

*Portions of Herflicker Boulevard and Irons Street are contained with the Special Waterfront Redevelopment Area that lies between West Water Street (Water Street west of Main Street) and the Toms River, easterly to the Garden State Parkway (see Figure 8). If redevelopment occurs in the Special Waterfront Redevelopment Area, Irons Street could be redesigned with a separated two-way bikeway associated with the relocation of the Post Office (see Figure 15). In the meantime, retrofit with conventional, one-way bike lanes on each side of the street is recommended as a prudent, low-cost alternative. Additionally Herflicker Boulevard could be modified with shoulders and bike route signage as a route from Irons Street to Highland Parkway in the short term, with the Township-owned ROW of the former Barnegat Branch railroad as the long term link to the Bus Terminal and Highland Parkway should redevelopment proceed along Herflicker Boulevard in the future (see Figure 16).*


*Figure 15: If the Post Office property is redeveloped in the future, Irons Street could become a two-way contraflow bike lane crossing Water Street.*

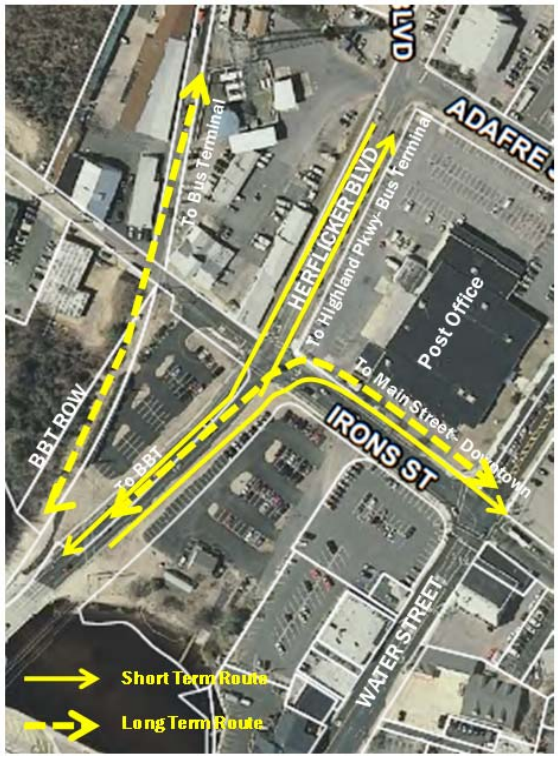



*Figure 16: Short term recommendation for bicycle circulation is for Irons to be one-way bike lane out of downtown and for Herflicker and other back streets to link to Bus Depot via Highland Parkway. Long term connection to Bus Depot would be via rail R.O.W*

*Selected residential streets have been identified to serve as connecting routes to specific bicycle trip attractions. Once a safe and efficient link is made between the Herflicker Boulevard Bridge and Water Street, a bike lane up Irons Street to Legion Court would enable bicycle access to Toms River South High School and*

*the Ocean County Library without having to ride on either Hooper Avenue, Main Street or Washington Street.*

*Once a cyclist gets to Legion Court, Hyers Street provides a generous right-of-way that leads to Dayton Avenue. Dayton Avenue is the only connector between the Main Street corridor down the west side of the Downtown, and the Hooper Avenue corridor along the east side of the Downtown. Hyers, which runs parallel to both Main and Hooper, provides a low-traffic route for cyclists. Dayton Avenue serves the St. Joseph's Catholic Parish and Monsignor Donovan High School on Hooper Avenue and the First Baptist Church on Main Street, while Hyers Street connects Dayton to Toms River High School South and the Ocean County Library.*

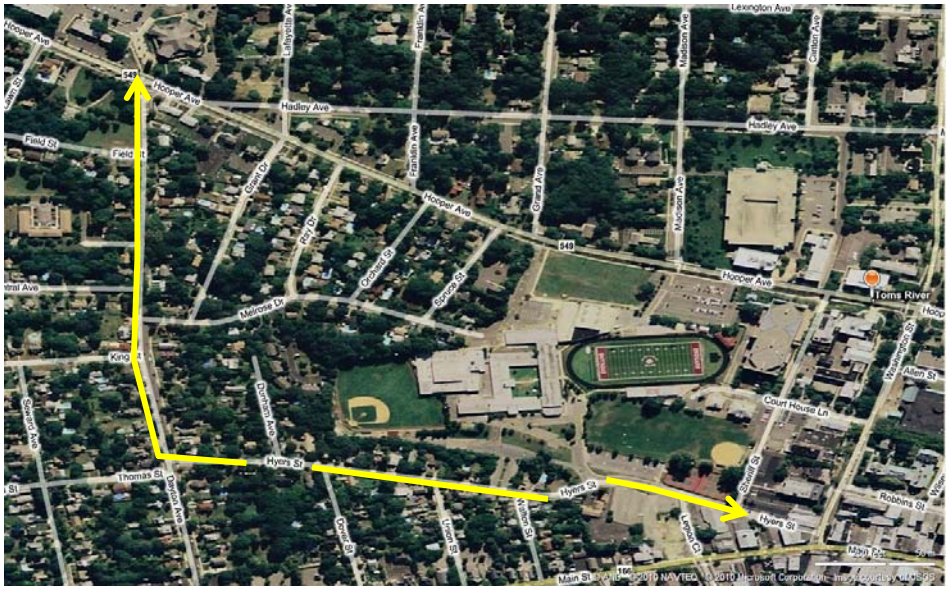



*Figure 17: Hyers Street is the recommended bike route between Legion Court and Dayton Avenue.*

*These streets should be retrofitted with navigational signage, bike lanes, shared lane markings and "share the road" warning signs as appropriate.*

## Bicycle treatments

*The study team's recommendations for bicycle treatments fall largely under the category of traffic control devices – signage and pavement markings. All of the treatments recommended here are included in the Manual of Uniform Traffic Control Devices (MUTCD), 2009 Edition. These devices are designed to improve bicyclist safety, increase motorist awareness and acceptance of bicyclists in the roadway, increase the comfort of bicyclists in mixed traffic, and direct bicyclists to their destination. These devices and their recommended application in the study area are described below.*

## Bike lanes

*Bike lanes are spaces within the roadway delineated by white stripes, pavement symbols and directional arrows, regulatory signage (optional) and sometimes by pavement coloring (most frequently applied on intersection approaches, as the bike lane moves to the left of a right turn lane), for preferential use by bicyclists. They are positioned to the right of the rightmost general purpose travel lane, and are one-way in the same direction as the adjacent lane. Their principal benefits are to increase comfort of bicyclists using the roadway, increase the predictability*

*for both bicyclist and motorists. They are typically 5' wide, and not less than 4' wide. Motorists may encroach on the bike lane when preparing to turn right or to park, although parking in a bike lane is prohibited.*

*Ocean County's current policy on bike lanes is that they will designate and even potentially line a shoulder, but will not include the painted symbols or arrows within the lanes for liability reasons. They will however use bicycle route signage in combination with lined shoulders to guide cyclists.*

*Care must be taken when designing bike lanes adjacent to parking lanes to provide bicyclists sufficient shy distance to minimize the risk of collision between bicyclists and open car doors as drivers and passengers exit parked vehicles. Some large cities are experimenting with "buffered" bike lanes which are separated from general purpose lanes and parking lanes by a gore strip. The MUTCD provides full guidance on the application and design of bike lanes.*

*The study team recommends bike lanes on Atlantic City Boulevard, Herflicker Boulevard, S. Main Street, Irons Street (including a contraflow bike lane between Water Street and Herflicker Boulevard) and portions of Flint Road and Water Street east of Main Street. A contraflow lane is a two way bike lane that opposes the direction of vehicular traffic flow. This would only be feasible if additional width could be secured through the redevelopment of the Post Office site at the corner of Irons Street and Water Street as part of the larger redevelopment plan being pursued by the Township and the Toms River Business Improvement District. For the short term, the bike lane on Irons Street would be a one-way lane along the shoulder that would flow with vehicular traffic out of the Downtown.*

*Figure 18: Marked Bike lane*

*Figure 19: Unmarked Bike Lane*

*Figure 20: Example of contraflow two-way bike lane*

## Shared lane markings

*In the absence of bike lanes, many bicyclists ride too far to the right of the roadway in situations where for their own safety they should fully occupy the right travel lane, or "take the lane." Riding in the gutter is dangerous for a bicyclist. It greatly decreases riders' visibility to motorists overtaking, turning left, and entering the roadway; provides the bicyclist little margin for error nor room to take evasive maneuvers; poses a hazard from drainage grates and accumulated gravel and debris, and tempts overtaking motorists to pass too closely.*

*Figure 21: Shared lane markings on urban street*

*Shared lane markings, or "sharrows" are a new addition to the MUTCD. They are pavement markings consisting of a chevron pointing in the direction of travel above a symbolized bicycle or bicyclist. Per the Bike Guide, sharrows are utilized where the distance from centerline of roadway to edge of pavement (or gutter line) is 15' or less or there is an adjacent parking lane, and a bike lane is not provided. Where the travel lane is larger than 15', and no adjacent parking lane is present, a shoulder should be striped so that bicyclists may utilize the shoulder without significantly interfering with normal traffic flow. Sharrows are intented to increase both motorist and bicyclist acceptance of bicyclists taking the lane, and to guide bicyclists along the safest lateral position in which to ride. The MUTCD provides full guidance on the application and design of shared lane marking (see Figure 23).*

*Figure 22: A sharrow on a road without on-street parking*

*The study team initially recommended shared lane markings along N. Main Street, Washington Street, and portions of Water Street and Flint Road. However, after further consultation with the*

*County Engineer, it was determined that bicycle route signage, including "Share The Road" signage, was the favored alternative.*

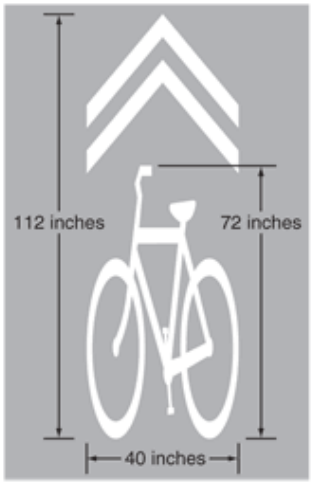



*Figure 23: Dimensions of a sharrow: MUTCD standards (Figure 9C-9)*

## Desirable Typical Sections (DTS)

*A desirable typical section (DTS) has been prepared for each segment of the proposed bike route through Downtown Toms River (see Appendix A). These DTSs have been prepared to accommodate bicyclists within the existing pavement width. The following publications were referenced in preparation of the DTSs.*

- *Manual on Uniform Traffic Control Devices (MUTCD), FHWA, 2009*
- *Guide for Development of Bicycle Facilities (Bike Guide), AASHTO, 1999*

*The MUTCD provides recommendations for pavement markings and their placement. Specifically, when a bike lane is proposed, what type of markings, where, and how frequently they should be placed within the bike line. The Bike Guide provides recommendations for when a dedicated bike lane, shared bike lane, or simply nothing should be done to accommodate bicyclists. Specific dimensions are provided and justifications for the recommended practice.*

*Bicyclists are proposed to be accommodated within the study area utilizing shoulders (without bike lane markings). The County has specified that dedicated bike lanes should not be used within their jurisdiction and determined that bike route signage is better suited for the traffic conditions in Downtown Toms River. Due to all but one of the roadways being under the jurisdiction of the County, no dedicated bike lanes have been proposed.*

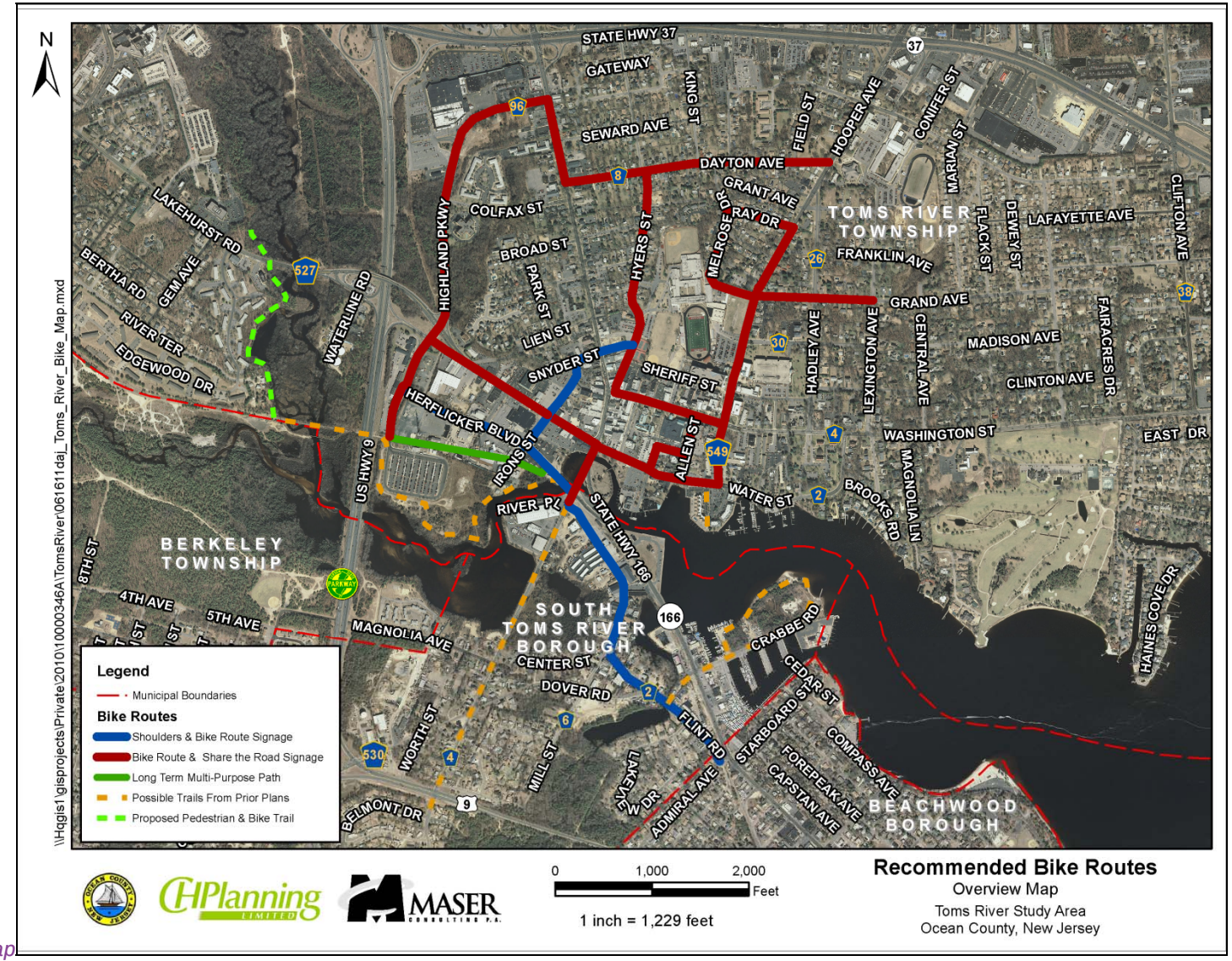
## Striped Shoulders

*Striped Shoulders have been proposed where there is sufficient pavement to provide a 12' travel lane and a minimum 4' shoulder. A typical bicyclist will occupy 3.33' of roadway width according to the Bike Guide. As such, a 4' shoulder is sufficient to accommodate bicyclists without interfering with the adjacent travel lane.*

*There are special circumstances where striped shoulder may need to be constrained slightly due to the presence of a culvert or other obstacle when the shoulders become smaller in width. At these locations where the shoulder is constrained to below 4' in width, it is recommended that either appropriate "Share the Road" signage be installed. This treatment will indicate to motorsts*

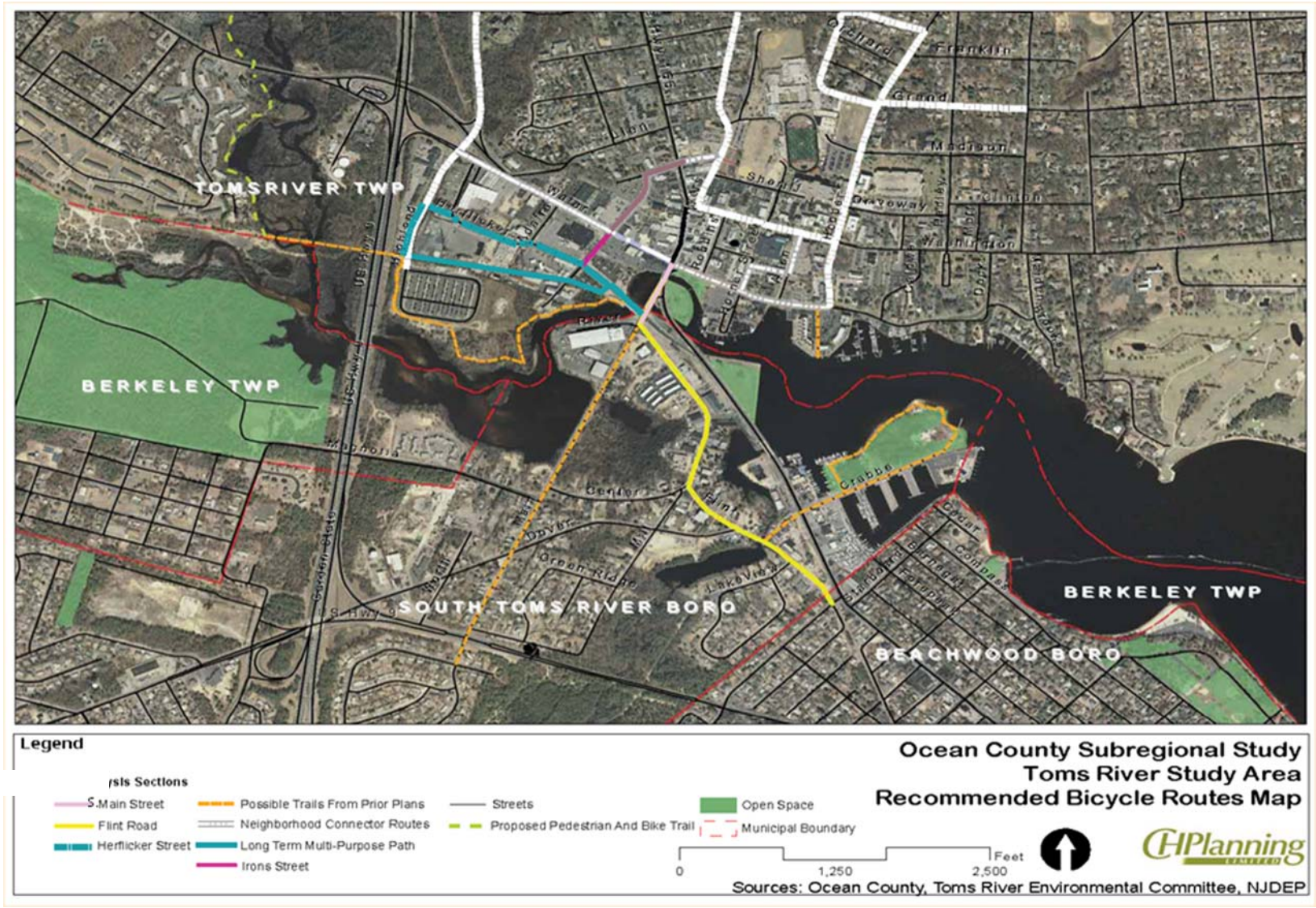
*and bicyclists of the pending constriction to the normal DTS. This treatment will be required along Flint Road at the culvert.*

*Figure 24: Recommended Bike Routes – Overview*




*Map*

*Figure 25: Recommended Bicycle Routes - Downtown Core*



## Directional signage

*A system of directional signage, designed for bicyclists, should be installed along the bike route and surrounding streets. A signage system should be coordinated with the wayfinding signage already successfully installed around the Downtown. The signage for bicyclists would be placed where needed to supplement the wayfinding signage at the gateways to the Downtown and direct bicyclists to key destinations such as downtown businesses, the BBT, Huddy Park, the bus terminal, the government center, and schools and libraries along the routes identified earlier. Signs should be placed around each point of decision and turn in the route: on approach, at the junction, and after the turn, as confirmation.*


*Figure 26: Directional signage along Bike Routes (left) would complement wayfinding signage installed by the Downtown Toms River BID (right)*

*Key locations for sign placement include the terminus of the BBT at Admiral Avenue; Flint and South Main streets, Herflicker Boulevard and South Main Street, South Main and Water streets, South Main Street and Atlantic City Boulevard, Irons and Water streets, and Irons Street at Herflicker Boulevard. Additional signage should direct bicyclists from the main route to specific destinations along preferred connector routes.*

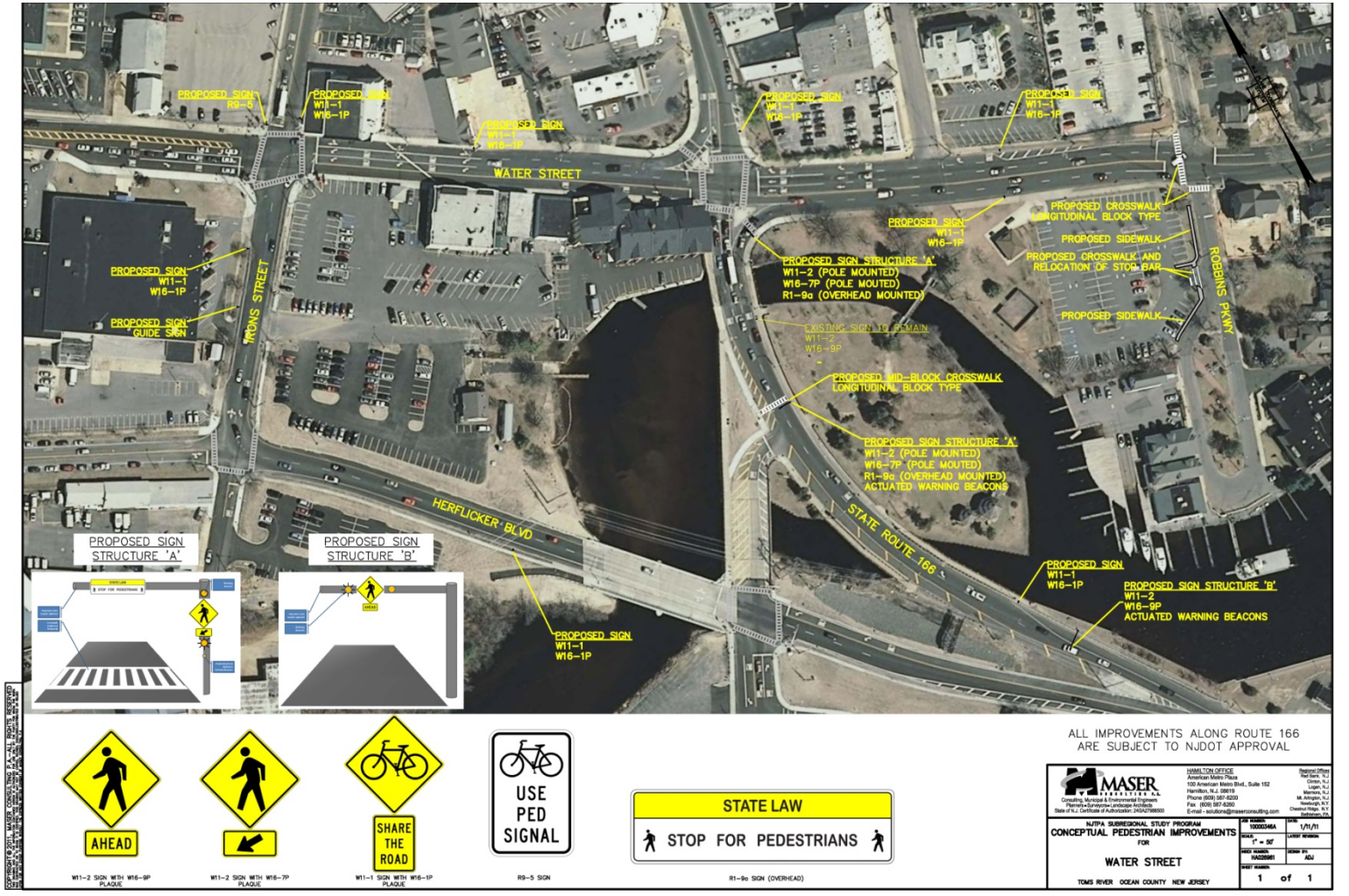
*A separate and distinct system of directional signage should be provided for pedestrians within the immediate downtown area.*

## Pedestrian facilities

*The study team recommends modification to traffic signal phases at the intersections of Main and Iron Streets with Water Street (see Appendix B) to include faster push-button actuation, coupled with re-timing to accommodate pedestrians automatically, advanced pedestrian phase (initiation of the pedestrian "walk" signal a few seconds in advance of the parallel green phase), and pedestrian crossing warning signs. Pedestrian signal heads with countdown timers, which allow pedestrians to see how much time is left for crossing, are now required when replacing pedestrian signal heads.*

*Pedestrian amenities such as seating, street trees, trash receptacles, and pedestrian-oriented directional signage are present generally around the County buildings on Hooper Avenue, the Headquarters Branch of the County Library and Town Hall on Washington Street, but should be installed on sidewalks throughout other parts of the business district, particularly along Water, S. Main, and Hooper Avenue between Washington Street and Water Street.*

*Figure 27: Summary Map of Pedestrian Recommendations*



*Barriers to sidewalk access exist at multiple locations throughout the study area, including physical obstructions to the sidewalk, sidewalks in disrepair, and missing and non-ADA-compliant ramps. These barriers impede the ability to achieve a "complete street", or a street that facilitates all forms of mobility (car, bicycle, pedestrian and transit). The study team recommends the following locations for priority attention: around Huddy Park, the government center on Hooper Avenue, along Water Street, Irons Street and Herflicker Boulevard, and surrounding the terminus of the BBT.*

*In addition to aggressive pedestrian signage treatments at these locations, the study team also recommends a prominent pedestrian crossing at the current intersection of Main Street and Atlantic City Boulevard opposite the opening in the wall and path leading to the west side of Huddy Park (see figures below).*

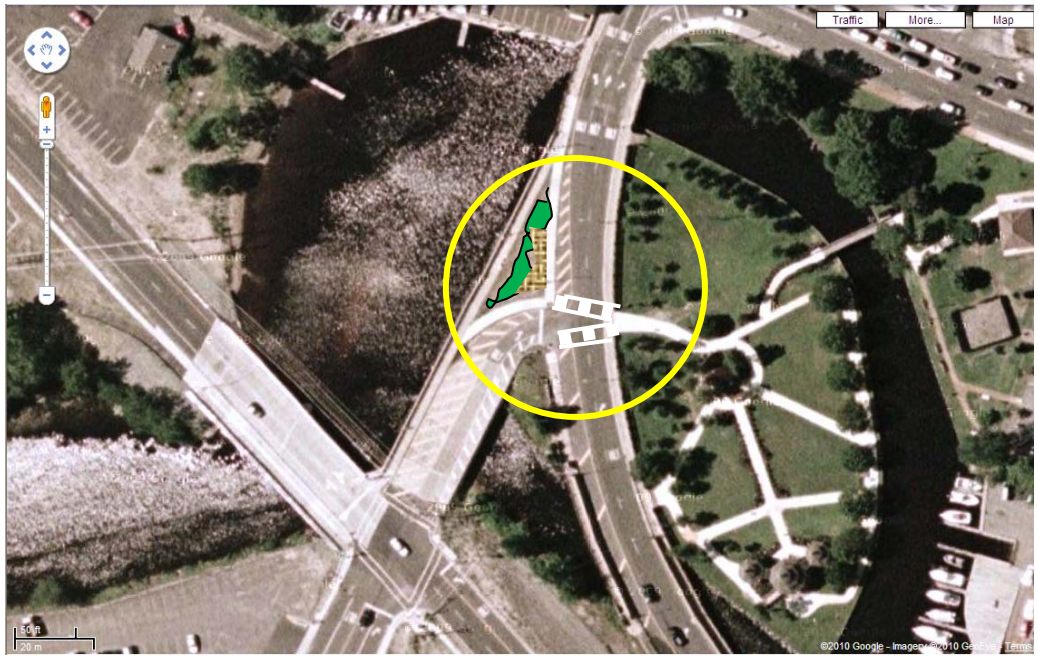



*Figure 28: Suggested pedestrian crossing (left) and gateway treatment (right) at Main Street and Huddy Park*

*The space left over from the reconfiguration of the S. Main Street-Atlantic City Boulevard intersection presents a unique opportunity to create a landscaped gateway entrance announcing arrival in downtown Toms River to trail users and motorists, prompting motorists to slow down as they leave a highway environment and enter the realm of pedestrians.*


*Figure 29: Examples of gateway treatments: Water Street TOP;*


*Belmar, NJ, BOTTOM*

*Figure 30: Existing condition of proposed gateway treatment location*

**Warning signs**

*Warning signs should be installed where appropriate to enhance safety. These include "Share the Road," pedestrian crossing, bicycle crossing, and bike lane ahead. Warning signs should also be placed in areas where there are wide and busy crosswalks, at Atlantic City Boulevard and South Main Street at the entrance to Huddy Park; South Main Street at Water Street; Irons Street and Water Street; and Irons Street and Herflicker Boulevard. Push-button actuated blinking pedestrian crossing signs are appropriate for busy intersections such as Admiral Avenue at Flint Road, and South Main Street at Atlantic City Boulevard.*

**Interpretive signage**

*Interpretive signage along the BBT and in downtown Toms River would educate bike route and pedestrian users about the BBT, the history of Toms River, environmental and park assets, redevelopment, and other natural and cultural features along the bike route. Ideal locations for interpretive signs include the trail terminus at Admiral Avenue; and the underutilized park space at South Main Street and Atlantic City Boulevard; North Main Street at Washington Street; and within Huddy, Mathis and Cedar Point parks.*

## Other Considerations

*Bike-friendly storm grates and drains are recommended along designated bike routes and bike-friendly streets. Redesign of certain key high traffic intersections, such as Iron and Water streets, Water and South Main streets, Flint Road and Admiral Avenue, and Herflicker Boulevard and Irons Street may be needed to facilitate safe bicycle crossing and turning movements. A dashed bike lane or other specialized crossing are recommended at these locations.*

## Implementation

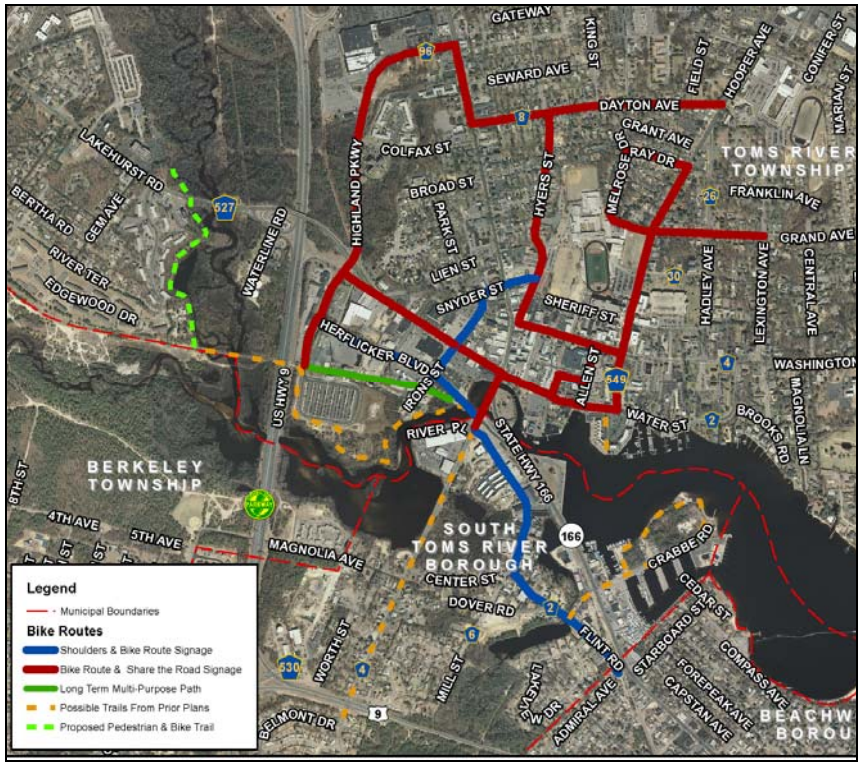
*Unless the County determines that it is feasible to pursue the acquisition of Block 23, Lots 1 and 1.02 and bridge a portion of the Toms River for purposes of extending the Barnegat Branch Trail as a dedicated Class 1 multipurpose path along the west side of Atlantic City Boulevard, none of the recommendations presented in this report require right of way acquisition, road widening, installation of traffic calming features, or trail construction. Engineering studies may be required to advance recommendations regarding signal timing and intersection design. Design services will be required to advance recommendations regarding signage, pavement markings, ADA compliance and pedestrian amenities.*

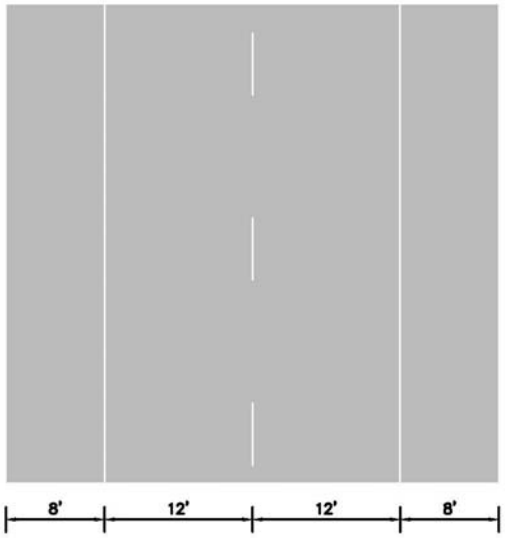
*The improvements may be completed in phases or through a single contract. ADA compliance of sidewalks and crosswalks, the most critical issue, should take priority.*

*Federal and state funding programs can be used for the implementation of the recommendations in this report if funding is available. Applications for federal surface transportation funding that may be available in the future should be made through the North Jersey Transportation Planning Authority; state funding should be sought directly from the New Jersey Department of Transportation.*

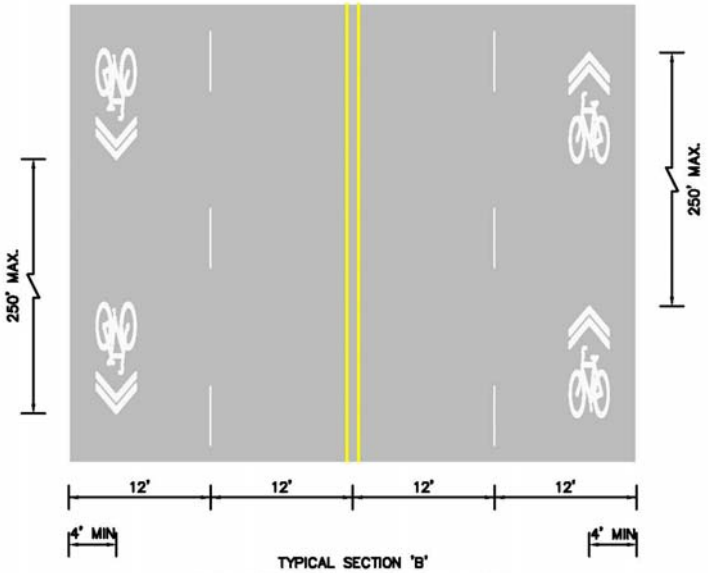
## *APPENDICES*

### *APPENDIX A: BICYCLE PATH SYSTEM – DESIGN TYPICAL SECTIONS*

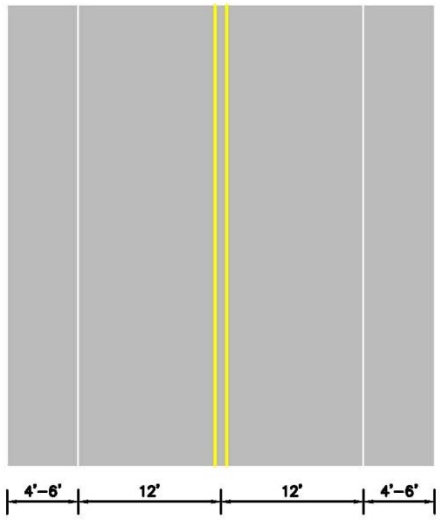



TYPICAL SECTION 'A'
HERFLIKCER BOULEVARD (SR 166Z) BETWEEN IRONS STREET (SR 166Z) & SOUTH MAIN STREET (CR 530)
IRONS STREET (CR 166Z) BETWEEN WATER STREET (CR 527/SR 166Z) & HERFLICKER BLVD (SR 166Z)

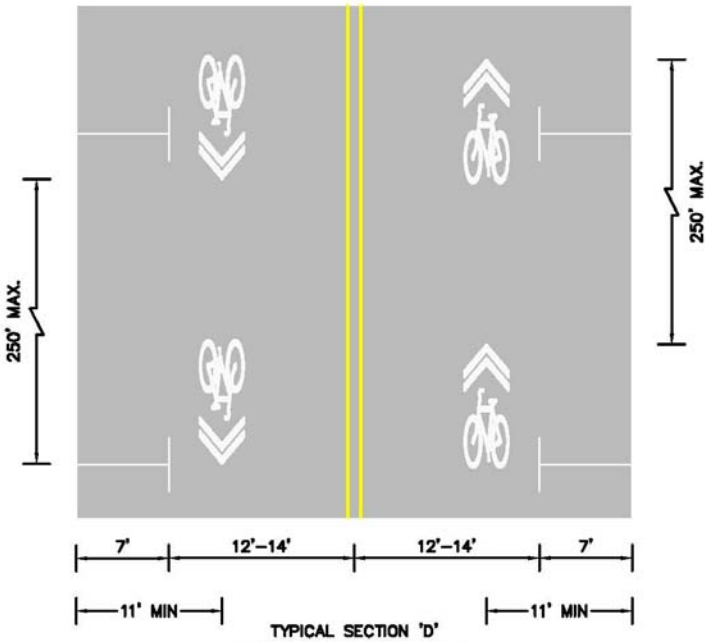



TYPICAL SECTION 'B'
HIGHLAND PARKWAY BETWEEN 166 & 527
WATER STREET / HOOPER STREET (CR 549) BETWEEN SR 166 & MADISON AVENUE (CR 30)
HOOPER STREET (CR 549) BETWEEN LAFAYETTE AVENUE (CR 26) & DAYTON AVENUE (CR 8)

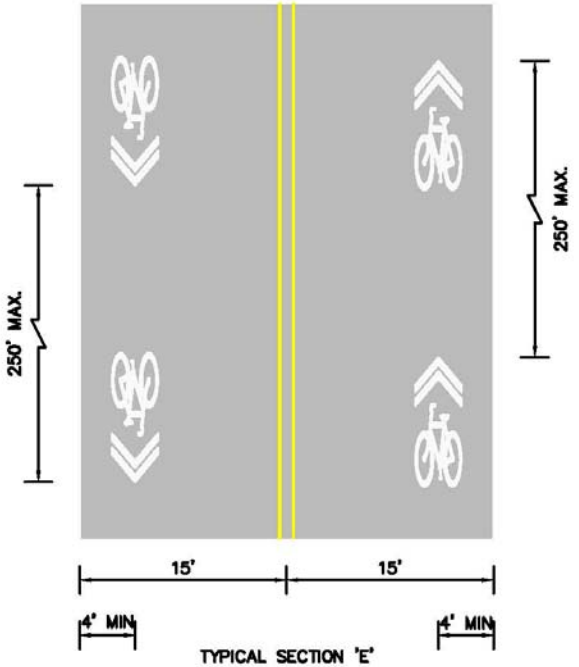



TYPICAL SECTION 'C'
FLINT ROAD (CR 2)
HOOPER AVENUE (CR 549) BETWEEN MADISON AVENUE (CR 30) & LAFAYETTE AVENUE (CR 26)
DAYTON AVENUE (CR 8) BETWEEN KING STREET & SR 166
STATE ROUTE 166 BETWEEN DAYTON AVENUE (CR 8) & HIGHLAND PARKWAY (CR 96)

*Sharrow lane marking includes option of Bicycle Route & "Share The Road" signage without painted lane marking based on input from County Engineer.*

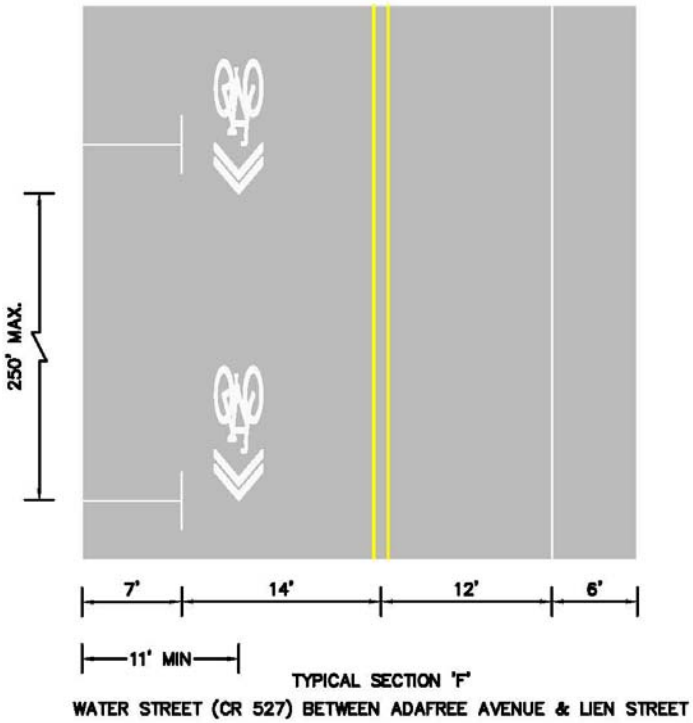



TYPICAL SECTION 'D'
WASHINGTON STREET (CR 4)
HERFLICKER BOULEVARD BETWEEN IRONS STREET (ST 166Z) & ADAFREE AVENUE
ADAFREE AVENUE

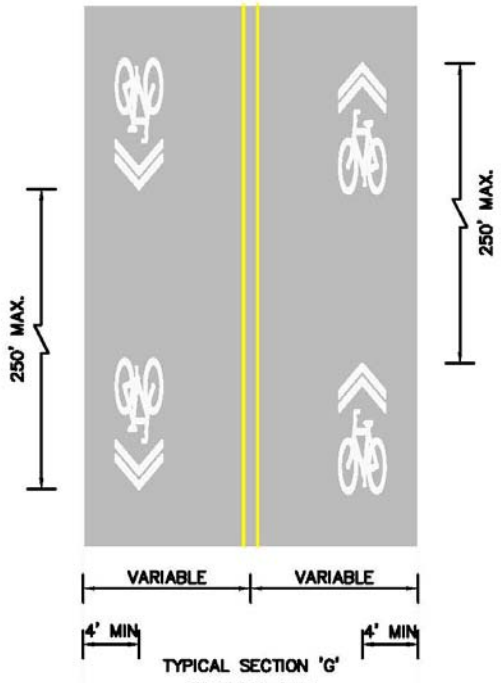



TYPICAL SECTION 'E'
DAYTON AVENUE (CR 8) BETWEEN HOOPER AVENUE (CR 549) & KING STREET
HIGHLAND PARKWAY SOUTH OF WATER STREET

*Sharrow lane marking includes option of Bicycle Route & "Share The Road" signage without painted lane marking based on input from County Engineer.*

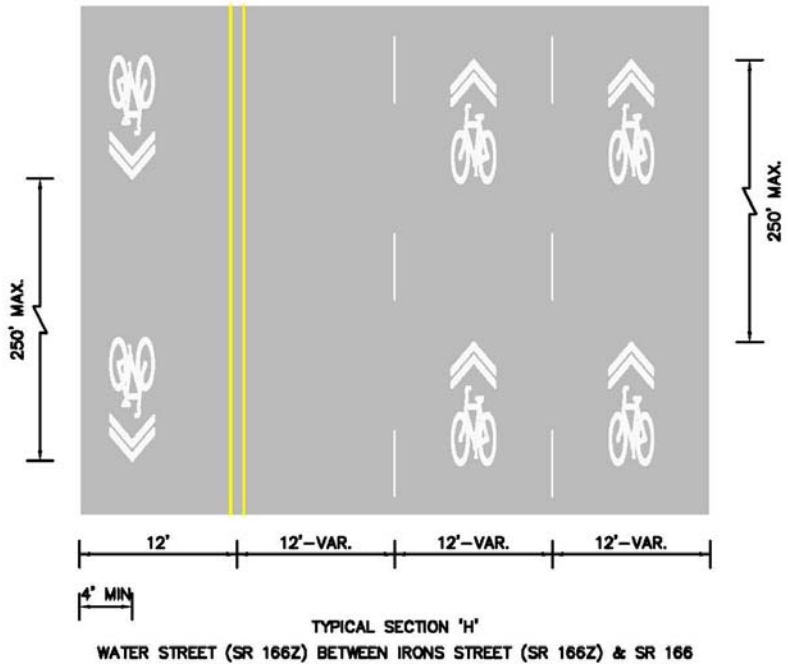



TYPICAL SECTION 'F'
WATER STREET (CR 527) BETWEEN ADAFREE AVENUE & LIEN STREET

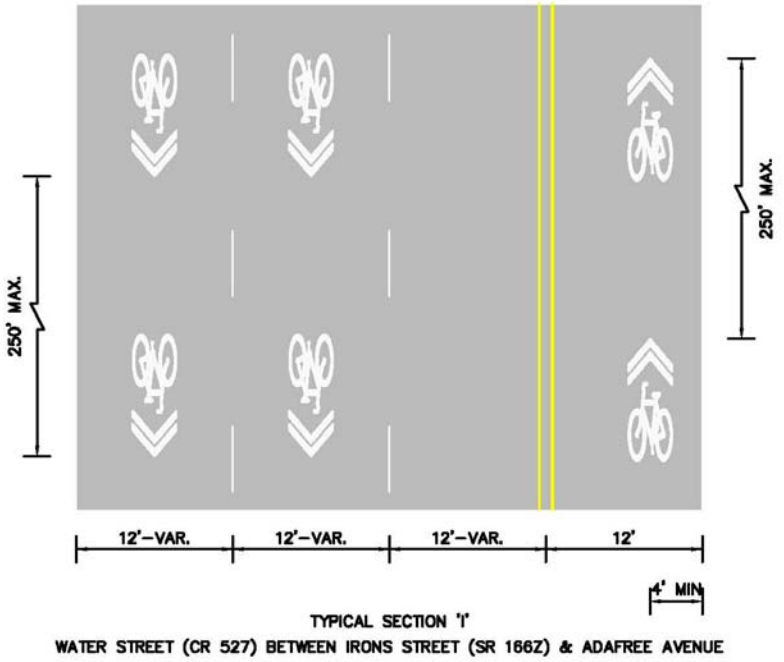



TYPICAL SECTION 'G'
HYERS STREET
HERFLICKER BOULEVARD BETWEEN HIGHLAND PARKWAY & IRONS ADAFREE AVENUE

*Sharrow lane marking includes option of Bicycle Route & "Share The Road" signage without painted lane marking based on input from County Engineer.*




TYPICAL SECTION 'H'
WATER STREET (SR 166Z) BETWEEN IRONS STREET (SR 166Z) & SR 166




TYPICAL SECTION 'I'
WATER STREET (CR 527) BETWEEN IRONS STREET (SR 166Z) & ADAFREE AVENUE

*Sharrow lane marking includes option of Bicycle Route & "Share The Road" signage without painted lane marking based on input from County Engineer.*

# APPENDIX B: Traffic Circulation and Pedestrian Mobility Assessment

## Traffic Circulation and Pedestrian Mobility Assessment

*During field observations and as noted by County officials, several Traffic Circulation and Pedestrian Mobility concerns exist within the study area, as depicted within Figure 1. The purpose of this section is to identify traffic and pedestrian improvements that could be implemented within the identified study area to improve pedestrian connectivity and traffic progression within this high volume roadway network. As is typical in most urban environments, when pedestrian facilities interact with the adjacent roadway network, it is necessary to achieve a healthy balance between pedestrian accommodations and traffic efficiency. The goal of the improvements will be to balance this relationship to serve both efficiently. A more efficient traffic circulation pattern, coupled with increased pedestrian safety and mobility, is the primary goal.*

*A thorough field investigation was conducted throughout the study area to gain a better understanding of the existing pedestrian facilities, traffic patterns, and the future needs of the area. Additionally, several areas of concern have been identified by the County and other stakeholders where solutions are desired. This report provides recommended improvements where deficiencies have been identified, and/or stakeholders have identified problematic areas.*

*A traffic analysis has been conducted for the existing traffic conditions and proposed roadway network inclusive of all recommended improvements. To establish the existing traffic conditions, the official signal timing directives and traffic volume counts have been obtained from the County. The existing conditions have been analyzed, and existing traffic deficiencies have been identified. Where feasible, solutions have been recommended to improve traffic operations.*

*In summary the following is included as part of this section:*

- *Discussion of Existing Pedestrian Facilities & Recommended Pedestrian Improvements*
- *Evaluation of Existing Traffic Conditions & Recommended Traffic Operational Improvements*
- *Evaluation of Proposed Traffic Conditions, Inclusive of all recommended improvements*

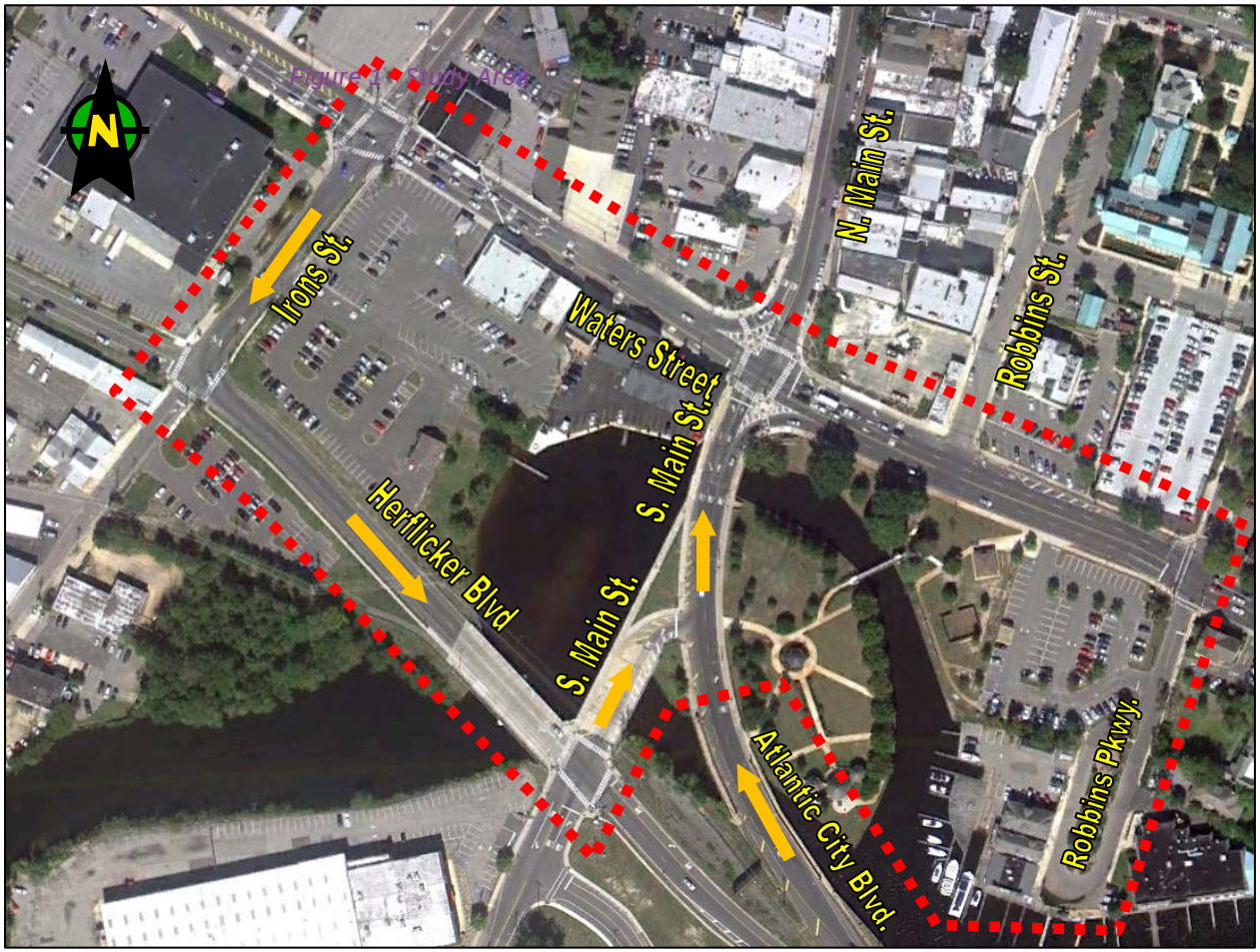



*Figure 1: Huddy Park Pedestrian Mobility Assessment Study Area*

## Evaluation of Pedestrian Facilities & Recommendations

*In order to ensure pedestrians are receiving the most up-to-date and advanced safety parameters, Maser conducted a safety audit of the study area concentrating on pedestrian facilities. An engineer visited each intersection within the study area and noted any deficiencies found. The following represents the summary of the field observations.*

## Herflicker Blvd. & S. Main St. (CR 530) - Signalized

### Observations

*Pedestrian signal heads with countdown timers are present for all crossings. The pedestrian crossing across Herflicker Boulevard (NB/SB) is push button actuated, while S. Main Street is non-actuated. The pedestrian signs (MUTCD R10-3e) are missing the arrows which direct pedestrians to push the correct push button. This may create inefficiencies for the intersection operation when pedestrian unknowingly press the wrong pushbutton and present confusion and unsafe operation for pedestrians. Figure 2 depicts one of the observed signs vs. the sign per MUTCD. Note that the arrow within the example MUTCD sign should be reversed for this specific application.*


*Figure 2 - Pedestrian Crossing Signs*

*Sidewalk is not present along the easterly side of S. Main Street between Herflicker Blvd & Atlantic City Blvd. Signage should be installed to direct pedestrians to the westerly side of S. Main Street, where sidewalk is present. Refer to Figure 3 for a depiction of the missing sidewalk.*

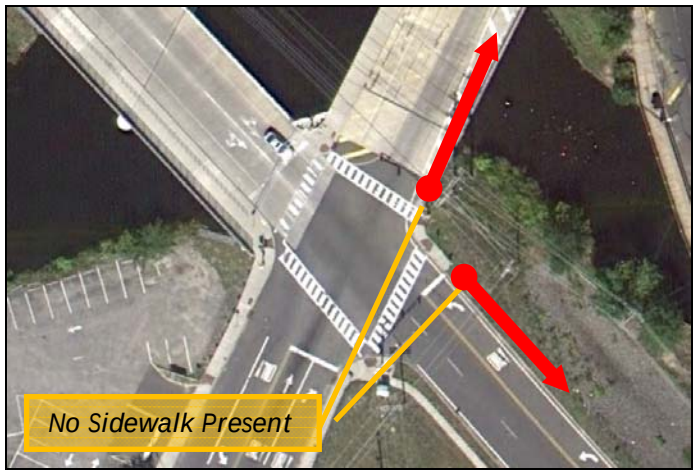



*Figure 3 - S. Main St. & Herflicker Blvd. - Sidewalk Presence*

### Recommendations

*The following summarizes the recommendations to improve pedestrian facilities at the intersection of Herflicker Blvd & S. Main St.:*

- *Install signage to direct pedestrians to west side of S. Main Street where sidewalk is present.*
- *Replace MUTCD R10-3e at pedestrian push buttons where the sign is not fully intact.*

*The proposed pedestrian improvements will not affect the traffic operations of this intersection, or the roadway network.*

## S. Main Street (CR 530) & Atlantic City Boulevard (State Route 166) - Unsignalized

### Observations

*This intersection is unsignalized, where South Main Street is stop controlled, and permits left turns only. South Main Street is one-way into the intersection. Atlantic City Boulevard is a two-lane, one-way roadway, in the northbound direction, towards Water Street. Crosswalks are not present at this intersection.*

*An access point for Huddy Park is located across from S. Main Street. Local stakeholders have stated that pedestrians cross Atlantic City Boulevard at this intersection when entering or exiting Huddy Park. From the access point on Atlantic City Boulevard there are wide concrete paths leading to a pedestrian bridge over the portion of the Toms River connecting to the portion of Huddy Park along Water Street and the "port". Cyclists were observed already using the pedestrian bridge as a short cut to Horner Street and it is anticipated that the proposed trail will further increase demand for a safer crossing from South Main Street across Atlantic City Boulevard. Figure 4 depicts this operation.*

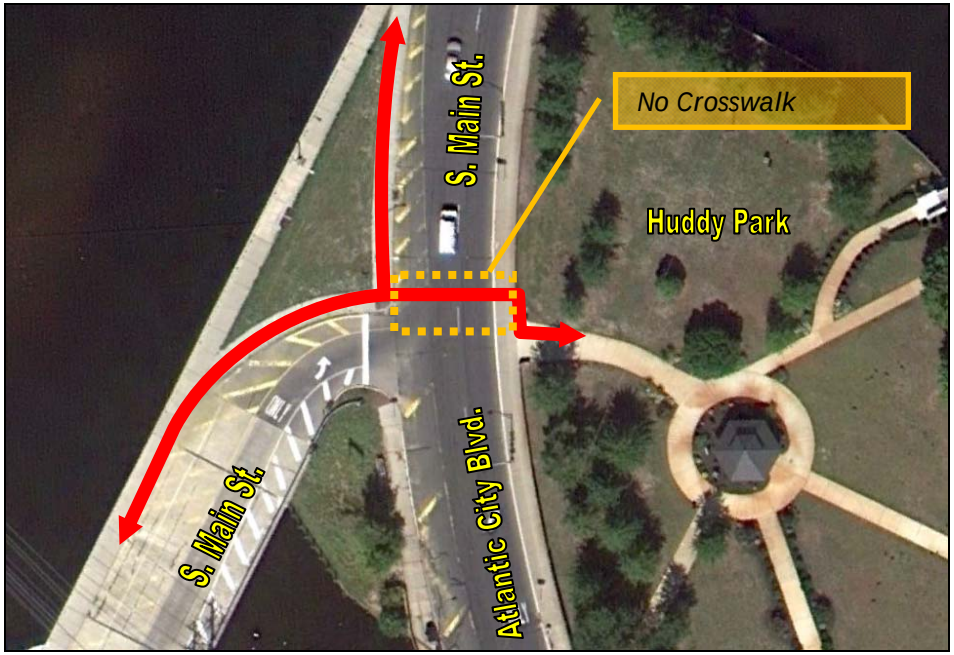



*Figure 4 - S. Main St. & Atlantic City Blvd. - Pedestrian Demand*

*A field investigation was conducted within this area to assess the safety of this crossing, and the possible implementation of supplementary crossing features. During this investigation, it became apparent that there is a significant lack of sight distance*

*between oncoming motorists traveling northbound along Atlantic City Boulevard and pedestrians with the desire to cross Atlantic City Boulevard at this location. Figures 5 - 7 depict photographs of the sight distance from various locations.*

*It is apparent from the photos that the existing parapet for the bridge located upstream of this intersection along Atlantic City Boulevard prevents the desirable sight distance from being achieved.*


*Figure 6 - Photo from East Side of S. Main St. & Atlantic City Blvd. looking Southwest*


*Figure 5 - Photo from NW Corner of S. Main St & Atlantic City Blvd Looking Southwest*

*Figure 7 - Photo from East Side of S. Main St. & Atlantic City Blvd. looking Southwest*

*It is recommended that a crosswalk be installed at this location to connect the northwest corner of the intersection with the east side of Atlantic City Boulevard. However, due to the horizontal curve and bridge parapets along Atlantic City Boulevard, special treatment must be provided. It is recommended that advance pedestrian crossing warning signs be installed with flashing beacons. The beacons would be actuated by pedestrian push button and would be located at the crossing, and upstream to the crossing. Preferably, cantilever structures would be installed upstream and at the crossing to further highlight the presence of a pedestrian crossing.*

*The placement of the advance warning lights will be dictated based on the required stopping sight distance. The posted speed limit along Atlantic City Boulevard is 35 MPH. Based on AASHTO, 305 feet of stopping sight distance is necessary for a vehicle traveling at the design speed of 40 MPH to come to a full stop prior to the crosswalk. As such, the advance cantilever sign with flashing beacons should be installed so that a vehicle has a minimum distance of 305 feet when viewing the sign to come to a complete stop. Upon the decision to implement this crosswalk, an engineering study will be required to determine appropriate placement.*

### Recommendations

*The following summarizes the recommended pedestrian improvements for the intersection of Atlantic City Boulevard & S. Main Street.*

- *Install crosswalk from NW corner to East side of Atlantic City Boulevard*
- *Construct cantilever structure at crosswalk location with MUTCD signs R1-9a mounted overhead, and W11-2 and W16-7p mounted on pole. Flashing beacons shall supplement the W11-2 and shall be actuated by pedestrian push button.*
- *Construct cantilever structure upstream from crossing (location to be determined by engineering study) with MUTCD signs W11-2 and W16-9P mounted overhead. Flashing beacons shall supplement the W11-2 and shall be actuated by pedestrian push button present at aforementioned crossing (to be connected wirelessly).*

*Please note, Route 166 is under the jurisdiction of the New Jersey Department of Transportation (NJDOT) and any improvements are contingent upon NJDOT approval.*

## Water St. (CR 527) & N. Main St. / S, Main St. (State Route 166) - Signalized

### Observations

*This intersection is a signalized intersection. The northbound approach (Atlantic City Blvd.) is one-way into the intersection. The northbound approach provides a dedicated left turn lane, dedicated thru lane and dedicated, free-flow channelized right turn lane. The southbound approach provides a dedicated left turn lane and a dedicated, channelized right turn lane. The southbound right turn lane is yield controlled, but does flow into a dedicated lane, which forms the third lane out of the intersection.*

*Although motorists making a southbound right turn through the intersection could flow freely into the right most lane, most instead yield into the center lane in preparation for a left turn at the intersection downstream from Water Street, eastbound to Irons Street southbound. As such, the southbound right turn lane more commonly functions with yield control. The eastbound approach provides two (2) dedicated thru lanes and a dedicated right turn lane. The westbound approach provides one (1) dedicated thru lane.*

*Pedestrian signals with countdown timers are present for all crossings. Push buttons are present for crossing Atlantic City Boulevard and the west leg of the intersection. Crossing the east leg of the intersection is non-actuated. Due to the northbound and southbound channelized right turn lanes not being controlled by the traffic signal, the crosswalks to the islands do not benefit from the presence of the push buttons . Vehicles are required to stop to yield to adjacent lane traffic, or to stop for pedestrians within the crosswalk. However, local officials have stated that motorists regularly do not stop for pedestrians waiting to cross the northbound channelized right turn lane. This could be due to many reasons such as poor sight distance, or a lack of emphasis placed on pedestrians priority and right-of-way via signage. In contrast with the southbound right turn, the need for the majority of motorists to yield into the adjacent center lane creates an opportunity for pedestrians to step into the crosswalk, thus stopping traffic.*

*To improve the pedestrian crossing across the northbound channelized right turn lane , it is recommended that a cantilever sign with MUTCD R1-9a is installed overhead.*

*Similar to the intersection of Herflicker Boulevard & South Main Street, the portion of MUTCD sign R10-3e that distinguishes the roadway which a push button will allow a pedestrian to cross has been removed. Therefore, inefficiencies, confusion and unsafe operations may exist at this intersection when pedestrians use push buttons when they are not required. It is recommended that these signs be replaced as necessary. Refer to figure 2 for an example of the missing portion of the sign.*

### *Recommendations*

*The following summarizes the recommended pedestrian improvements for the intersection of Atlantic City Boulevard & Water Street.*

- *Construct cantilever structure over the northbound channelized right turn lane with MUTCD signs R1-9a mounted overhead, and W11-2 and W16-7p mounted on pole.*
- *Replace MUTCD R10-3e at pedestrian push buttons where the sign is not fully intact.*

*Please note, Route 166 is under the jurisdiction of the New Jersey Department of Transportation (NJDOT) and any improvements are contingent upon NJDOT approval.*

*It is noted that the aforementioned improvements will not affect the traffic operations of the intersection. However, as is discussed in a subsequent section about the overall traffic operations of the roadway network, recommended changes the network coordination will require that a pedestrian push button is*

*installed for crossing the east leg of the intersection which is currently non-actuated.*

## Water St. (CR 527) & Irons St. - Signalized

### Observations

*This intersection is signalized operating with three (3) phases. The south leg to the intersection is one-way out of the intersection. The eastbound approach provides dedicated left, dedicated thru and dedicated right turning lanes. The westbound approach provides two (2) left turn lanes and a third shared thru/right turning lane. The southbound approach permits right turns only with a single right turn lane. The signal operates with split phases between the east/west approaches, and a third phase for the southbound right turn movement.*

*Pedestrian signals with countdown timers are present for all crossings. The walk symbol is activated via push button when crossing the southern, eastern and western legs of the intersection. When crossing the northern leg, pedestrian accommodation is non-actuated and appears with each WB ROW phase. It should be noted that when the pedestrian crossing is actuated across Water Street, it appears coincident with the southbound right turn phase which is displayed a green arrow. The presence of the green right turn arrow to the southbound approach and the walk symbol to a pedestrian crossing the western leg of the intersection is a conflict. Several options to eliminate this conflict are discussed herein.*

*Based on a review of the timing directive, the intersection as it operates today is not operating as it was originally intended. Contrary to the three phases that exist today, the original timing directive calls for two (2) phase operation. To reduce the operation to two phases, it was proposed that the southbound right turn movement be displayed a green right-turn arrow when the eastbound left turn movement was displayed a green arrow, also known as an overlap phase. Additionally, a third, all-pedestrian phase, was proposed to be called only during the presence of pedestrian demand across Water Street. However, upon field investigation, it is apparent that this operation is not feasible due to the geometry on the northwest corner of the intersection that precludes the ability for southbound right turning vehicles and eastbound left turning vehicles to operate simultaneously. Figure 8 displays a photo of a left turning vehicle from the position of a potential right turning vehicle.*


*Figure 8 - Photo from center of southbound right turning lane of eastbound left turning vehicle*

*Four (4) alternatives have been identified that would eliminate the aforementioned conflict. It is noted that Alternative 'D' is the preferred alternative, however due to the resources that this would require, Alternative 'C' is the preferred short-term alternative.*

A. *Permit thru movement from southbound approach, and replace southbound right turn green arrow with a green ball.*

*It is presumed that the original purpose of restricting this approach to right turns was so that the overlap phase, as previously discussed, could be implemented, thus improving the overall operations of the intersection and study network. However, due to the lack of sufficient geometry to provide the overlap phase, there is no significant reason to continue to restrict the southbound approach to right turns only, other than to discourage the use of this approach. However, the present pedestrian-vehicle conflict could be resolved by allowing thru movements, and replacing the arrow with a typical ball traffic signal indication. By adding through movements to the southbound approach and since it is a single lane approach, right turns will not be the only movement, thereby creating gaps for pedestrians to cross.*

*An engineering study would need to be conducted in order to establish the new trip distribution pattern which will result from the addition of movements and ultimately, the timing needed for the intersection to operate efficiently.*

B. *Add an "All Pedestrian" to the signal operation, which would make up the fourth phase when actuated*

*This alternative will significantly degrade the operation of the intersection, and roadway network as a whole, when actuated. This alternative is not recommended, but is included for completeness.*

C. *Allow the southbound right turn phase to be skipped (regardless of vehicular demand) when pedestrian demand across the west leg of the intersection exists.*

*The success of this alternative is highly dependant upon pedestrian counts at this intersection. However, this alternative is most likely to provide the least disruption to the roadway network as a whole.*

*When pedestrian demand is actuated along the west leg to the intersection, the southbound right turn approach will be skipped for a cycle, even if vehicular demand exists. However, this does not prevent a right turn on red movement if the yellow arrow displays and is set to flash during the pedestrian phase. As such, when the pedestrian(s) have finished crossing the eastern leg of Water Street, those southbound right turning vehicles will have the opportunity to make a right turn on red. Based on the required walk and don't walk*

*times for a pedestrian crossing across Water Street, there would be approximately 27 seconds available for pedestrians to cross Water Street, and for southbound right turning vehicles to conduct a right turn on red without competition from the conflicting eastbound thru movement.*

*This alternative would require that the signal be reprogrammed. However with the exception of an increase in delay to the southbound right turn movement, the overall intersection and roadway network would not be affected. Alternative C is the recommended short-term alternative.*

D. *Widen the northwest corner of the intersection to provide geometry capable of a right-turn overlapping phase*

*This alternative would modify the geometry at this corner to provide a southbound channelized right turn lane that can operate coincidentally with the eastbound left turn movement. This improvement would allow the signal phasing to operate as originally intended within the initially proposed timing directive when the intersection was improved in 2003. The initially proposed timing directive provided an overlapping right turn phase for the southbound right turn movement. To accommodate pedestrians crossing Water Street, an all pedestrian phase was proposed which would be actuated when necessary. This proposed improvement will allow this operation to be implemented.*

*To provide this improvement, a portion of the adjacent municipal parking lot would need to be acquired, eliminating approximately ten (10) parking stalls. This improvement will eliminate the aforementioned pedestrian-vehicle conflict, and improve traffic operations for the entire coordinated study area. Alternative D is the recommended long-term alternative.*

*In addition to eliminating the vehicular-pedestrian conflict as discussed above, and similar to the intersections of Water Street & Atlantic City Boulevard and Herflicker Boulevard & South Main Street, portions of the MUTCD signs R10-3e have been removed as depicted in Figure 2. The absence of this information has the potential to create inefficiencies in the signal if pedestrian demand is falsely called.*

## *Recommendations*

*The following summarizes the recommended pedestrian improvements for the intersection of Water Street & Irons Street.*

- *Improve the intersection to eliminate the vehicular-pedestrian conflict between southbound right turning vehicles and pedestrians crossing the west leg of the intersection, Water Street.*
  - *Alternative 'C', as discussed above, is recommended in the short-term which requires the signal to be reprogrammed. This alternative would not affect the eastbound or westbound approaches, nor would it affect the overall roadway network.*

- Alternative 'D' suggests widening the northwest intersection corner to provide sufficient geometry so that the southbound right turn movement and eastbound left turn movement can operate simultaneously is recommended in the Long-Term.

- Replace MUTCD R10-3e at pedestrian push buttons where the sign is not fully intact.

The aforementioned improvements will affect the traffic operations of the intersections, as discussed above. However, independent of the traffic operational issues that are tied with pedestrian operations, there is a need to lengthen the eastbound right turn lane to Adafre Avenue. Refer to subsequent sections of this report for additional information.

## Irons St. & Herflicker Blvd. - Unsignalized

This unsignalized intersection provides crosswalks across Herflicker Blvd and Irons Street for the southern leg to the intersection. This intersection is notably missing a crosswalk across the northern leg to the intersection (Irons St.). It is not anticipated that this crossing could be provided without significantly impacting the traffic operations.

No improvements are recommended at the intersection of Irons Street & Herflicker Boulevard.

## Robbins Pkwy & Water Street (CR 527) - Signalized

### Observations

This is a four-legged, two-phase, signalized intersection. Two (2) lanes are present for the eastbound and westbound approaches, while one (1) is present for the northbound and southbound approaches. Pedestrian signal heads with countdown timers are present for crossing the west leg of Water Street. A pedestrian signal head without a countdown timer is present for crossing the south leg of Robbins Parkway. No pedestrian crossing accommodations are provided for pedestrians crossing the east leg of Water Street or the North leg of Robbins Parkway. Depressed curb is provided at all four corners with the exception of the northwest corner. The absence of the depressed curb in this particular location is unacceptable since a user may enter the crosswalk via the depressed curb at southwest corner, with the understanding that a depressed curb will exist at the other end of the crosswalk, however, this is not true per the field investigation.

It is recommended that the pedestrian facilities are fully upgraded at this intersection to current MUTCD and County standards. The following summarizes the major pedestrian improvements that are recommended:

- Restripe existing crosswalks to provide longitudinal block striping.

- Install crosswalks across northern and eastern legs of intersection using logituinal block striping style (not currently present)

- *Install pedestrian signals with countdown timer eastern, southern and northern legs of intersection (already present for western leg)*
- *Install depressed curb at northwest corner of intersection (already present at other corners)*
- *Install detectable warning surfaces at all depressed curbs*
- *Install pedestrian push buttons for crossing eastern leg of intersection (already present for crossing western leg)*

*A concern was voiced during initial investigations into this project, that there are a significant amount of pedestrians who travel from the library and parking lot located north of Water Street to the parking lot, marina and other amenities located to the south of Water Street along Robbins Parkway. However, the westerly side of Robbins Parkway lacks a sideway to connect to the crosswalk across Water Street. A utility pole is located in the desirable position for a sidewalk as depicted in Figure 9.*

*A sidewalk extending along the easterly side of Robbins Parkway would be beneficial to pedestrians. The installation of sidewalk within this area will require that the existing raised beds and landscaping be reconfigured to accommodate the sidewalk.*

*The following summarizes the recommended pedestrian improvements for the intersection of Water Street & Robbins Parkway.*

- *Conduct a full upgrade of pedestrian signal equipment and ADA installations.*
- *Construct sidewalk along easterly side of Robbins Parkway to connect pedestrians to Marina and other attractions.*

*Figure 9 - Photo of utility pole blocking possible sidewalk along easterly side of Robbins Parkway looking south.*

*The aforementioned improvements will not materially impact the traffic operations of the intersection. However, this signal is not currently part of the coordinated signal system within the remainder of the study network. As will be discussed in a subsequent section, it is recommended that this intersection be included within the coordinated system to improve the network operations as a whole. Even with this improvement, no material impact to the traffic operations of this intersection is anticipated.*

## Water Street & Robbins Street - Unsignalized

### Observations

*This is an unsignalized 'T' style intersection. Robbins Street, the southbound approach, is stop controlled, and Water Street is free flowing. Local officials have stated that there are a significant number of pedestrians crossing to and from Huddy Park opposite of Robbins Street without the presence of a crosswalk. Figure 10 depicts the referenced pedestrian crossing location.*

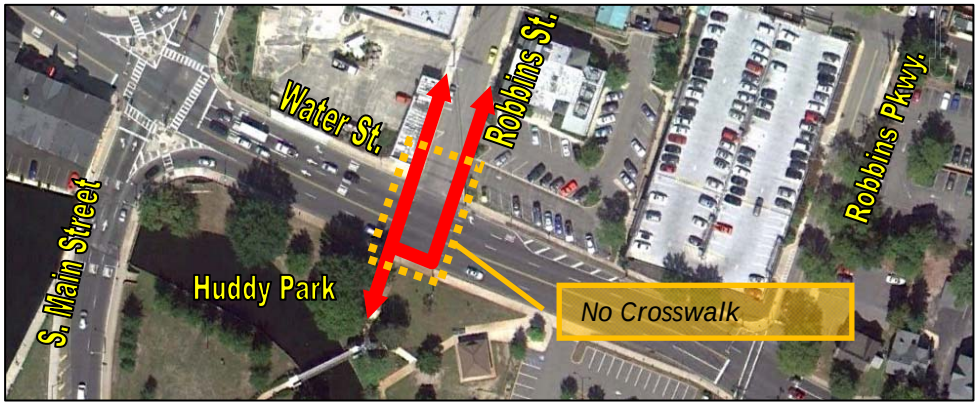



*Figure 10 - Illegal Pedestrian Crossing Location at Robbins Street & Water Street*

*Several recommendations can be made. First, prevent pedestrian crossings at ill-advised locations such as Robbins Street and direct pedestrians either to S. Main Street or Robbins Parkway. Signs should be installed to prohibit pedestrians from crossing at Robbins Street and be directed to cross at S. Main Street or Robbins Parkway. This alternative is preferred by the Ocean County Department of Engineering. Second, an overhead flashing beacon could be installed similar to the structure proposed at the Huddy Park Crossing at S. Main Street and Atlantic City Boulevard. There are concerns, however, that if a high number of pedestrians cross at S. Main Street, the flow of traffic would be affected, causing further congestion within the already taxed network. As such, a third recommendation would be to install a traffic signal, which would maintain traffic flow, while serving pedestrians. The signal would become part of the coordinated system. The proposed signal would provide complete pedestrian accommodations with pedestrian signal heads and countdown timers. Furthermore, a fire department is located on Robbins Street. As such, introduction of a third signal may increase response time if they are mitigated by providing preemption at the signal that would be directly linked to the firehouse. To validate the feasibility that a signal could be installed, an engineering study would be required to determine if the intersection meets MUTCD warrants for signal installation. Initial concerns regarding feasibility of obtaining a warrant for a signal at Robbins Street relate to the close proximity of this intersection with the signals at Robbins Parkway and S. Main Street.*

*For both the flashing overhead beacon and signal alternatives, detectable warning surfaces with depressed curb and crosswalks should be installed as an extension of Robbins Street on both sides of the road, in addition to across Robbins Street.*

### Recommendations

*The following summarizes the recommended alternative pedestrian improvements for the intersection of Water Street & Robbins Street:*

- *Signage prohibiting crossing at Robbins Street and signage directing pedestrians to cross at S. Main Street; or*
- *Construct cantilever structure over the eastbound and westbound lanes of Water Street with MUTCD signs R1-9a mounted overhead, and W11-2 and W16-7p mounted on pole; or.*
- *Signalize intersection and provide complete pedestrian accommodations.*

*Traffic and pedestrian counts were not available for this intersection, however such volumes were conservatively estimated and input into the model to assess the operation of the network with this signal. Based on this analysis, if a warrant could be obtained despite the close proximity of the two adjacent intersections, a signal at this location would not adversely affect those intersections. Refer to the network analysis discussion for the "Proposed Conditions" in a subsequent section for more information regarding traffic operations for the network with the overall improvements recommended for the roadway network.*

## Existing Traffic Conditions

*The primary focus of this study is on pedestrian operations and facilities. However, as is typical in most urban environments, there is a need to balance the desire for pedestrian facilities with the need to provide safe and efficient traffic operations within the roadway network. As such, a model of the existing conditions and proposed conditions has been created.*

*To establish the existing traffic conditions, traffic counts from January 2007 and February 2011 have been obtained for the intersections within the study area. The following intersections were counted in January 2007:*

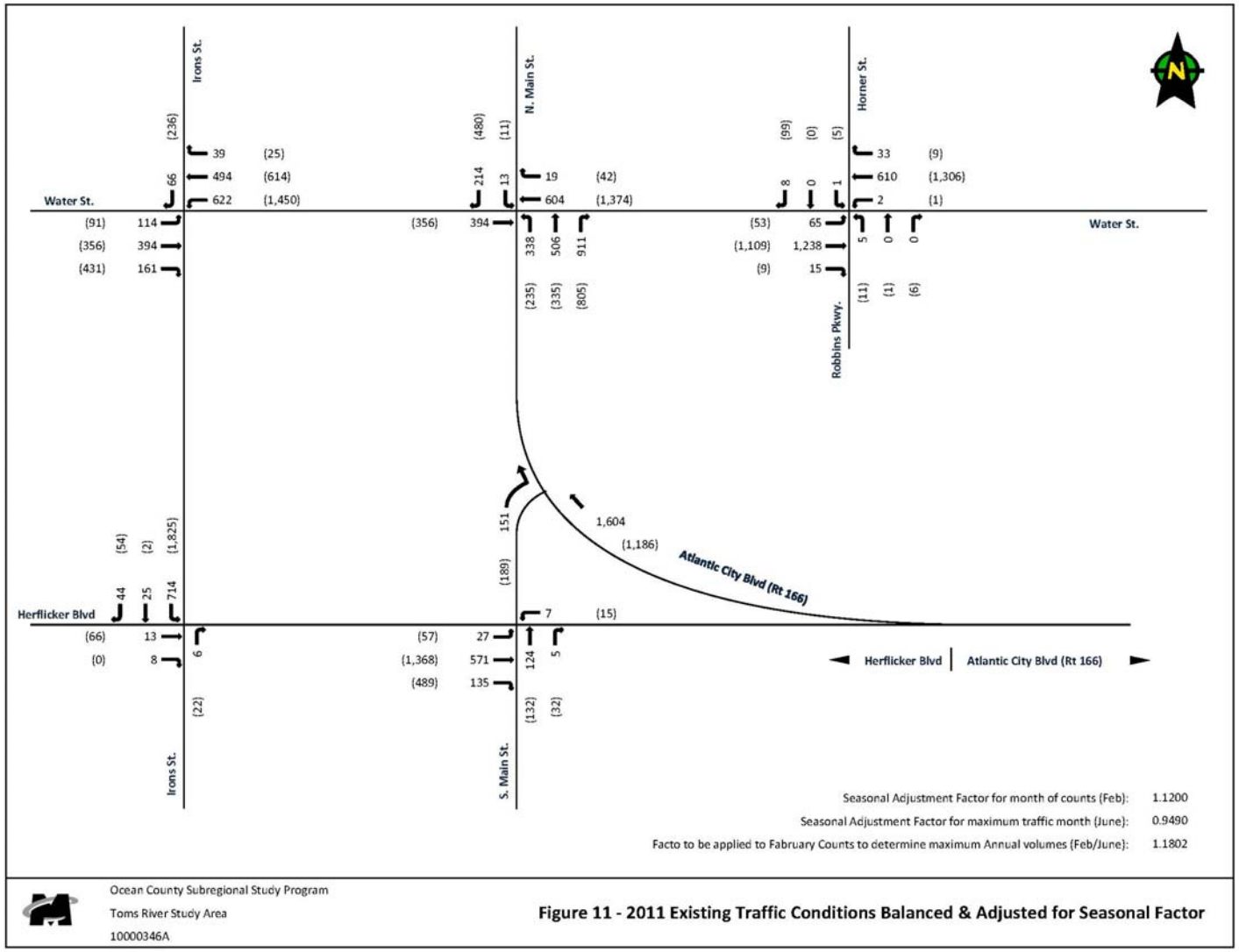
- *Water Street & Irons Street*
- *Herflicker Boulevard & Irons Street*

*The following intersections were counted in February 2011:*

- *Water Street & Robbins Parkway*
- *Water Street & S. Main Street*

*These counts have been combined and balanced to form the 2011 existing traffic conditions. Where balancing of the traffic counts was necessary, the traffic counts were balanced in an upward direction to maintain a conservative estimate of existing traffic volumes. In this fashion, the traffic counts are indicative of the 2011 traffic volumes. Additionally, the balanced traffic volumes have been increased by a factor of 1.18 to determine the peak traffic volumes per the NJDOT "Seasonal Adjustment and Axle Correction Factors" table for 2010. Figure 11 depicts the 2011 balanced and seasonally adjusted existing traffic volumes.*

*Figure 11 - 2011 Existing Traffic Conditions (Balanced & Seasonally Adjusted)*



## Evaluation of Traffic Conditions & Recommended Improvements

Based on an analysis of the existing conditions, several undesirable characteristics have been identified. Solutions have been proposed where feasible. A second analysis has been prepared which includes all recommended improvements. For each recommended improvement, the measure of success has been summarized to compare the existing and proposed conditions.

It should be noted that the PM peak hour is critical to this roadway network. Additionally, as pedestrians become active, they will increasingly affect the PM peak hour, rather than the AM peak hour commute. As such, the improvements have been focused on the PM peak hour, and then applied to the AM peak hour.

To conduct the analysis, capacity analyses have been conducted for the AM and PM peak hours. The capacity analyses conducted for this report are based on the 2003 Highway Capacity Manual (HCM) which provides methodology in terms of determining Level of Service (LOS).

LOS are qualitative measures describing operational conditions within a traffic stream in terms of traffic characteristics such as freedom to maneuver, traffic interruption, comfort and convenience. The LOS of an intersection is determined by the computed control delay for each movement. Six (6) LOS are defined for signalized and unsignalized intersections. Levels of Service range from "A" through "F", with "A" representing excellent conditions with no delays, and failure or breakdown denoted by Level "F". The LOS criteria for unsignalized intersections are tabulated in Table 1.

Table 1 - HCM Level of Service Criteria

| Level of Service (LOS) | Average Control Delay (sec/veh) Unsignalized Intersections | Average Control Delay (sec/veh) Signalized Intersections |
|---|---|---|
| A | < 10 sec. | < 10 sec. |
| B | 10 - 15 sec. | 10 - 20 sec. |
| C | 15 - 25 sec. | 20 - 35 sec. |
| D | 25 - 35 sec. | 35 - 55 sec. |
| E | 35 - 50 sec. | 55 - 80 sec. |
| F | > 50 sec. | > 80 sec. |

The analysis was performed using the latest version of Synchro v7. Synchro is a traffic analysis and simulation software which applies the standards and methodologies found in the HCM. The results provide Level of Service and average seconds of delay per vehicle for the intersection movements. Additionally, Synchro provides a report titled "Detail Measure of Effectiveness" that reports on various roadway network parameters such as emissions, overall stops per vehicle, delay per vehicle, fuel efficiency, and other measureable parameters. Since this analysis is not concerned with the operation of individual intersections, but with the network as a whole, the analysis focuses on this reporting technique. However, the HCM LOS analysis has been reviewed to ensure desirable operation.

Based on the existing analysis, the following undesirable characteristics have been identified:

Poor coordination among signalized intersections - The signalized intersections within the network are referenced for coordination purposes to the northbound ROW at the intersection of Water Street & S. Main Street. However, based on our review of the existing traffic volumes, and operation of the system, it is recommended that the master reference phase be changed to the beginning of yellow for the eastbound/westbound ROW at this intersection. Upon modifying the reference phase for the coordinated system, it will become feasible to include the intersection of Robin's Parkway & Water Street within the coordinated system, and it is recommended that this is completed. This improvement will have the most drastic affect on the operation of the Water Street Corridor. Figure 12 depicts a screenshot of the simulation showing the queuing occurring on the westbound approach to Water Street & S. Main Street.

Figure 12 - Screenshot of Water Street Corridor during PM Peak Hour (Existing, PM)

In this specific instance, the green time is being provided to the northbound approach of Atlantic City Boulevard however, as indicated by the stacking along the westbound approach, the demand is not serviced well under existing coordination. In contrast, Figure 13 depicts the network in the same situation with the recommended improvements implemented. Note that Figure 13 also depicts other recommended improvements to be discussed in the following pages.

Insufficient Walk / Don't Walk Times for Pedestrians - The Manual on Uniform Traffic Control Devices (MUTCD) has been

*recently updated to require that 7 seconds of walk time and an appropriate amount of don't walk time for a pedestrian traveling at 3.5 feet per second is allotted to cross the intersection. As a result of this modification to the MUTCD, it is necessary to increase the walk and don't walk times for the pedestrian phases at the signalized intersections throughout the study network. It is not anticipated that updating the walk/don't walk times to current MUTCD standard can be conducted successfully without significant impact to the operation of the roadway network.*

*Figure 13 - Screenshot of Water Street Corridor during PM Peak Hour (Proposed, PM)*

*Insufficient Storage for Eastbound Right Turn Lane at Water Street & Irons Street - The existing storage length for the right turn lane at this intersection is approximately 200 feet. However, based on the analysis, the 95th percentile queue length for this movement is 217 feet. More importantly, the 95th percentile queue length for the adjacent thru lane at this intersection is 490 feet. As a result, access to the right turn lane is commonly blocked due to the excessive stacking occurring within the adjacent thru lane. To mitigate this, it is recommended that the eastbound right turn lane is increased by approximately 200 feet by widening the southerly side of Water Street between Adfre Road and Irons Street. This would require a ROW acquisition from the adjacent post office, and an impact to the parking area for the same, which might be considered at the time the Post Office is relocated as part of the implementation of the Township's redevelopment plan.*

*The screenshot depicted in Figure 14 depicts the existing right turn lane, and the typical stacking observed within the simulations. Figure 15 depicts the typical stacking observed with the extended right turn lane, and all other improvements.*

Figure 14 - Worst Case Screenshot of Eastbound Approach to Water Street & Irons Street (Existing, PM)

Figure 15 - Worst Case Screenshot of Eastbound Approach to Water Street & Irons Street (Proposed, PM)

*As a result of the improvements listed above, and the pedestrian improvements listed within the individual discussion for each study intersection, it will be necessary to optimize splits and offsets throughout the study network. In addition to modifying the splits and offsets, it is recommended that the phasing at the intersection of Irons Street & Water Street is modified to provide a lead protected eastbound left turn phase and lag protected westbound left turn phase. These left turn movements would be prohibited via a red arrow during other phases. This improvement will specifically help to dissipate queues between Irons Street and S. Main Street, along Water Street, so that the risk of gridlock within the coordinated system is minimized.*

## *Summary of Recommendations & Results*

*In summary, the following improvements are recommended for implementation as a result of the existing traffic operational characteristics:*

- *Change master reference phase for coordinated signal system from start of yellow for the northbound ROW at Water Street & S. Main Street to the start of yellow for the eastbound / westbound ROW at the same intersection*
- *Include the existing signalized intersection of Robbins Pkwy & Water Street in the coordinated signal system*
- *If implemented, include the signalized intersection of Robbins Street & Water Street in the coordinated signal system*
- *Update all "Walk" and "Don't Walk" times throughout the study network to comply with current MUTCD standards*
- *Extend the existing eastbound right turn lane at Water Street & Irons Street to Adafre Avenue (REQUIRES ROW FROM ADJACENT POST OFFICE)*
- *Retime & Optimize all signals throughout the study network*

*Additionally, the following summarizes the proposed pedestrian improvements that will have an impact to the traffic operations throughout the study network:*

- *Signalization of Robbins Street & Water Street*
- *Short-Term: Retiming / new timing directive at Water Street & Irons Street*
- *Long-Term: Channelization of southbound right turn at Water Street & Irons Street & modification of signal as described herein (REQUIRES ROW ACQUISITION FROM ADJACENT MUNICIPAL LOT)*

*Tables 2 & 3 tabulate the LOS and MOE results for the AM Peak Hour and Tables 4 & 5 for the PM peak hour for the study intersections.*

*As shown, the proposed operational and pedestrian improvements will provide significant decrease in delay experienced throughout the network. As a result, the emissions released throughout this study network will also be reduced.*

Table 2 - LOS Results for AM Peak Hour

| Intersection / Approach | Existing LOS & Delay (Sec.) | Proposed LOS & Delay (Sec.) | Change in Delay (Sec.) | % Change in Delay |
|---|---|---|---|---|
| **Water St. & Irons St. (Overall)** | **C (29.6)** | **B (17.8)** | **-11.8** | **-40%** |
| Eastbound Approach (Water St.) | D (48.6) | D (38) | -10.6 | -22% |
| Westbound Approach (Water St.) | B (16.9) | A (5.1) | -11.8 | -70% |
| Southbound Right (Irons St.) | E (59.7) | D (35.6) | -24.1 | -40% |
| **Herflicker Blvd. & S. Main St. (Overall)** | **B (10.3)** | **A (7.5)** | **-2.8** | **-27%** |
| Eastbound Approach (Herflicker Blvd.) | A (1.7) | A (1.5) | -0.2 | -12% |
| Westbound Left (Herflicker Blvd.) | E (56.6) | D (47) | -9.6 | -17% |
| Northbound Approach (S. Main St.) | E (56.4) | D (39.4) | -17.0 | -30% |
| **Water St. & S,Main St.. (Overall)** | **B (15.2)** | **B (11.7)** | **-3.5** | **-23%** |
| Eastbound Approach (Water St.) | B (17.1) | A (3.5) | -13.6 | -80% |
| Westbound Approach (Water St.) | D (40.7) | B (10.1) | -30.6 | -75% |
| Southbound Approach (N. Main St.) | A (7.2) | B (15.2) | 8.0 | 111% |
| Northbound Approach (S. Main St.) | A (3.6) | A (3) | -0.6 | -17% |
| **Water St. & Robbins Pkwy / Horner St. (Overall)** | **A (2.3)** | **A (1.4)** | **-0.9** | **-39%** |
| Eastbound Approach (Water St.) | A (2.2) | A (1) | -1.2 | -55% |
| Westbound Approach (Water St.) | A (1.6) | A (1.3) | -0.3 | -19% |
| Southbound Approach (Horner St.) | D (41.1) | D (44.8) | 3.7 | 9% |
| Northbound Approach (Robbins Pkwy.) | D (40.9) | D (43.9) | 3.0 | 7% |

Table 3 - MOE Results for AM Peak Hour

| Measure of Effectiveness (MOE) | Existing Value | Proposed Value | Change in MOE | % Change of MOE |
|---|---|---|---|---|
| Total Delay per Veh (Sec) | 10 | 8 | -2 | -20% |
| Total Delay (Hr) | 35 | 28 | -7 | -20% |
| Stops per Veh. | 0.25 | 0.25 | 0 | 0% |
| Total Stops | 3029 | 3086 | 57 | 2% |
| Fuel Economy (mpg) | 12.7 | 13.3 | 0.6 | 5% |
| CO Emissions (kg) | 6.31 | 6.04 | -0.27 | -4% |
| NOx Emissions (kg) | 1.23 | 1.17 | -0.06 | -5% |
| VOC Emissions (kg) | 1.46 | 1.4 | -0.06 | -4% |

Table 4 - MOE Analysis for PM Peak Hour

| Measure of Effectiveness (MOE) | Existing Value | Proposed Value | Change in MOE | % Change of MOE |
|---|---|---|---|---|
| Total Delay per Veh (Sec) | 29 | 8 | -21 | -72% |
| Total Delay (Hr) | 140 | 41 | -99 | -71% |
| Stops per Veh. | 0.4 | 0.28 | -0.12 | -30% |
| Total Stops | 6965 | 4809 | -2156 | -31% |
| Fuel Economy (mpg) | 7.8 | 13.1 | 5.3 | 68% |
| CO Emissions (kg) | 14.89 | 8.84 | -6.05 | -41% |
| NOx Emissions (kg) | 2.9 | 1.72 | -1.18 | -41% |
| VOC Emissions (kg) | 3.45 | 2.05 | -1.4 | -41% |

*Table 5 - LOS Results for PM Peak Hour*

| Intersection<br>Approach | Existing LOS & Delay (Sec.) | Proposed LOS & Delay (Sec.) | Change in Delay (Sec.) | % Change in Delay |
|---|---|---|---|---|
| **Water St. & Irons St. (Overall)** | **D (37.1)** | **C (21.8)** | **-15.3** | **-41%** |
| Eastbound Approach (Water St.) | E (58.2) | D (49.2) | -9.0 | -15% |
| Westbound Approach (Water St.) | C (24.8) | A (6.9) | -17.9 | -72% |
| Southbound Right (Irons St.) | E (67.4) | D (50.7) | -16.7 | -25% |
| **Herflicker Blvd. & S. Main St. (Overall)** | **C (21.7)** | **A (7.7)** | **-14.0** | **-65%** |
| Eastbound Approach (Herflicker Blvd.) | B (18.5) | A (3.3) | -15.2 | -82% |
| Westbound Left (Herflicker Blvd.) | E (63.6) | E (56.7) | -6.9 | -11% |
| Northbound Approach (S. Main St.) | D (54.9) | D (54.9) | 0.0 | 0% |
| **Water St. & S. MainSt. (Overall)** | **C (21.9)** | **B (11.9)** | **-10.0** | **-46%** |
| Eastbound Approach (Water St.) | A (1.4) | A (6.4) | 5.0 | 357% |
| Westbound Approach (Water St.) | D (45.4) | A (10) | -35.4 | -78% |
| Southbound Approach (N. Main St.) | A (10) | B (18.8) | 8.8 | 88% |
| Northbound Approach (S.Main St.) | A (1.9) | A (1.9) | 0.0 | 0% |
| **Water St. & Robbins Pkwy / Horner St. (Overall)** | **A (6.9)** | **A (4.6)** | **-2.3** | **-33%** |
| Eastbound Approach (Water St.) | A (5.5) | A (1.2) | -4.3 | -78% |
| Westbound Approach (Water St.) | A (5.6) | A (3.1) | -2.5 | -45% |
| Southbound Approach (Horner St.) | C (33.1) | D (54.5) | 21.4 | 65% |
| Northbound Approach (Robbins Pkwy.) | C (33.2) | D (52.9) | 19.7 | 59% |

## *APPENDIX C: PRESENTATION: PUBLIC OPEN HOUSE – TOMS RIVER LIBRARY*


# Ocean County Subregional Study

## *Expanding Bicycling & Pedestrian Mobility*

## Open House Meeting

**August 3, 2010**
**7PM**
**Headquarters Branch, Ocean County Library**
**Toms River, New Jersey**

David G. Roberts, AICP/PP, LLA, RLA, LEED AP
Maser Consulting, PA

# Introduction

Downtown Toms River

New Egypt Bikepath

In March of 2009, the North Jersey Transportation Planning Authority (NJTPA) awarded Ocean County a $120,000 grant through its Subregional Study Program. The grant will study pedestrian strategies and the possibility of expanding bicycle facilities and mobility; specifically, the creation of a bike/walking path on an existing railroad right-of-way in New Egypt and the Barnegat Branch Trail's link in downtown Toms River.

2

# Downtown Toms River

# Link from Admiral Boulevard to Herflicker Blvd. Bridge

## Downtown Toms River

The current end of the Barnegat Branch Trail at Admiral Boulevard at the border of South Toms River and Beachwood Boroughs presents a choice for cyclists to either ride the shoulders down Rt. 166 (Atlantic City Boulevard) to South Main Street or Flint Street to get to the Herflicker Boulevard Bridge

# Route 166 from Admiral Boulevard to South Main Street

## Downtown Toms River

The stretch of Rt. 166 running through South Toms River between Admiral Boulevard and South Main Street has intermittent shoulders and lacks controlled driveway cuts, making it confusing to cyclists as to whether to ride along the shoulder or ride on the sidewalks (where they exist).


# Link from Admiral Boulevard to Herflicker Blvd. Bridge

## Downtown Toms River

Flint Road (to the right in adjacent image) exhibits some of the same lack of controlled driveway cuts, but carries much less traffic and much less development intensity than Rt 166 (to the left in adjacent image), making it the safer route for cyclists.

# Bike Lanes

## Downtown Toms River

Bike lanes are lined lanes along streets or rights-of-ways shared with motor vehicles that are dedicated for use by cyclists and marked by signs or line markings painted on the pavement.

Bike Lane crossing a road, such as the split between Rt 166 and Flint Road

Bike Lane in a shoulder with curb-gutter edge. Most lanes range from 3 to 5 feet in width.

# GATEWAY TREATMENTS

## Downtown Toms River

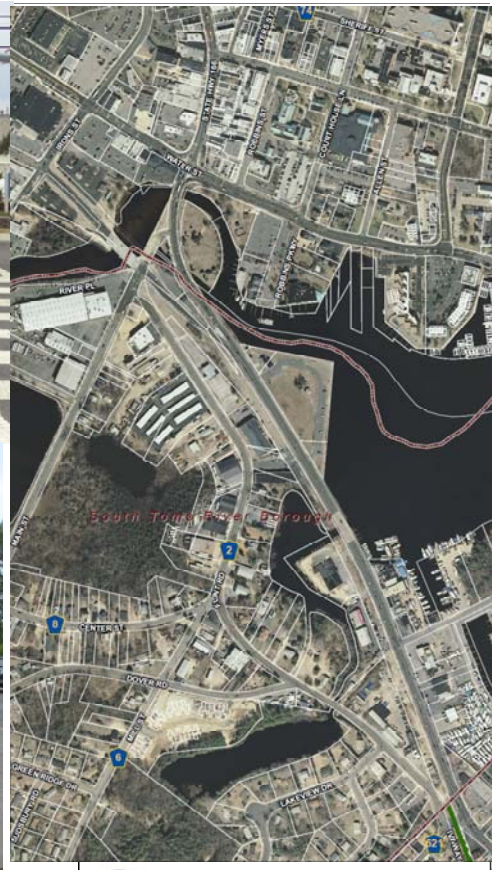
The entrance to Downtown Toms River via Main Street or Flint Road, whether by car, bicycle or on foot, contains spaces that are left-over from the circulation changes made to Rt 166 and are opportunities for extensions of Huddy Park as landscaped gateway treatments.

The turf area between the Main Street approach to Downtown and the edge of the bridge could be transformed into a gateway pocket park such as the examples below.

# Intersection of Water Street and Main Street

## Downtown Toms River

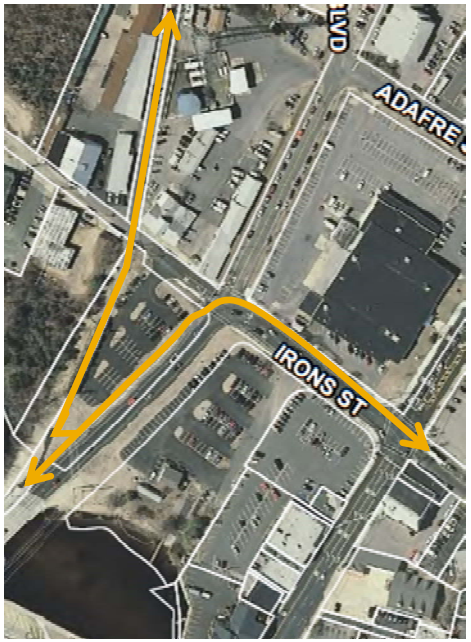
One of the principal challenges to bicycle mobility between the end of the Barnegat Branch Trail and Downtown Toms River is the safe crossing of Water Street for both pedestrians and cyclists.



# Intersection of Water Street and Irons Street

## Downtown Toms River

If a safe and efficient link can be made between the Herflicker Boulevard Bridge and Water Street, a bike lane up Irons Street to Legion Court would enable bicycle access to South Toms River High School and the Ocean County Library without having to ride on either Hooper Avenue, Main Street or Washington Street

# Iron Street Potential Treatment

## Downtown Toms River

**While unorthodox , a two-way bikepath may be feasible along Iron Street within a reconfigured shoulder. So that cyclists are separated from the large volume of vehicles circling counterclockwise on Rt 166 as they pass through the downtown en route to South Toms River and points south and west.**


Cross section at left shows two-way bike-lane at 10 ft. separated by a 9 ft. planting strip.

Bike Lane shown at left is a 10 ft wide two-way lane with pavement markings in the shoulder.

# HUDDY PARK

## Downtown Toms River

Another challenge and opportunity for bicycle and pedestrian mobility between the end of the Barnegat Branch Trail and Downtown Toms River is Huddy Park. The Park is already used by cyclists moving between Rt 166 in South Toms River and Downtown as a means of avoiding the busy Main Street-Water Street intersection.

The footbridge over the river connects both sides of Huddy Park and is used by cyclists as a shortcut.

The water's edge on the far side of Huddy Park provides an attractive place for cyclists to rest after traveling the BBT.

# HUDDY PARK

## Downtown Toms River

Huddy Park's pedestrian circulation system features an existing connection to the Main Street approach to Downtown Toms River that could be expanded to accommodate cyclists and connect to the vacant turfed space on the other side via a prominent crossing.

The existing sidewalk system on the Main Street bridge connects to Huddy Park on the east side.

The insertion of a prominent pedestrian/bicycle crossing with a safety island such as pictured here would connect the two open spaces.

# Irons Street to Legion Court

## Downtown Toms River

If a safe and efficient link can be made between the Herflicker Boulevard Bridge and Water Street, a bike lane up Irons Street to Legion Court would enable bicycle access to South Toms River High School and the Ocean County Library without having to ride on either Hooper Avenue, Main Street or Washington Street

# Hyer Street to Dayton Avenue

## Downtown Toms River

**Once a cyclist gets to Legion Court, Hyer Street provides a generous right-of-way that leads to Dayton Avenue. Dayton Avenue is the only connector between the Main Street corridor down the west side of the Downtown, and the Hooper Avenue corridor along the east side of the Downtown. Using Hyer, which runs parallel to both Main and Hooper, provides a less trafficked, lower speed limit and safer route for cyclists.**


**A "sharrow" (left) is a bike route on roads shared with automobile traffic marked with a painted arrow.**

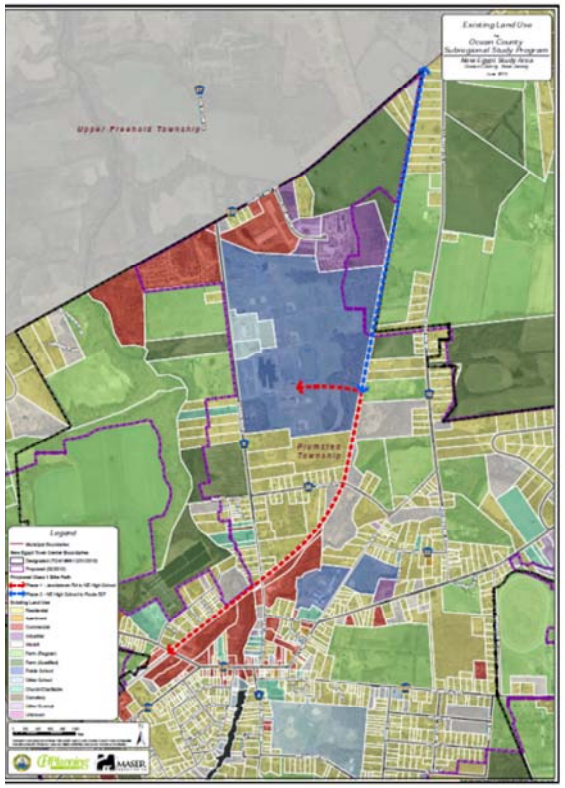
# Dayton Avenue to Hooper (MonDon HS)

## Downtown Toms River

**Dayton Avenue connects the St. Joseph's Catholic Parish and Monsignor Donovan High School on Hooper Avenue to the First Baptist Church on Main Street, while Hyer Street connects Dayton to Toms River High School South and the County Library Headquarters Branch.**

# New Egypt Bikepath

The Plumsted Circulation Element identified a potential Class 1 Bikepath along the JCP&L right-of-way, which was a former rail line at the turn of the Century.



# The New Egypt Rail Trail Bikepath

## Existing JCP&L Right-of Way
## Former Long-Branch New Egypt Railroad (1868 to 1959)

The former rail line that runs through downtown New Egypt from North Hanover in Burlington County to Upper Freehold in Monmouth County provides an opportunity to provide a off-road bikepath through the woods between Jacobstown Road in downtown New Egypt to the High School-Middle School-Library-Municipal Building campus on Evergreen Road with only two road crossings.

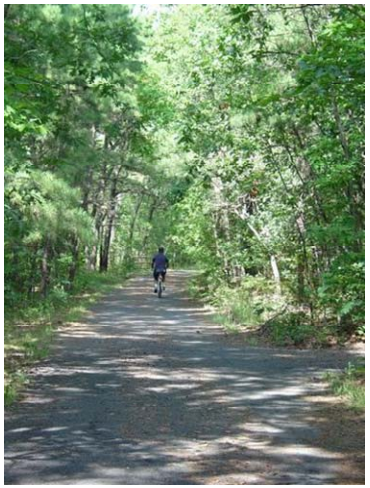
# The New Egypt Rail Trail Bikepath

## The Vision

The images from the completed sections of the Barnegat Branch Trail shown in three of the four images to the right provide a glimpse of what the New Egypt Rail Trail Bikepath could be.

A crossing such as pictured at the lower right would be needed at Evergreen Avenue and Bright Avenue. A more prominent crossing would be needed to continue the path across CR537 into Monmouth County.

The existing bridge at right along the BBT at Cedar Creek is representative of the timber rail bridge that once crossed the Crosswicks Creek



The End

# Discussion

Please visit the Project Website at: http://www.planning.co.ocean.nj.us/transp-subreg.htm