essex

Essex is a small seaside community on the Boston region's North Shore. During the summer months, its antique shops, restaurants, and recreational activities make Essex a very popular tourist destination. Essex has the smallest population and the lowest population density of the six towns evaluated in this study. The town hall, library, police and fire departments, an elementary school, several churches, the Essex Shipbuilding Museum, and many shops and restaurants are located in the town center. There are also several residential areas in the study area.

Essex had 3,267 residents in 2000, representing a 0.2 percent decrease from 1990.[1] MAPC projects that Essex's population is likely to grow to 3,634 by 2030, representing an 11.2 percent increase from 2000. Essex's employment, recorded at 1,249 jobs in 2000, is projected to increase by 17.7 percent by 2030.[2]

Essex is indirectly served by Route 128 to the south (in Manchester-by-the-Sea) and east (in Gloucester). Route 22 terminates at Route 133 in the town center. Route 133, the main corridor through town, connects Ipswich and Gloucester, and experiences higher traffic volumes during the summer months.

There is a project in the federal fiscal year (FFY) 2007 element of the Boston Region MPO's FFYs 2007–2010 Transportation Improvement Program (TIP) for the reconstruction of Route 133 in the town center of Essex. The project will reconstruct the roadway, within its current right-of-way, between Western Avenue and Water Street. The project includes constructing concrete sidewalks on both sides of the street, striping crosswalks at their current locations, and installing curb cut ramps. These improvements are expected to address most of the recommendations of the study that fall within the project area. MassHighway's project design firm has submitted 100 percent design plans for the project, which are under review by the MassHighway District 4 engineer. The project may be advertised for construction bids by September 30, 2007.

[1] U.S. census
[2] MAPC population and employment projections, January 2006

The Essex town center

Between 1995 and 2001, there were three reported crashes involving pedestrians in Essex, representing 0.86 percent of all crashes, and three reported crashes involving bicyclists, representing 0.86 percent of all crashes. None of these crashes resulted in fatalities. The pedestrian crash rate in Essex is lower than the region's average of 1.79 percent, but the bicyclist crash rate is higher than the regional average of 0.82 percent.[3]

STUDY AREA

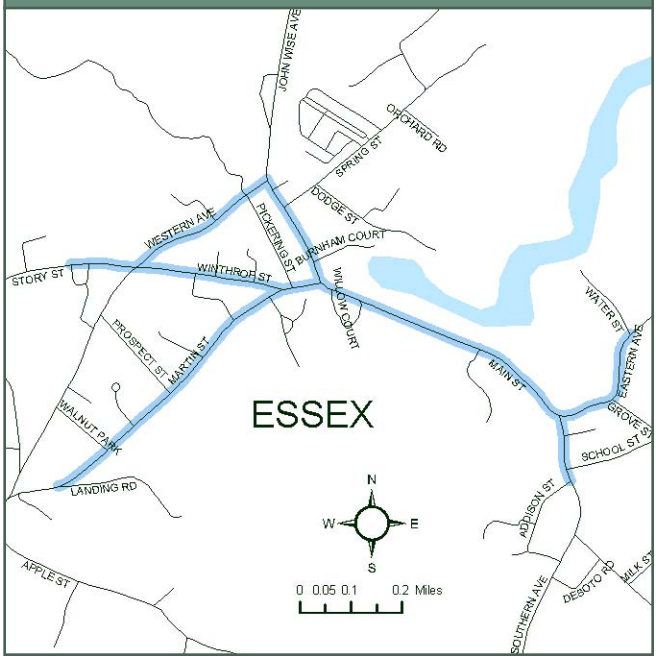
The study area for Essex (shown in Figure 13) includes:

- Main Street/Eastern Avenue from Western Avenue to Water Street
- Martin Street from Landing Road to Main Street
- Western Avenue from Winthrop Street to Main Street
- Winthrop Street from Western Avenue to Martin Street
- Story Street from Western Avenue to Essex Elementary School

[3] Massachusetts Registry of Motor Vehicles crash data, 1995–2001

- Southern Avenue from Main Street to Addison Street

Figure 13
ESSEX STUDY AREA



SIDEWALKS

Each of the roadways evaluated in this study has sidewalks on one or both sides of the street. However, the north side of Main Street has two sections without sidewalks, forcing pedestrians to walk on the shoulder. The sidewalks in the study area are made of asphalt or concrete, and some sections have large bumps and cracks, making the surface very uneven. See Figure 14 for a map of the pedestrian network in the town center.

Most sidewalks have bumps and cracks, making them uneven.

The crosswalks in the town center have recently been restriped.

CROSSWALKS

All crosswalks in the town center have recently been restriped and have highly visible pavement markings. The crosswalks connect sidewalks across roadways in logical places, but many sidewalks lack curb cut ramps that would provide smooth connections to the crosswalks. There are some pedestrian signs alerting motorists to the crosswalks on Martin Street near Main Street. There are crosswalk signs located near crosswalks at other locations in the study area as well. There is no stop sign on Pickering Street where it ends at Martin Street. See Figure 14 for a map of the pedestrian network in the Essex town center.

SIGNALIZED PEDESTRIAN CROSSINGS

There are no signalized pedestrian crossings in Essex.

On-street parking along Main Street is a hazard to bicyclists.

ON-STREET BICYCLING

Main Street, a popular bicycle route between Ipswich and Gloucester, has large bumps and cracks that are a hazard to bicyclists. While Main Street is wide enough to safely accommodate bicyclists and motorists, on-street parking along the roadway makes bicycling very dangerous during peak traffic periods. Martin Street and Western Avenue have recently been resurfaced and are very smooth. Several of the drainage grates on Western Avenue are set back from the roadway, improving bicyclist safety. There are no bicycle lanes in Essex. See Figure 14 for a map of the bicycle network in the town center.

BICYCLE PARKING

There is no bicycle parking in the town center.

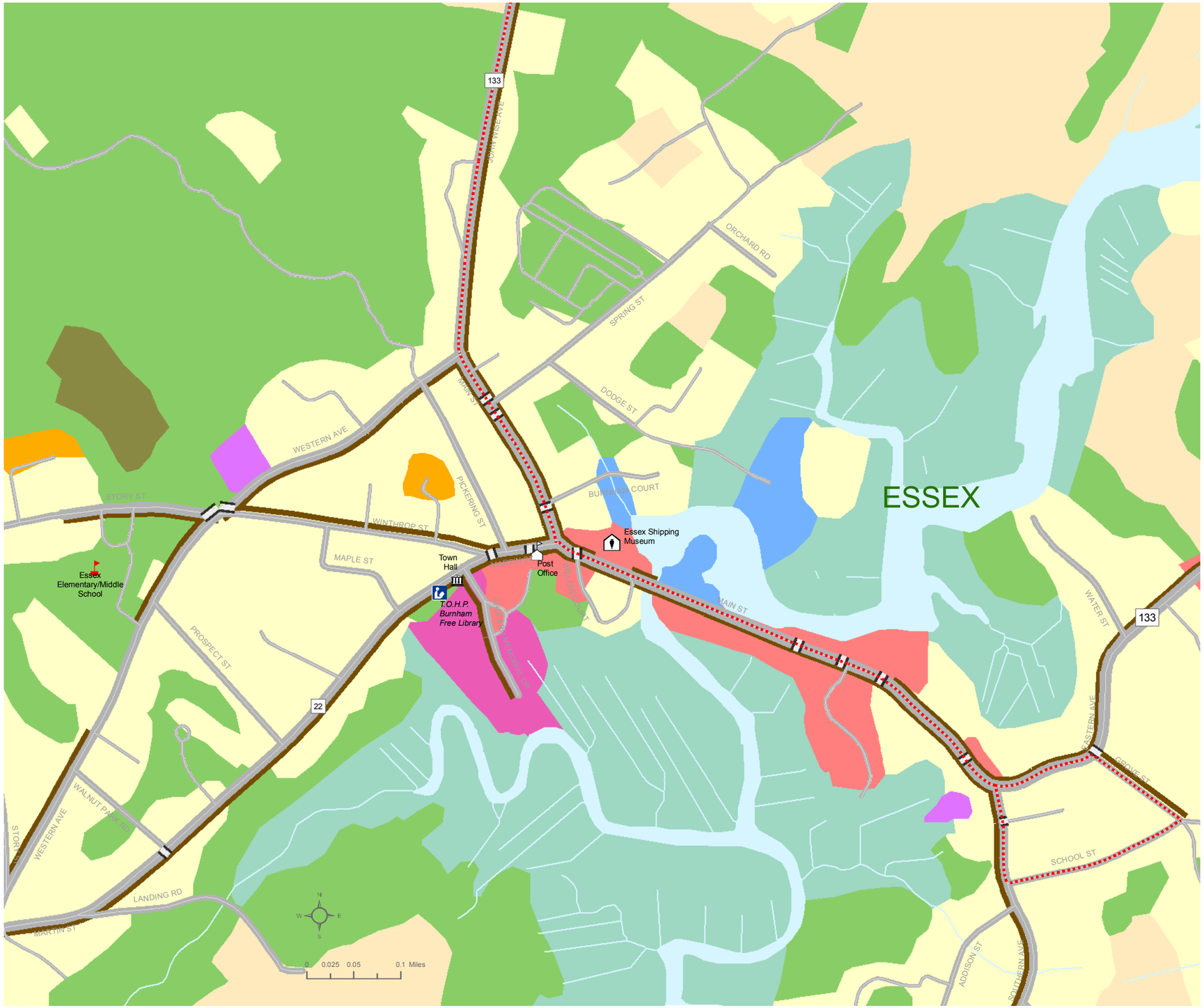
TRANSIT SERVICE

The Ipswich-Essex Explorer is a summer shuttle service that is operated by the Cape Ann Transit Authority (CATA) and funded by the Boston Region MPO and the Massachusetts Office of Travel and Tourism. The Explorer's route to Essex begins at the Ipswich commuter rail station and stops along Main Street at major destinations in the town center. The shuttle operates on weekends and holidays in the summer.

FIGURE 14

Pedestrian and Bicycle Network: Land Use and Activity Generators

Essex



Activity Center

- Post office
- Town hall
- Essex Shipping Museum
- Public school
- Library

Pedestrian Accommodations

- Crosswalk
- Sidewalk

Transit

- Explorer Bus Route (seasonal)

Land Use

- Commercial
- Multifamily residential
- Single-family residential
- Participation recreation
- Water-based recreation
- Agricultural
- Industrial mining, waste disposal
- Forest, open land
- Saltwater wetland
- Freshwater wetland
- Water

MAJOR CORRIDORS

MAIN STREET/EASTERN AVENUE: *WESTERN AVENUE TO WATER STREET*

Corridor Length: 1.03 miles

Main Street, looking west

ROADWAY

The roadway's two travel lanes range in width from 15 to 17 feet each and are divided by a double solid yellow line. A solid white line marks the shoulders, which range in width from 1 foot to 8.25 feet. Where the shoulder width permits, cars are parked at the roadway edge, forcing bicyclists to use the travel lanes. Heading east, the posted speed limit is 25 mph. Heading west, the posted speed limit is 30 mph. The roadway surface is uneven, with significant bumps, cracks, and holes that pose a serious threat to bicyclist safety. The shoulders have rough surfaces that could be unsafe for bicyclists. See Figure 15 for more information on bicycling conditions.

SIDEWALKS

There is a sidewalk along the south side of the street from Western Avenue to Southern Avenue, except in front of the parking lot for The Village restaurant. The sidewalk ranges in width from 4.25 feet to 8.5 feet and has many cracks and bumps, some of which may decrease pedestrian safety (see Figure 15 for more details on sidewalk conditions). There is no buffer between the sidewalk and the roadway. Driveways are raised to meet the level of the sidewalk, eliminating the need for curb cut ramps at these locations. The asphalt sidewalk surface slopes down to the level of intersecting roadways.

There is a sidewalk along the north side of the street from Western Avenue to just east of Saint John the Baptist Church. The sidewalk ends at the church, and the roadway shoulder is used as a sidewalk from there to the bridge over the Essex River. There is a concrete sidewalk on the bridge, but it ends a short distance from the bridge. The shoulder is again used as a sidewalk to 114 Main Street, where there is a sidewalk that continues to beyond Water Street. The sidewalk segments range in width from 4.25 feet to 8.5 feet and have many cracks and bumps, some of which may reduce pedestrian safety. There is no buffer between the sidewalk segments and the roadway. Driveways are raised to meet the level of the sidewalk, eliminating the need for curb cut ramps at these locations. The asphalt sidewalk slopes down to the level of intersecting roadways.

CROSSWALKS

There are nine crosswalks along this corridor:

- Across Main Street at Spring Street (at the north side of the intersection)
- Across Main Street at Spring Street (at the south side of the intersection)
- Across Main Street at Burnham Court
- Across Main Street at Willow Court
- Across Main Street at Riverside Restaurant
- Across Main Street at Woodman's Restaurant
- Across Main Street at 114 Main Street
- Across Main Street at Richdale Convenience Store
- Across Eastern Avenue at Grove Street

All of these crosswalks has highly visible pavement markings (see Figure 15 for more details on crosswalk conditions). Each of these crosswalks lacks one or both of the curb cut ramps that would connect the sidewalk to the crosswalks.

MARTIN STREET: *LANDING ROAD TO MAIN STREET*

Corridor Length: 0.68 miles

ROADWAY

The roadway's travel lanes range in width from 11 to 18 feet each. The shoulders range in width from 1 to 5 feet. Heading south, the posted speed limit is 35 mph. Heading north, the posted speed limit is 25 mph. The two travel lanes are divided by a double solid yellow line, and white solid lines delineate the shoulders. There are no marked bicycle lanes. The roadway was recently repaved and has a smooth surface. In some locations, the shoulder is wide enough to fully accommodate bicyclists. There are several places where the dirt buffer between the sidewalk and the roadway is occupied by parked cars. There is 30-minute parking in front of TD

Martin Street, looking east

BankNorth, near Pickering Street. See Figure 15 for more details on bicycling conditions.

SIDEWALKS

There is an asphalt sidewalk along the east side of Martin Street from Shephard Memorial Drive to Landing Road, continuing beyond the study area. The sidewalk ranges in width from 3.5 feet to 5 feet. In most locations, the sidewalk is in fair to poor condition, with dirt and cracks creating an uneven surface (see Figure 15 for more details on sidewalk conditions). The buffer between the roadway and the sidewalk alternates between a grass and dirt surface, and ranges in width from 3 feet to 10 feet. The asphalt sidewalk in front of the town hall and library was recently repaved and is very smooth. At this location, there is no buffer between the roadway and the sidewalk.

From just north of Shephard Memorial Drive to Main Street, the sidewalk on the east side of Martin Street continues at the level of the roadway and is bound by two thick parallel lines, resembling a crosswalk. There are several driveways for accessing the businesses on this side of the road. There are also several head-in parking spaces in front of the businesses, and cars cross the sidewalk to access them.

There is an asphalt sidewalk on the west side of Martin Street from Main Street to Winthrop Street. From Main Street to Pickering Street, the sidewalk surface is very uneven in some places (see Figure 15 for more details on sidewalk conditions). The sidewalk segment is raised 2 to 3 feet above the roadway and is separated from the roadway by a 2.5-foot to 4-foot-wide sloping dirt buffer. The sidewalk in front of the bank between Pickering and Winthrop streets was recently constructed and is in excellent condition; however, there is no buffer between the roadway and the sidewalk.

CROSSWALKS

There are three crosswalks along this corridor:

- Across Martin Street at the post office
- Across Martin Street at Pickering Street
- Across Martin Street at Walnut Park Road

Each of these crosswalks has highly visible pavement markings (see Figure 15 for more details on crosswalk conditions). There is no crosswalk across Pickering Street at Martin Street or across Shepard Memorial Drive at Martin Street.

WESTERN AVENUE: *WINTHROP STREET TO MAIN STREET*

Corridor Length: 0.31 miles

Western Avenue, looking northeast

ROADWAY

The roadway's two travel lanes are each 12 feet wide. The shoulders range in width from 1 foot to 2 feet. The travel lanes are divided by a double solid yellow line, and solid white lines delineate the shoulders. Heading east, the posted speed limit is 25 mph. The speed limit is not posted heading west within the study area. The shoulders are not wide enough to fully accommodate bicyclists. There are no marked bicycle lanes. The drainage grates are set back slightly from the shoulder, improving bicyclist safety. The roadway was recently repaved and has a smooth surface. See Figure 15 for more details on bicycling conditions.

SIDEWALKS

There is an asphalt sidewalk on the south side of the street from Story Street to Main Street. This sidewalk is between 4.5 feet and 5 feet wide and the surface is smooth, with only a few sections of cracks and bumps that may make the sidewalk unsafe for some pedestrians (see Figure 15 for more details on sidewalk condi-

FIGURE 15

Pedestrian and Bicycle Network: Conditions

Essex

Bicyclists encounter steady motor vehicle traffic, an uneven roadway surface, and narrow shoulders along Main Street.

On-street parking on Main Street is a potential hazard to bicyclists.

Crosswalk Markings

- Highly visible
- Sufficiently visible
- Moderately faded
- Very faded

Sidewalk Surface

- Smooth
- Some small bumps and/or cracks
- Some medium-sized bumps and/or cracks
- Significant bumps and/or cracks
- In serious disrepair
- Sidewalk not evaluated

Roadway Surface

- Rough roadway surface

tions). There is no buffer between the roadway and the sidewalk. Driveways are raised to meet the level of the sidewalk, eliminating the need for curb cut ramps at these locations.

CROSSWALKS

There is one crosswalk along this corridor:

- Across Western Avenue at Story and Winthrop streets

This crosswalk has highly visible pavement markings but lacks curb cut ramps (see Figure 15 for more details on crosswalk conditions). There is no crosswalk across Pickering Street at Western Avenue.

There is a short sidewalk segment at the north corner of the intersection of Western Avenue and Story Street. It provides a pedestrian connection between the two crosswalks at this intersection. However, it is uneven and contains cracks and bumps that make the sidewalk unsafe for pedestrians.

WINTHROP STREET: *MARTIN STREET TO WESTERN AVENUE*

Corridor Length: 0.29 miles

Winthrop Street, looking west

ROADWAY

The roadway is 24 feet wide and has no lane or shoulder markings. Heading north, the posted speed limit is 25 mph. The speed limit is not posted in the southbound direction within the study area. The roadway surface is smooth, with a few cracks and bumps that are not likely to pose a safety threat to bicyclists, and the drainage grates are not likely to affect bicyclist safety. There are no curbs or bicycle lanes. See Figure 15 for more details on bicycling conditions.

SIDEWALKS

There is an asphalt sidewalk on the north side of the street for the entire length of the roadway. The sidewalk ranges in width from 4 feet to 5 feet. The grass buffer between the roadway and the sidewalk ranges in width from 5 feet to 8 feet. The sidewalk is uneven, including some sections with large bumps and cracks. There are several trees that protrude into the sidewalk area (see Figure 15 for more details on sidewalk conditions). The sidewalk dips to meet the level of the driveways that it crosses. Approaching Western Avenue, the grass buffer ends and the sidewalk is adjacent to the roadway. This portion of the sidewalk is smooth, with small bumps that are not likely to pose a safety threat to pedestrians.

CROSSWALKS

There are no crosswalks along this corridor.

STORY STREET: *WESTERN AVENUE TO ESSEX ELEMENTARY SCHOOL*

Corridor Length: 0.12 miles

Story Street, looking west

ROADWAY

Story Street is 30 feet wide and has no lane markings, marked shoulders, or bicycle lanes. Heading west, the posted speed limit is 25 mph. The speed limit is not posted heading east in the study area. The roadway was recently repaved and has a smooth surface. See Figure 16 for more details on bicycling conditions.

SIDEWALKS

There is an asphalt sidewalk on the south side of the street from Western Avenue to Essex Elementary School. The sidewalk is 4.5 feet wide and there are some significant bumps and cracks on the surface, some of which may make the sidewalk unsafe for some pedestrians (see Figure 15 for more details on sidewalk

conditions). There is a 3-foot-wide grass buffer between the sidewalk and the roadway.

CROSSWALKS

There is one crosswalk along this corridor:

- Across Story Street at Western Avenue

This crosswalk has highly visible pavement markings (see Figure 15 for more details on crosswalk conditions).

RECOMMENDATIONS

Below is a set of recommendations for improvements to the pedestrian and bicycle environments in the town center. See Figure 16 for a map of these recommendations.

PEDESTRIAN ENVIRONMENT

CONSTRUCT SIDEWALKS

- Along the north side of Main Street from Saint John the Baptist Church to the bridge over the Essex River
- Along the north side of Main Street from the bridge over the Essex River to 114 Main Street
- Along the south side of Main Street in front of the Village Restaurant

RESURFACE SIDEWALKS

- Along the north side of Main Street from Spring Street to 18 Main Street
- Along the north side of Main Street for a short segment between Spring Street and Burnham Court
- Along the north side of Main Street for a short segment near the intersection of Main and Martin streets
- Along the north side of Main Street from Richdale Convenience Store to 148 Main Street
- Along the north side of Eastern Avenue from 4 Eastern Avenue to 26 Eastern Avenue
- Along the south side of Main Street from just south of Western Avenue to Spring Street
- Along the south side of Main Street from just south of Spring Street to 29 Main Street
- Along the south side of Main Street across from Riverside Restaurant
- Along the south side of Main Street from 139 Main Street to 151 Main Street
- Along the south side of Martin Street from Landing Road to the town hall
- Along the north side of Martin Street from Main Street to Winthrop Street
- Along the north side of Winthrop Street from Martin Street to 28 Winthrop Street
- Along the west side of Story Street from Western Avenue to Essex Elementary School
- At the north corner of Story Street and Western Avenue, connecting the two crosswalks

INSTALL CROSSWALKS

- Across Willow Court at Main Street
- Across Pickering Street at Western Avenue
- Across Pickering Street at Martin Street
- Across Shepard Memorial Drive at Martin Street

INSTALL CURB CUT RAMPS

- At both ends of the crosswalk that crosses Main Street at Spring Street (at the north side of the intersection)
- At both ends of the crosswalk that crosses Main Street at Spring Street (at the south side of the intersection)
- At both ends of the crosswalk that crosses Main Street at Burnham Court
- At the north end of the crosswalk that crosses Main Street at Willow Court
- At the south end of the crosswalk that crosses Main Street at Riverside Restaurant
- At the south end of the crosswalk that crosses Main Street at Woodman's Restaurant
- At the south end of the crosswalk that crosses Main Street at 114 Main Street
- At both ends of the crosswalk that crosses Main Street at Richdale Convenience Store
- At the north end of the crosswalk that crosses Eastern Avenue at Grove Street
- At the west end of the crosswalk that crosses Story Street at Western Avenue
- At the south end of the crosswalk that crosses Western Avenue at Winthrop Street
- At the west end of the crosswalk that crosses Southern Avenue at Southern Heights

IMPROVE SIGNAGE

- Install a stop sign on Pickering Street at Martin Street

BICYCLE ENVIRONMENT

RESURFACE ROADWAY

- Resurface Main Street/Eastern Avenue from Western Avenue to Water Street

MANAGE ON-STREET PARKING

- Stripe on-street parking spaces on both sides of Main Street where on-street parking is allowed; post no-parking signs where on-street parking is not allowed

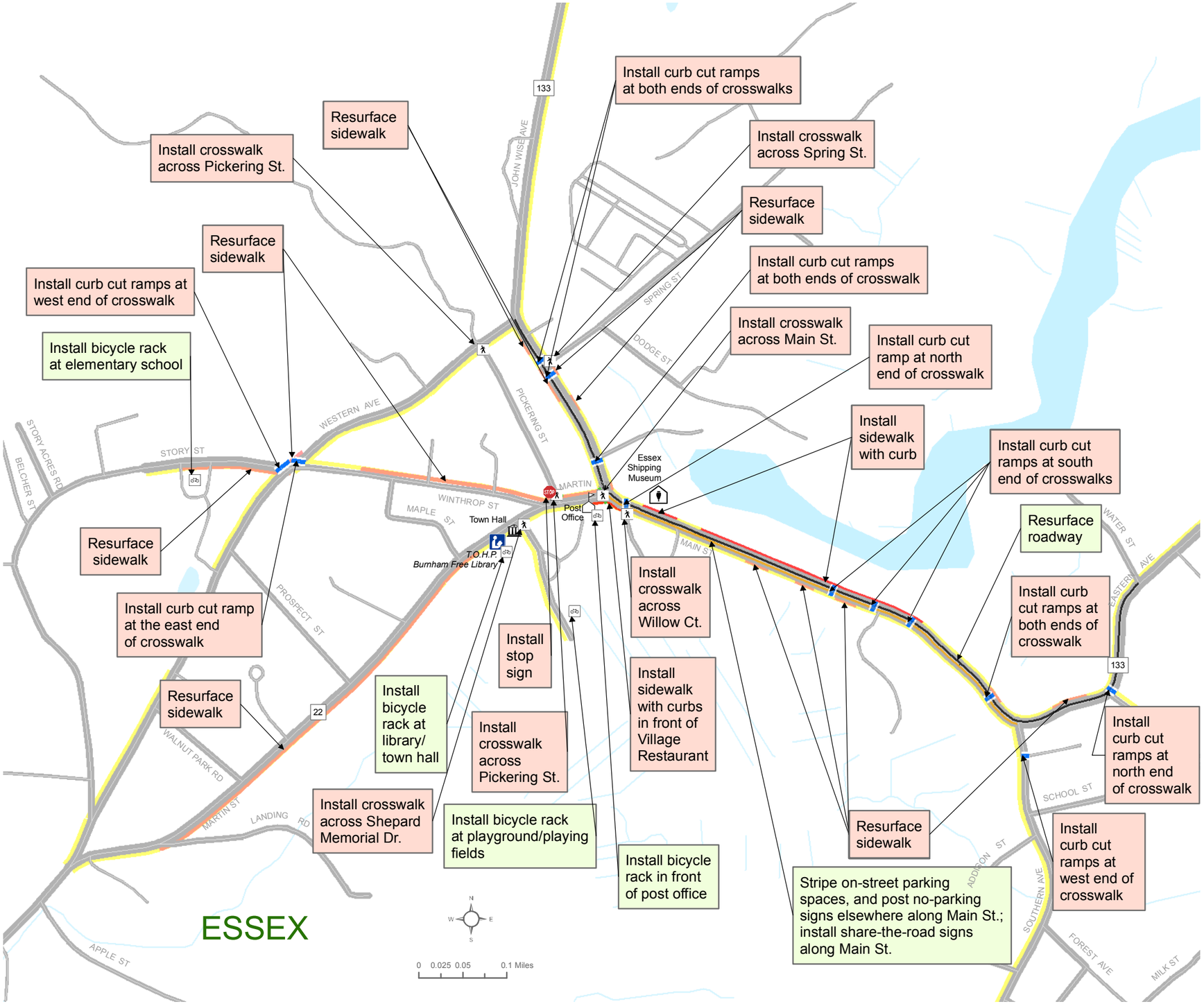
INSTALL SIGNAGE

- Install share-the-road signs along Main Street

INSTALL BICYCLE RACKS

- In front of the post office
- In front of the town hall/library
- At the playground and ball fields at the end of Shepard Memorial Drive
- At Essex Elementary School

FIGURE 16
Recommendations
Essex



- Install stop sign
- Install crosswalk
- Install bicycle rack
- Install sidewalk
- Resurface sidewalk
- Install curb cut ramps
- Stripe parking spaces
- Resurface roadway
- Existing sidewalk
- Pedestrian recommendation
- Bicycle recommendation

holbrook

Holbrook is a dense suburban community located south of Boston and north of Brockton on the border of the MPO region. With an area of only 7.4 square miles, Holbrook is geographically the smallest town in this study, but it has the highest population density. Two state routes with high traffic volumes, Routes 37 and 139, intersect in Holbrook's town center, where the town hall, a pharmacy, restaurants, small businesses, and a playground and ball fields are located. Holbrook High School and Saint Joseph Elementary School are located on South Franklin Street, and residential buildings are interspersed with commercial buildings throughout much of the study area.

Holbrook had 10,785 residents in 2000, representing a 2.3 percent decrease from 1990.[1] MAPC projects that Holbrook's population is likely to grow to 11,308 by 2030, representing a 4.8 percent increase from 2000. Holbrook's employment, recorded at 2,783 jobs in 2000, is projected to increase by 7.8 percent by 2030.[2]

Holbrook is indirectly served by Route 24 to the west (in Avon), I-93 to the north (in Braintree), and Route 3 to the north and east (in Braintree and Weymouth). Routes 37 and 139 intersect at Holbrook's town center. The Claire Saltonstall Bikeway, an on-road bicycle route between Boston and Cape Cod, passes through Holbrook to the south of the study area.

The Town of Holbrook reconstructed the intersection of North/South Franklin Street (Route 37) and Union/Plymouth Street (Route 139) in 2002 with Chapter 90 funds. The project included resurfacing the roadway, adding turn lanes at each approach to the intersection, replacing sidewalks, and installing street furniture (lights, trees, and trash receptacles).

The intersection of North/South Franklin Street and Union/Plymouth Street in Holbrook is ranked 534 on the list of the top 1,000 crash locations in Massachusetts.[3] Between 1995 and 2001, there were 61 crashes

Storefront in Holbrook's town center

at this intersection; 3 of them involved pedestrians and 1 involved a bicyclist. During that time, the entire town of Holbrook had 20 reported crashes involving pedestrians, representing 1.99 percent of all crashes, and 17 reported crashes involving bicyclists, representing 0.99 percent of all crashes. None of these crashes resulted in fatalities. The pedestrian and bicyclist crash rates in Holbrook are higher than the region's average of 1.79 percent and 0.82 percent, respectively.[4]

STUDY AREA

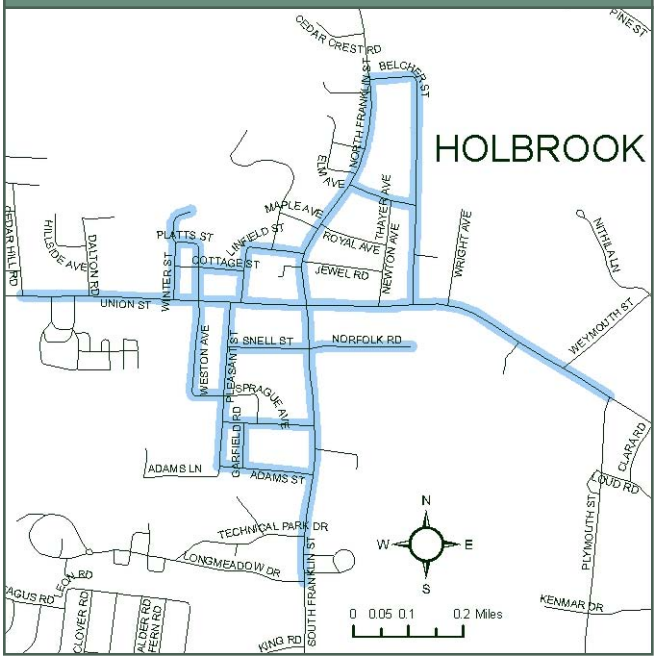
The study area for Holbrook (shown in Figure 17) includes:

- North Franklin Street from Belcher Street to Union Street
- South Franklin Street from Union Street to Longmeadow Drive
- Union Street from Cedar Hill Road to North Franklin Street

[1] U.S. census
[2] MAPC population and employment projections, January 2006
[3] MassHighway's statewide list of the top 1,000 Crash Locations, 1999–2001
[4] Massachusetts Registry of Motor Vehicles crash data, 1995–2001

- Plymouth Street from North Franklin Street to Abington Avenue
- Minor Roadways: Belcher Street, School Street, Linfield Street, Cottage Street, Summer Street, Winter Street, Card Crescent, Weston Avenue, Pleasant Street, Snell Street, Chandler Street, Garfield Road, Adams Street, and Norfolk Road

Figure 17
HOLBROOK STUDY AREA



Some of the sidewalks near the study boundary are in need of repair.

SIDEWALKS

Holbrook has a comprehensive sidewalk network in its town center. Within the study area, North Franklin, South Franklin, Union, and Plymouth streets all have sidewalks on both sides for most of their lengths, and many side streets have sidewalks. The sidewalks that were reconstructed as part of the 2002 roadway project are made of concrete and have smooth surfaces. These sidewalks are wide enough to easily accommodate two pedestrians walking past one another. However, many of the sidewalks beyond the boundaries of that project and on side roads are narrow and uneven. There are some sections of sidewalk that are in serious disrepair. See Figure 18 for a map of the pedestrian network in the town center.

The crosswalk markings in the town center are moderately or very faded.

CROSSWALKS

All crosswalks in Holbrook's town center have moderately faded or very faded pavement markings. The crosswalks connect sidewalks across roadways in logical places. The crosswalks within the area of the 2002 roadway reconstruction project have curb cut ramps, but many outside that area do not. There are signs identifying the crosswalks to motorists near Holbrook High School, but there are few signs elsewhere. Many minor roads do not have stop signs where they meet the main corridors. This poses a serious safety threat to pedestrians crossing at these crosswalks. See Figure 18 for a map of the pedestrian network in Holbrook's town center.

This intersection was reconstructed in 2002.

The pedestrian signal phase is too short for the long crosswalks at this intersection.

SIGNALIZED PEDESTRIAN CROSSWALKS

The intersection of North/South Franklin Street with Union/Plymouth Street has a four-way stoplight with pedestrian-activated crossing signals. The signal has an exclusive pedestrian phase consisting of a 10-second walk signal and a 16-second flashing don't-walk signal. There are crosswalks across North Franklin, South Franklin, Union, and Plymouth streets at the intersection. They are 64, 74, 48, and 51 feet long, respectively. Using a 3.5-foot-per-second standard for pedestrians crossing a roadway, the pedestrian phase is adequate for the lengths of the crossings.

The intersection of Plymouth Street and Abington Avenue has a flashing beacon traffic light. Traffic heading east on Plymouth Street and heading west on Abington Avenue is controlled by a flashing yellow signal, and traffic on Plymouth Street is controlled by a flashing red

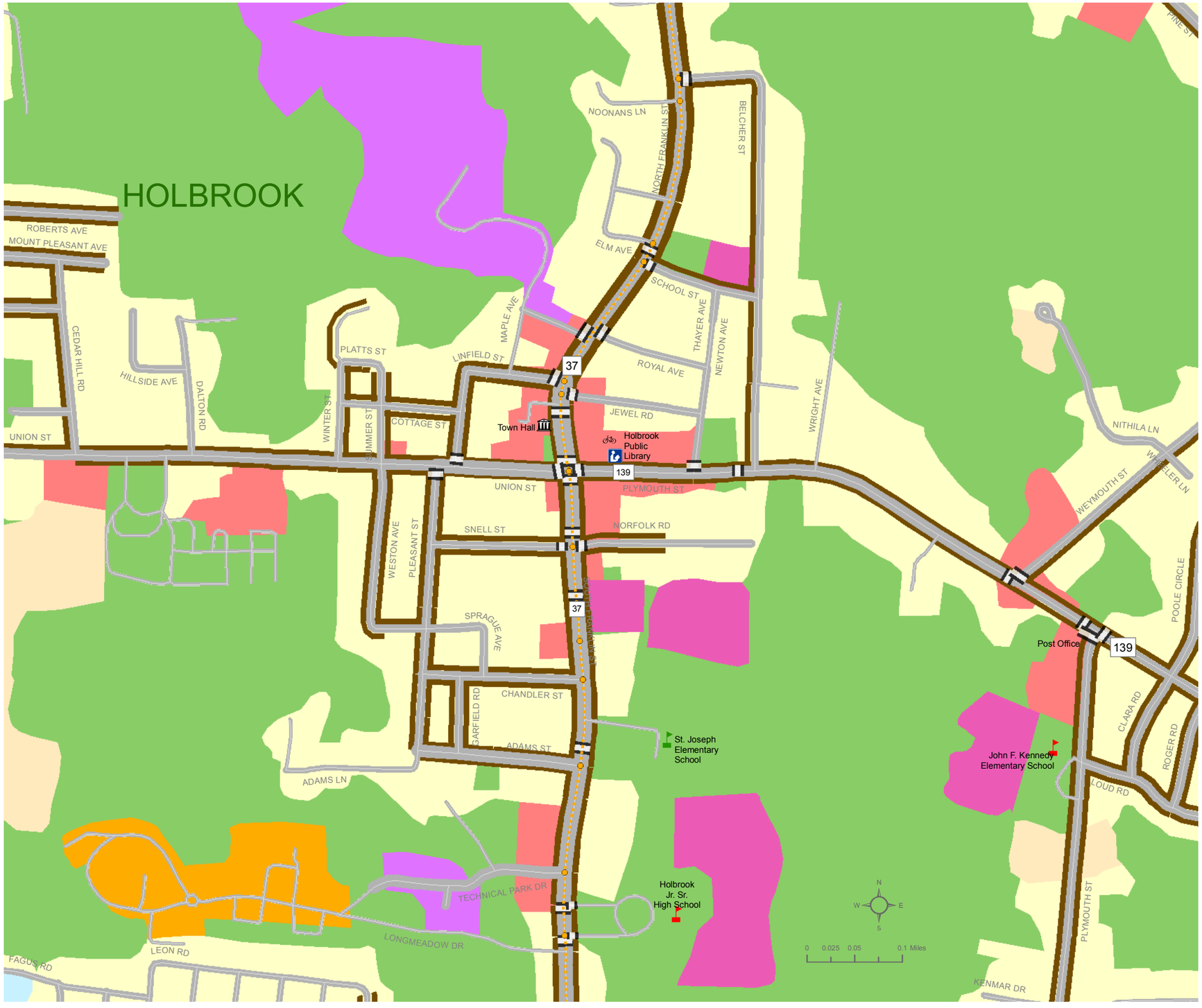


FIGURE 18

Pedestrian and Bicycle Network: Land Use and Activity Generators

Holbrook

Activity Center

- Post office
- Town hall
- Public school
- Private school
- Public library

Pedestrian Accommodations

- Crosswalk
- Sidewalk

Bicycle Racks:

- One rack

Transit

- MBTA Bus Route

Land Use

- Commercial
- Multifamily residential
- Single-family residential
- Participation recreation
- Industrial
- Agricultural
- Forest, open land
- Water

Figure 19
HYPOTHETICAL PLYMOUTH STREET–ABINGTON AVENUE INTERSECTION LAYOUT

Figure 20
HYPOTHETICAL PLYMOUTH STREET–ABINGTON AVENUE INTERSECTION LAYOUT

signal. There are pedestrian-activated signals at the ends of the crosswalks in the intersection; when activated, all vehicular approaches to the intersection have a solid red light. The signal has an exclusive pedestrian phase consisting of a 7-second walk signal and a 6-second flashing don't-walk signal. There are crosswalks across Plymouth Street at the west and south sides of the intersection and across Abington Street at the east side of the intersection. They are 38, 102, and 47 feet long, respectively. Using a 3.5-foot-per-second standard for crossing a roadway, the pedestrian phase (including the walk signals and the flashing don't-walk signals) is too short for pedestrians to safely use the crosswalks across Plymouth Street at the south side of the intersection, and across Abington Street at the east side of the intersection.

Staff developed two hypothetical layouts for improving pedestrian safety at this intersection based on the geometry of the intersection. These layout schemes are meant to show two potential approaches to improving pedestrian safety at the intersection. Traffic volumes and patterns were not taken into account because such work goes beyond the scope of the study. Additional analysis, including the consideration of pedestrian and traffic counts and patterns, would be needed to determine a final set of recommendations for improving the intersection for pedestrians.

Figure 19 shows a hypothetical intersection layout within the existing right-of-way. In this layout, a brick island and a brick median would be installed across Plymouth Street at the south side of the intersection to provide a refuge for pedestrians in the long crosswalk. The island and median would also channelize the movement of vehicles turning onto Plymouth Street southbound from Plymouth Street eastbound and from Abington Avenue westbound. The crosswalk across Plymouth Street at the west side of the intersection would be relocated to meet the brick island where Plymouth Street makes a right turn. The crosswalk across Abington Avenue would be relocated further east to meet the curb at a right angle on the south side of the street.

Figure 20 shows a hypothetical intersection layout that would require a small land taking. In this layout, two brick islands and a brick median would be installed across Plymouth Street at the south side of the intersection to provide refuge for pedestrians in the long crosswalk. The islands and median would also channelize the movement of vehicles turning onto Plymouth Street southbound from Plymouth Street eastbound and traffic turning right onto Abington Avenue eastbound from Plymouth Street northbound. The crosswalks across Plymouth Street at the west side of the intersection and across Abington Avenue would be relocated to meet the brick islands.

The roadway edges near the study boundary are uneven and contain debris.

ON-STREET BICYCLING

The main roadway corridors in Holbrook's town center are wide enough to comfortably accommodate bicyclists and motor vehicle traffic. Along North Franklin and South Franklin streets near the study area's northern and southern end, recent utility work has left the roadway edges very uneven and dangerous for bicyclists. Along Union and Plymouth streets, the roadway surfaces are relatively smooth. There are no bicycle lanes in the town center. On-street parking, particularly in unmarked spaces on Union Street, is an impediment to bicyclists. See Figure 18 for a map of the bicycle network in Hollbrook's town center.

The Holbrook Public Library has one bicycle rack.

BICYCLE PARKING

There is one four-space bicycle rack in Holbrook's town center. It is located near the rear entrance to the library. Staff observed no bicycles utilizing the rack on a warm, sunny summer day.

SIGNAGE

Many of the streets that intersect Routes 37 and 139 do not have stop signs, though some have stop lines painted on the roadway. Stop signs require drivers to come to a complete stop at an intersection in order to look for other vehicles, bicyclists, and pedestrians. They should be placed before the crosswalks so that cars stop to allow pedestrians to cross the roadway.

TRANSIT SERVICE

The MBTA's Route 230 bus runs through Holbrook's town center along North and South Franklin streets, making connections to the Montello commuter rail station in Brockton, and three stations on the Red Line. The route operates every 20 minutes during rush hour on weekdays and once every hour during off-peak times and on weekends.

Holbrook/Randolph Station, located on the Middleborough/Lakeville commuter rail line, is located one mile west of the town center on Union Street. From this station, there are 12 round-trips to/from Boston on weekdays and 7 round-trips on weekends. The station has 362 parking spaces for motor vehicles and has bicycle parking that can accommodate eight bicycles.

THE RIDE, the MBTA's paratransit service, operates in Holbrook, providing door-to door transportation to people who are unable to use general public transportation (subways, buses, and trains), all or some of the time, because of a physical, cognitive, or mental disability. THE RIDE, which is operated in compliance with the federal Americans with Disabilities Act (ADA), operates 365 days a year, from 6:00 AM to 1:00 AM.

MAJOR CORRIDORS

NORTH FRANKLIN STREET: UNION/PLYMOUTH STREET TO BELCHER STREET

Corridor Length: 0.45 miles

North Franklin Street, looking south

ROADWAY

The roadway's two travel lanes are each approximately 15 feet wide. The roadway widens at the intersection with Union/Plymouth Street to include a left-turn lane. There are marked shoulders from Union Street to just north of Royal Avenue. Where there are no on-street parking spaces, the shoulder is two feet wide. There are no shoulders from just north of Royal Avenue to Belcher Street. Heading south toward the intersection, the posted speed limit is 30 mph at Belcher Street and 25 mph at Royal Avenue. Heading north, the posted speed limit is 35 mph. The travel lanes are divided by a double solid yellow line. The roadway surface is smooth, with no impediments, from Union Street to just north of Royal

Avenue. North of Royal Avenue, the roadway surface is uneven, as recent utility work resulted in patches along the roadway, creating a safety hazard for bicyclists. On-street parking also poses a potential hazard to bicyclists. However, in some sections with on-street parking, the shoulder line is 1 to 2 feet to the left of the parking spaces, which may encourage bicyclists to ride at a safe distance from parked cars. See Figure 21 for more details on bicycle conditions.

BICYCLE PARKING

There is no bicycle parking along this corridor.

SIDEWALKS

There is a concrete sidewalk on both sides of North Franklin Street from its intersection with Union Street to Royal Avenue. These sidewalks range in width from 6 feet to 16 feet, and are smooth, with no impediments to pedestrians (see Figure 21 for more details on sidewalk conditions). There is a grass buffer between the roadway and the sidewalk on the east side of the street from just south of Jewel Avenue to Royal Avenue. Driveways are raised to meet the level of the sidewalk, eliminating the need for curb cut ramps at these locations. There are curb cut ramps where the sidewalk meets intersecting roadways.

The sidewalks continue north on both sides of North Franklin Street from Royal Avenue to Belcher Street and beyond the study area. These sidewalks range in width from 4.75 feet to 5.25 feet. They are made of asphalt, and the sidewalk surfaces are uneven, with bumps, cracks, and patches that make the sidewalk unsafe for pedestrians. There is a grass buffer on the west side of North Franklin Street between Royal Avenue and Belcher Street. The buffer on the east side of the street begins at the intersection with Union street and ends just south of School Street; it resumes just south of Belcher Street. The asphalt sidewalk slopes down to the level of intersecting roadways or driveways.

CROSSWALKS

There are eight crosswalks along this corridor:

- Across North Franklin Street at Town Hall
- Across Jewel Road at North Franklin Street
- Across Linfield Street at North Franklin Street
- Across Royal Avenue at North Franklin Street
- Across Maple Avenue at North Franklin Street
- Across School Street at North Franklin Street
- Across North Franklin Street at Elm Avenue
- Across Belcher Street at North Franklin Street

Each of these crosswalks has moderately faded or very faded pavement markings (see Figure 21 for more details on crosswalk conditions). There are no crosswalks across Noonan's Lane, Sunset Avenue, or Elm Avenue where they meet North Franklin Street.

SOUTH FRANKLIN STREET: UNION/PLYMOUTH STREET TO LONGMEADOW DRIVE

Corridor Length: 0.50 miles

South Franklin Street, looking south

ROADWAY

The roadway's two travel lanes are each approximately 19 feet wide. The roadway widens at the intersection with Union/Plymouth Street to include a left-turn-only lane and a right-turn-only lane. The shoulders range in width from 0.5 feet to 2.5 feet. There are two on-street parking spaces on the west side of the street just north of Union Street. Heading south from the intersection, the posted speed limit is 35 mph. Heading north, the posted speed limit is 25 mph. The travel lanes are divided by a double solid yellow line. The roadway surface is smooth, with no impediments to bicyclists, from Union Street to Dunkin' Donuts. South of Dunkin' Donuts, the roadway surface has several sections with significant cracks, bumps, and patches, as recent utility work has made the surface very uneven, especially at the edges of the roadway. There are no marked bicycle lanes, and the shoulders are not wide enough to accommodate bicyclists. See Figure 21 for more details on bicycling conditions.

SIDEWALKS

There is a concrete sidewalk on both sides of South Franklin Street from Union Street to Dunkin' Donuts. These sidewalks range in width from 6 feet to 7.75 feet and are smooth, with no impediments to pedestrians

(see Figure 21 for more details on sidewalk conditions). There is no buffer between the roadway and the sidewalk, but trees planted at the edge of the sidewalk next to the roadway provide a buffer between vehicles and pedestrians. Driveways are raised to meet the level of the sidewalk, eliminating the need for curb cut ramps at these locations. There are curb cut ramps where the sidewalk meets intersecting roadways.

The sidewalks, which range in width from 5 feet to 7.5 feet, continue south on both sides of South Franklin Street from Dunkin' Donuts to beyond Longmeadow Drive, outside of the study area. They have an uneven, asphalt surface; many sections have bumps, cracks, and patches that may significantly affect pedestrian safety. There is a 2.5-foot-wide sloping asphalt buffer between the sidewalk and the roadway on the east side of South Franklin Street from the playground to Saint Joseph Elementary School, and a 4.5-foot-wide grass buffer on the east side of South Franklin Street from 193 South Franklin Street to just before Holbrook High School. There is no buffer between the sidewalk and the roadway on the west side of the street. The asphalt sidewalk slopes down to the level of intersecting roadways and driveways.

CROSSWALKS

There are nine crosswalks along this corridor:

- Across South Franklin Street at Norfolk Street
- Across Norfolk Street at South Franklin Street
- Across Snell Street at South Franklin Street
- Across South Franklin Street at the playground
- Across South Franklin Street at Saint Joseph Church
- Across the Holbrook High School driveway (exit) at South Franklin Street
- Across South Franklin Street at the Holbrook High School driveway (exit)
- Across Holbrook High School driveway (entrance) at South Franklin Street
- Across South Franklin Street at the Holbrook High School driveway (entrance)

Each of these crosswalks has moderately faded pavement markings (see Figure 21 for more details on crosswalk conditions). There are no crosswalks across Chandler Street, the Saint Joseph Elementary School driveway, Adams Street, and Technical Park Drive where they meet South Franklin Street.

UNION STREET: *NORTH FRANKLIN STREET TO CEDAR HILL ROAD*

Corridor Length: 0.52 miles

Union Street, looking east

ROADWAY

The roadway's two travel lanes are each approximately 12 feet wide. The roadway widens at the intersection with North/South Franklin Street to include a right-turn-only lane. The shoulders range in width from 1 foot to 2.5 feet. Heading east, the posted speed limit is 35 mph. Heading west, the posted speed limit is 25 mph. The travel lanes are divided by a double solid yellow line. The shoulders are not wide enough to fully accommodate bicyclists, and there are no marked bicycle lanes. The roadway surface is smooth, with no impediments, from North Franklin Street to Pleasant Street. West of Pleasant Street, the roadway surface has several uneven sections, with cracks, bumps, and patches. Between North Franklin Street and Pleasant Street, the shoulders contain only minor obstructions that are not likely to affect bicyclist safety. Between Linfield and Pleasant streets, cars are allowed to park at the roadway edge and partially onto the sidewalk along the north side of Union Street between Linfield and Pleasant Streets, a potential hazard for bicyclists. See Figure 21 for more information on bicycle conditions.

SIDEWALKS

There is a concrete sidewalk on both sides of Union Street from North Franklin Street to Pleasant Street. On the east side of the street, the sidewalk is 8 feet wide, with no buffer between the roadway and the sidewalk. There are utility poles in the sidewalk in this area. On the west side of the street, the sidewalk is 4.5 feet wide, with no buffer between the roadway and the sidewalk. The sidewalk surfaces are smooth, with no impediments to pedestrians (see Figure 21 for more information on bicycle conditions). Driveways are raised to meet the level

FIGURE 21

Pedestrian and Bicycle Network: Conditions

Holbrook

Beyond the immediate town center area, the shoulders contain debris that could be hazardous to bicyclists.

Recent utility work has made the roadway surface along North Franklin and South Franklin streets very uneven.

HOLBROOK

37
139
NORTH FRANKLIN ST
SOUTH FRANKLIN ST
CEDAR CREST RD
MAPLE AVE
SCHOOL ST
ROYAL AVE
JEWEL RD
ELM AVE
BELCHER ST
THAYER AVE
WRIGHT AVE
NEWTON AVE
DAMON AVE
BRIARWOOD RD
KOSKI LN
PINE ST
FOREST ST RD
NITHILA LN
WEYMOUTH ST
WHEELER LN
PLEYMOUTH ST
ABINGTON AVE
POOLE CIRCLE
WILLIAM RD
LOUISE RD
CLARA RD
ROGER RD
VIRGINIA RD
NORMA RD
HILLSIDE AVE
DALTON RD
CEDAR HILL TERRACE
UNION ST
PLATTS ST
LINFIELD ST
SNELL ST
NORFOLK RD
WESTON AVE
PLEASANT ST
SPRAGUE AVE
CHANDLER ST
ADAMS ST
ADAMS LN
TECHNICAL PARKWAY
LONGMEADOW DR
LEON RD
Town Hall
Holbrook Public Library
Post Office
St. Joseph Elementary School
John F. Kennedy Elementary School
Holbrook Jr. Sr. High School
N
W
E
S
0 0.025 0.05 0.1 Miles

Bicycle Racks

- One rack

Crosswalk Markings

- Highly visible
- Sufficiently visible
- Moderately faded
- Very faded

Sidewalk Surface

- Smooth
- Some small bumps and/or cracks
- Some medium-sized bumps and/or cracks
- Significant bumps and/or cracks
- In serious disrepair
- Sidewalk not evaluated

Roadway Surface

- Rough roadway surface

of the sidewalk, eliminating the need for curb cut ramps at these locations. There are curb cut ramps where the sidewalk meets intersecting roadways.

The sidewalk on the north side of Union Street continues west from Pleasant Street to beyond the study area, leading to the Holbrook/Randolph commuter rail station. This sidewalk ranges in width from 5 feet to 6 feet. It is made of asphalt and has an uneven surface in places due to bumps, cracks, and patches, which could significantly affect pedestrian safety. There is a dirt and gravel buffer between this sidewalk and the roadway from 100 Union Street to Dalton Street. The asphalt sidewalk slopes down to the level of intersecting roadways and driveways.

The sidewalk on the south side of Union Street continues west from Pleasant Street to just beyond Union Cemetery. This sidewalk ranges in width from 4.5 feet to 5.75 feet. The sidewalk surface is uneven in places due to sections with a significant number of bumps, cracks, and patches that could significantly affect pedestrian safety. There is a grass and dirt buffer between the sidewalk and the roadway from 121 Union Street to 145 Union Street. The asphalt sidewalk slopes down to the level of intersecting roadways and driveways.

CROSSWALKS

There are two crosswalks along this corridor:

- Across Linfield Street at Union Street
- Across Pleasant Street at Union Street

These two crosswalks have moderately faded and very faded pavement markings, respectively (see Figure 21 for more details on crosswalk conditions). There are no crosswalks across Dalton Road, Winter Street, Summer Street, or Weston Avenue where they meet Union Street.

PLYMOUTH STREET: *NORTH FRANKLIN STREET TO ABINGTON AVENUE*

Corridor Length: 0.60 miles

ROADWAY

The roadway's two travel lanes are each approximately 15 feet wide. The roadway widens at the intersection with North/South Franklin Street to include a right-turn-only lane. The shoulders are 2 feet wide from this intersection to Newton Avenue, and 1 foot wide from Newton Avenue to the intersection of Plymouth and Abington streets. There are two on-street parking spaces, with very faded pavement markings, on the south side of the street near the intersection with North/South Franklin

Plymouth Street, looking west

Street. Heading west toward that intersection, the posted speed limit is 35 mph. The speed limit is not posted for eastbound traffic. The travel lanes are divided by a double solid yellow line. There are no marked bicycle lanes along Plymouth Street, and the shoulders are not wide enough to fully accommodate bicyclists. The roadway surface is smooth, with no impediments, from the intersection with North/South Franklin Street to Newton Avenue. East of there, the roadway surface is smooth, with only a few cracks that do not pose a safety threat to bicyclists. The shoulders have minor obstructions that are not likely to inhibit bicyclist mobility. See Figure 21 for more details on bicycling conditions.

SIDEWALKS

There is a 6-foot concrete sidewalk on both sides of Plymouth Street from North Franklin Street to Newton Avenue. The surfaces are smooth, with no impediments to pedestrians (see Figure 21 for more details on sidewalk conditions). There is no buffer between the roadway and the sidewalk. Driveways are raised to meet the level of the sidewalk, eliminating the need for curb cut ramps at these locations. There are curb cut ramps where the sidewalk meets intersecting roadways.

These sidewalks continue east on both sides of Plymouth Street from Newton Avenue to the intersection of Plymouth and Abington streets. In this segment, sidewalks are made of asphalt, with smooth surfaces only slightly marred by minor cracks and bumps that are not likely to pose a safety hazard to pedestrians. The sidewalks are 4 feet to 8 feet wide, with no buffer between the sidewalk and the roadway, on both sides of the street. The asphalt sidewalk slopes down to the level of intersecting roadways and driveways.

CROSSWALKS

There are seven crosswalks along this corridor:

- Across Newton Avenue at Plymouth Street
- Across Plymouth Street at Temple Beth Shalom
- Across Plymouth Street at Weymouth Street
- Across Weymouth Street at Plymouth Street
- Across Plymouth Street at Abington Avenue (at the west side of the intersection)
- Across Plymouth Street at Abington Avenue (at the south side of the intersection)
- Across Abington Avenue at Plymouth Street (at the east side of the intersection)

These crosswalks have moderately faded or very faded pavement markings (see Figure 21 for more details on crosswalk conditions). There are no crosswalks across Belcher Street or Wright Avenue where they meet Plymouth Street.

RECOMMENDATIONS

Below is a set of recommendations for improvements to the pedestrian and bicycle environment in Holbrook's town center area. See Figure 22 for a map of these recommendations.

PEDESTRIAN ENVIRONMENT

INSTALL CROSSWALKS

- Across Noonan's Lane at North Franklin Street
- Across Sunset Avenue at North Franklin Street
- Across Elm Avenue at North Franklin Street
- Across Chandler Street at South Franklin Street
- Across the Saint Joseph Elementary School driveway at South Franklin Street
- Across Adams Street at South Franklin Street
- Across Technical Park Drive at South Franklin Street
- Across Dalton Road at Union Street
- Across Winter Street at Union Street
- Across Summer Street at Union Street
- Across Weston Avenue at Union Street
- Across Belcher Street at Plymouth Street
- Across Wright Avenue at Plymouth Street

RESTRIPE CROSSWALKS

- Restripe all existing crosswalks in the study area, using a more visible paint pattern

CONSTRUCT SIDEWALK

- Along the south side of Weston Avenue from the end of the existing sidewalk to Pleasant Street

RESURFACE SIDEWALKS

- Along the east side of North Franklin Street from Royal Avenue to Belcher Street
- Along the west side of North Franklin Street from Maple Avenue to Belcher Street
- Along the north side of School Street from North Franklin Street to Belcher Street
- Along the west side of Belcher Street from 152 Belcher Street to Plymouth Street
- Along the north and west sides of Linfield Street from North Franklin Street to Union Street
- Along the north side of Cottage Street from Winter Street to Linfield Street
- Along the south side of Cottage Street from Summer Street to Linfield Street
- Along the west side of Summer Street from Cottage Street to Platts Street
- Along the east side of Summer Street from Cottage Street to Platts Street
- Along the south side of Platts Street from Winter Street to Summer Street
- Along the east side of Winter Street from Cottage Street to just north of Union Street
- Along the west side of Weston Avenue from 3 Weston Avenue to the end of the sidewalk
- Along the west side of Pleasant Street from just north of Weston Avenue to Adams Street
- Along the east side of Pleasant Street from just south of Snell Street to Sprague Avenue
- Along the south side of Snell Street from Pleasant Street to 38 Snell Street
- Along the north side of Chandler Street from just east of Pleasant Street to Sprague Avenue
- Along the south side of Chandler Street for a short segment just west of South Franklin Street
- Along the east side of Garfield Road for a short segment just south of Chandler Street
- Along the south side of Adams Street from 62 Adams Street to South Franklin Street
- Along the north side of Norfolk Road from the Walgreens driveway to the end of the sidewalk
- Along the south side of Norfolk Road from the Mutual gas station to the end of the sidewalk
- Along the north side of Plymouth Street from 154 Plymouth Street to the beginning of Abington Avenue

- Along the south side of Plymouth Street from 154 Plymouth Street to the beginning of Abington Avenue

INSTALL STOP SIGNS

- On Belcher Street at Plymouth Street
- On Newton Avenue at Plymouth Street
- On Noonans Lane at North Franklin Street
- On Sunset Avenue at North Franklin Street
- On Elm Avenue at North Franklin Street
- On School Street at North Franklin Street
- On Royal Avenue at North Franklin Street
- On Maple Avenue at North Franklin Street
- On Jewel Road at North Franklin Street
- On Dalton Road at Union Street
- On Winter Street at Union Street
- On Summer Street at Union Street
- On Linfield Street at Union Street
- On Weston Avenue at Union Street
- On Pleasant Street at Union Street
- On Norfolk Road at South Franklin Street
- On Snell Street at South Franklin Street
- On Chandler Street at South Franklin Street
- On the Saint Joseph Elementary School driveway at South Franklin Street
- On Technical Park Drive at South Franklin Street
- On Longmeadow Drive at South Franklin Street
- On the Holbrook High School driveway (exit) at South Franklin Street

BICYCLE ENVIRONMENT

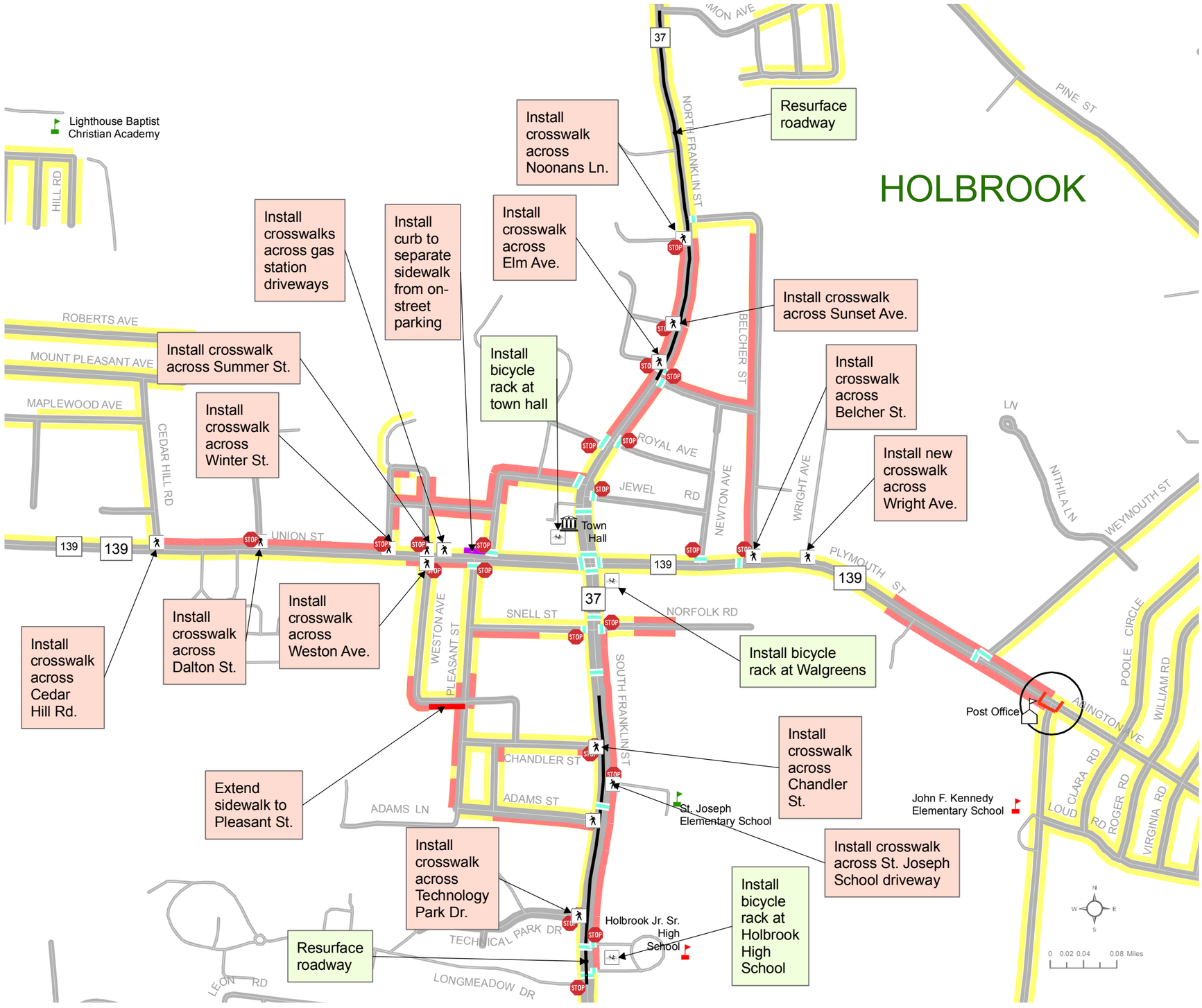
RESURFACE ROADWAY

- Resurface North Franklin Street from Royal Avenue to beyond Belcher Street (outside of the study area)
- Resurface South Franklin Street from just south of Norfolk Road to beyond Longmeadow Drive (outside of the study area)

INSTALL BICYCLE RACKS

- At the town hall
- At Holbrook High School
- At Walgreens

FIGURE 22
Recommendations
Holbrook



Improvements detailed in Figures 19 and 20

- Install stop sign
- Install crosswalk
- Install bicycle rack
- Install sidewalk
- Resurface sidewalk
- Restripe crosswalk
- Install curb
- Resurface roadway
- Existing sidewalks
- Pedestrian recommendation
- Bicycle recommendation