Borough of Hightstown

Streets & Sidewalks Committee

Intersection Analysis and Priorities for Improvement

Report to Borough Council

May 15, 2019

Borough of Hightstown
Streets & Sidewalks Committee
Intersection Analysis and Priorities for Improvement

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Table of Contents

Source for the intersection data collection form was the West Windsor Bicycle and Pedestrian Alliance.

Source for some recommendations derived from the 2017 State of New Jersey Complete Streets Design Guide, Chapter 3 Complete Streets Toolbox, subsection on Intersections, produced by the New Jersey Department of Transportation.

Downtown Walk Audit data collection form derived from the New Jersey Department of Transportation Safe Routes to Schools Walking Assessment and the AARP Walk Audit Toolkit.

Executive Summary

In 2018 the Hightstown Borough Council established a Streets and Sidewalks Committee to set priorities for future infrastructure projects. It was recently designated a permanent Borough Committee under the name "Complete Streets Committee." Membership is drawn from Council, the Planning Board and the Environmental Commission. The rationale was that in the past most infrastructure projects originated from the Borough professionals and staff, were designed to take advantage of various grant programs and were not tied to a larger Community-driven multi-year plan with established priorities under a broader vision for enhancements to the quality of life in Hightstown for our residents.

To achieve this goal, Committee membership was drawn from Council, the Planning Board and the Environmental Commission:

2018	2019
Councilman Steve Misiura, Chair	Council President Steve Misiura, Chair
Councilman Lee Stultz	Dave Zaiser, Environmental Commission
Dave Zaiser, Environmental Commission	Dodie Colavecchio, Planning Board and Historic Preservation Commission
Dodie Colavecchio, Planning Board and Historic Preservation Commission	Beverly Asselstine, Planning Board
Beverly Asselstine, Planning Board	Joe Cicalese, Planning Board and Environmental Commission

The Committee decided to initially focus on two key areas:

1. Downtown and
2. A continuous network of safe intersections and sidewalks from all parts of the Borough to Hightstown High School

The Borough Engineer provided a report of missing sidewalks and street segments in need of repair based on ongoing work to maintain a list of longer term capital projects (see Appendix). From this the Committee prioritized a series of intersections for closer inspection and analysis, including the following:

- Franklin Street (Route 33) and Maxwell Avenue, with recommendations for Maxwell Avenue and Ward Street
- Franklin Street (Route 33) and Broad Street
- North Main Street (County Route 539) and Monmouth Street (County Route 633)
- South Main Street (County Route 539) and Etra Road (County Route 571)
- South Main Street (County Route 539) and Springcrest Drive
- South Main Street (County Route 539) and Leshin Lane
- Mercer Street (State Route 33) and Grape Run Drive
- Stockton Street (County Route 571), Harron Avenue, Oak Lane and Dutchneck Road

- Downtown:
    - Franklin Street (Route 33) and Main Street (County Route 539)
    - Stockton Street (County Route 571) and Main Street (Route 33, County Route 539)
    - Mercer Street (Route 33) and South Main Street (County Route 571)
    - Mercer Street (Route 33) and Rogers Avenue (Truck Route for County Route 571)
    - Ward Street (County Routes 571 and 539) and Mercer Street (Route 33) and Academy Street

This report summarizes the conditions and recommendations for these intersections based on data gathered by members of the Committee in 3Q and 4Q 2018 and a Downtown Walk Audit conducted on November 29, 2018 with representatives from Hightstown Police, Public Works, Council and Planning Board, as well as Mercer County Planning Department, Downtown Hightstown, Inc., RISE and Greater Mercer TMA.

Other activities that have taken place since the Committee began work include the following:

- The Planning Board established a Bike Planning Committee, which led the effort to develop an application for technical assistance to the New Jersey Department of Transportation's Office of Local Bicycle and Pedestrian Assistance Program for the creation of a comprehensive Mobility Plan. This plan is intended to include a network map and typical design cross-sections that can be used to support the installation of appropriate pedestrian and bicycle facilities in accordance with Complete Streets when municipal capital improvement projects are undertaken. The Plan will be consistent with the standards established in the State of New Jersey Complete Streets Design Guide and those in the Mercer County Master Plan Transportation Element, since most major roadways through the Borough are under the jurisdiction of the State or County.
- The Borough submitted an application with East Windsor under the Safe Routes to Schools program to install sidewalks on Dutch Neck Road.
- The Borough submitted an application under the Municipal Assistance Program to install sidewalks on Springcrest Drive and Taylor Avenue.
- The Committee spearheaded the launch of the Hightstown Pace Car Program, where residents sign a pledge to obey traffic laws and display a magnet on their car to raise awareness of pedestrian and bike safety issues on our roadways.

Intersection Analysis

Intersection of Franklin Street (Route 33) and Maxwell Avenue, with recommendations for Maxwell Avenue and Ward Street

Description

The intersection is located between the eastern entrance to Hightstown and the Downtown Hightstown central business district on a main thoroughfare. It is a major intersection and includes one of only three traffic lights in the Borough. Franklin Street is a two lane road running east-west and Maxwell Avenue is a two lane road running north-south. They meet at a slightly off 90 degree angle.

Franklin is a major highway and this intersection marks the transition from 35 mph to 25 mph to the west. There is a traffic signal with a pedestrian button on the SW corner, but no crosswalks or curb cuts on the south, east or west sides of the intersection. A crosswalk and island with a right turn lane exists from the north, but the markings are faded. There are detectable warning surfaces on the ramps. From the south there is a "no turn on red" sign. The only sidewalk is on the NW corner, with ramps at the corner and on the two sides of the island.

The SW corner contains many obstacles, such as telephone poles, electrical box controlling the light and posts marking underground cables. Traffic light poles extend across the intersection from the SW and NE corners.

Analysis

Traffic traveling west on Route 33 has a posted speed limit of 55 mph east of Twin Rivers and no other signage until a warning sign just outside the Borough line indicating the approaching 35 mph speed limit as vehicles enter the Borough. Traffic traveling east experiences different speed limit signage. A 50 mph sign is posted near the old Turnpike entrance and a 55 mph sign is posted at the Shell Station in Twin Rivers. Traffic routinely exceeds the speed limit in both directions and the intersection serves as a starting/stopping place for this behavior.

This intersection is a natural crossing place for residents heading to downtown and for students walking to Hightstown High School. All high school students in this part of the Borough, including those to the north and east of this intersection, are designated "walkers" by the school district. The route to the High School would be to continue south down Maxwell to Ward, where sidewalks exist to South Main and then to Spring Crest.

The right turn lane from the north does not appear to comply with the NJDOT Complete Streets Design Guide. The location does not meet the criteria for this type of treatment and it allows cars to enter Franklin Street at a slow roll at a difficult angle to watch for oncoming traffic, bicycles and pedestrians.

Franklin Street is quite wide at this location and this creates a dangerous situation for pedestrians trying to cross.

Recommendations

The intersection should have crosswalks across all four street segments with high visibility pavement markings (continental stripe) and lighted walk/don't walk signals with pedestrian control buttons. High visibility pedestrian crossing signs should be posted in all directions on approaches to the intersection. Stop lines should be repainted.

NJDOT should be asked to examine speed limits approaching from the east. Corrective action is needed to post consistent mph signs for eastbound and westbound traffic. Also a longer glide path to speed limit reductions approaching the high traffic and residential areas in Twin Rivers and the Borough could help reduce speeding. A 45 mph limit at the eastern border of Twin Rivers could more easily be stepped down to 35 at Milford Road and 25 at the Borough line.

Traffic calming measures should be implemented on the approach from the east, which could include a road diet to slow traffic and replacement of the wide shoulder with bike lanes and sidewalks. Currently the travel lanes are 12+ feet wide, the east bound shoulder is 6 feet wide and the west bound shoulder is 9 and ½ feet wide. With approximately 40 feet of right away, significant improvements could be made to advance complete streets strategies at this important entrance to the Borough. Other treatments like street trees would create additional signals that traffic has entered a town.

Several ideas in the DOT Complete Streets Design Manual could be added to the intersection to help improve safety and accommodate all users. The distance that has to be covered by pedestrians in the crosswalks could be reduced by curb extensions. The right turn lane and island from the north should be eliminated, forcing all traffic to stop on the red light and preventing cars from rolling into a bike lane. A "No Turn on Red" sign should be added on Maxwell on the approach from the north. A larger curb extension on the NW corner could also include a rain garden to absorb surface water and support a street tree. The curb extension on the SW corner would allow the sidewalk from the west to be extended for the final lot to the corner around the obstacles at that location.

Maxwell south of Franklin to Ward Street should be prioritized for new sidewalks to close an important gap in a continuous sidewalk to Hightstown High School. The most appropriate location appears to be on the east side of Maxwell, where a new sidewalk was installed over the culvert in recent years. There may be a need for a retaining wall along one or more properties to address a large drop in elevation. Very few cars are parked on this block, so a road diet may be possible to obtain more room for a sidewalk and bike lane. To complete the pedestrian route to Hightstown High School, a crosswalk and ramps are needed at Maxwell and Ward Street on the eastern side of Maxwell to allow longer sight lines and safer travel to the existing sidewalk on

the south side of Ward. A sidewalk extension is also required to connect the sidewalk to the new crosswalk on the south side.

NJ Complete Streets Design Guide references:

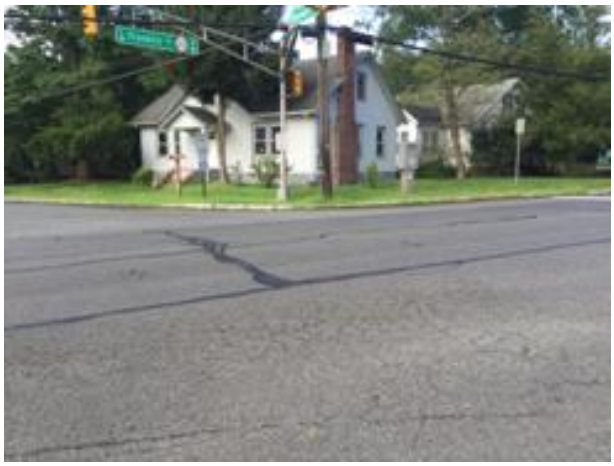
- Crosswalks, pages 42-43
- Signals, page 44
- Curb Ramps, page 45
- Curb Extensions, page 48
- Channelized Right Turn Lane, page 49
- Stormwater Management, page 50

Franklin Street (Route 33) and Maxwell Avenue

Franklin and Maxwell

NW corner

NE corner



SW corner

SE corner

Defects:

Design of right turn lane

Drainage NW corner

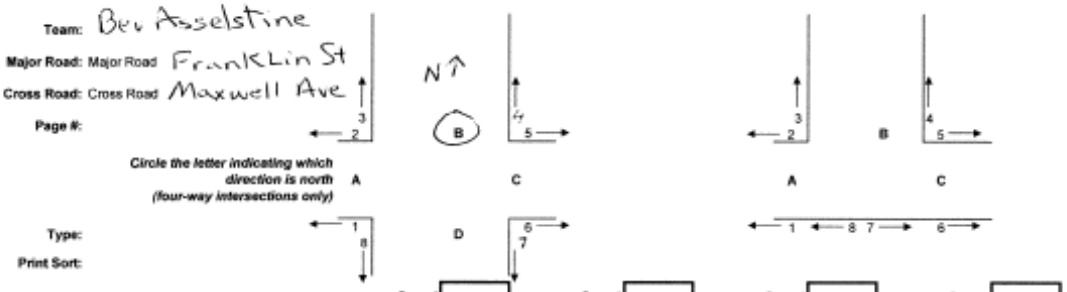
Street damage

Team: Bev Asselstine

Major Road: Major Road Franklin St

Cross Road: Cross Road Maxwell Ave

Page #:



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Start	Incentive to cross? (Crosswalk, curb cut and/or walk signal) *Take photo of intersection road signs*		X				X						X					X			
	If NO INCENTIVE, ALL questions are NA																				
1	Crosswalk Missing?	X						X				X					X				
2	Crosswalk Faded or Low Visibility? **(NA if no Crosswalk)**						X														
3	Crosswalk Road Surface Damaged?							X									X	**			
4	Curb Cut Missing?	X	@ #1				X	@ #4				X	@ 5+6				X	@ 7+8			
5	Curb Cut Slope Dysfunctional? **(NA if no Curb Cut)**							X													
6	Curb Cut Detectable Warnings Missing? **(NA if no Curb Cut)**							X													
7	Curb Cut NOT Flush? **(NA if no Curb Cut)**						X*														
8	Sidewalk Missing? **(NOTE numbers where missing)**	X					X					X					X				
		1					4					5,6					7,8				
9	Sidewalk Blocked? **(NA if no Sidewalk)** **(NOTE numbers where missing)**							X													
10	Sidewalk Narrow (<3 ft)? **(NA if no Sidewalk)** **(NOTE numbers where missing)**							X													
11	Sidewalk Surface Damaged? **(NA if no Sidewalk)** **(NOTE numbers where missing)**							X													
12	Walk Signal Missing?	X					X					X					X				
13	Walk Signal Button Missing? **(NA if no Walk Signal)**																				
14	Walk Signal Non-Functional? **(NA if no Walk Signal)**																				

* Drainage + debris build-up

** Utility cuts and patches

Intersection of Franklin Street (Route 33) and Broad Street

Description

The intersection is located at the eastern entrance to the Downtown Hightstown central business district on a main thoroughfare. It is a T-intersection with Broad Street ending at a stop sign. Franklin Street is a two lane road running east-west and Broad Street is a two lane road running north-south.

Franklin is a major highway and this intersection is in the 25 mph zone. There are existing crosswalks on all three street segments with handicapped ramps with detectable warning surfaces, including two across Franklin Street. There are high visibility crosswalk signs, but no signals to help stop traffic for pedestrians. Crosswalk paint is faded.

From this point westward, bicycle riders are not allowed on the street or sidewalks. There is a sign on the eastbound side of Franklin indicating a bicycle route is to the north down Broad Street.

Analysis

There is heavy traffic in this area. There are also many destinations to attract pedestrians. The library is on the south side of the intersection. There is a commuter bus stop at Memorial Park near the library. Just to the east of the library is an active driveway hidden by the curve of the road and plant material (bushes and trees).

To the north is a shopping center with many take-out restaurants and a convenience store. The only route to access the shopping center from the west is to turn left onto Broad and enter through the side driveway. Cars traveling west can enter through Broad Street or a parking lot entrance to the west of the intersection from Franklin Street.

Traffic on Franklin is heavy heading west and often backed up to this intersection by the traffic light at Main Street. Traffic on Franklin heading east picks up speed after having passed through the traffic light at Main Street. Frequent turns and distractions in the area create a hazardous situation for pedestrians trying to navigate through the traffic across Franklin.

Recommendations

Tree branches currently obscure the crosswalk signs from the western approach. They should be trimmed back.

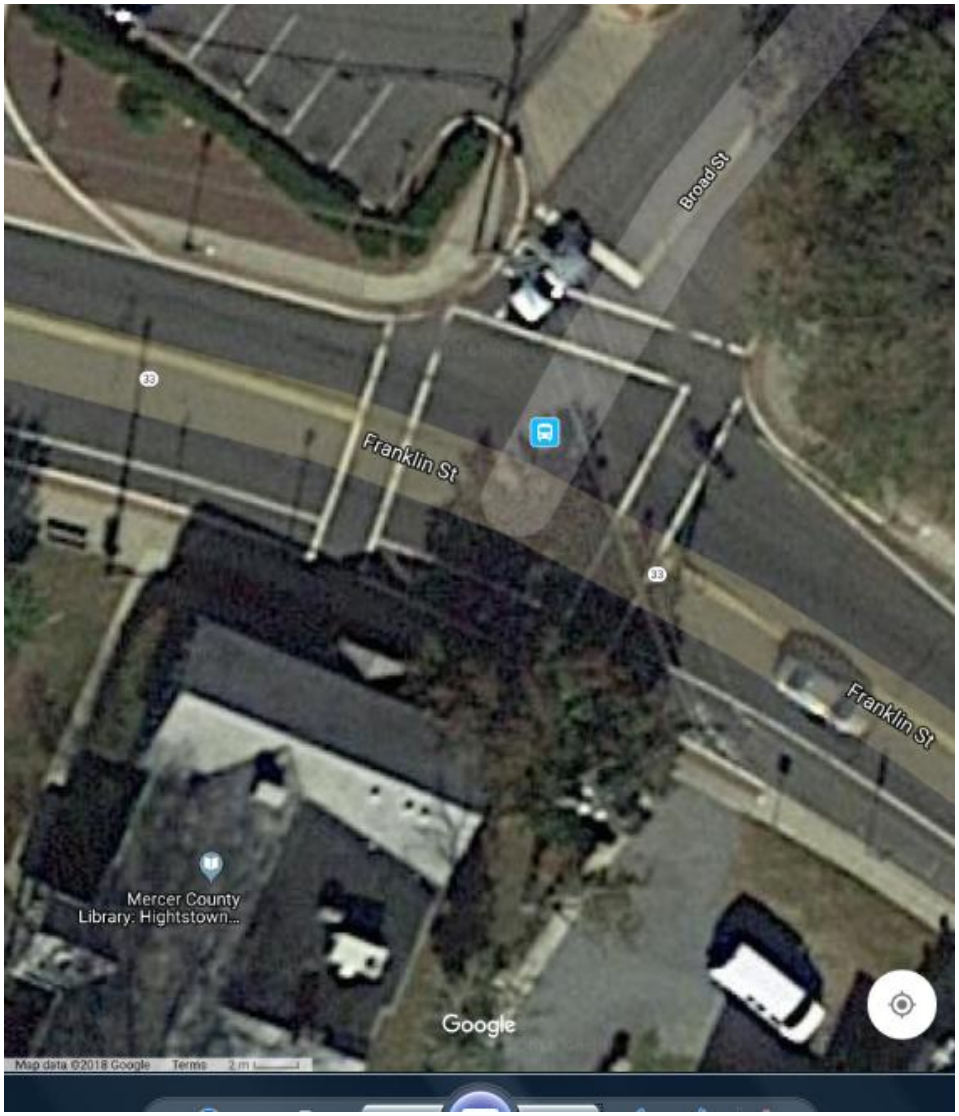
Hawk or RRFB signals should be installed at the two crosswalks across Franklin Street in order to allow pedestrians to stop traffic. Currently it is a challenge to navigate two fast moving lanes of traffic at a bend in the road in order to get the attention of drivers and get them to stop.

Elevated crosswalks would provide additional indications to traffic to slow down. Crosswalks should be repainted with high visibility continental stripes.

NJ Complete Streets Design Guide references:

- Crosswalks, pages 42-43
- Rectangular Rapid Flashing Beacons, page 46
- Pedestrian Hybrid Beacons (HAWK), page 47
- Raised Crossings and Intersections, page 53

Franklin Street (Route 33) and Broad Street



Franklin and Broad

NW corner

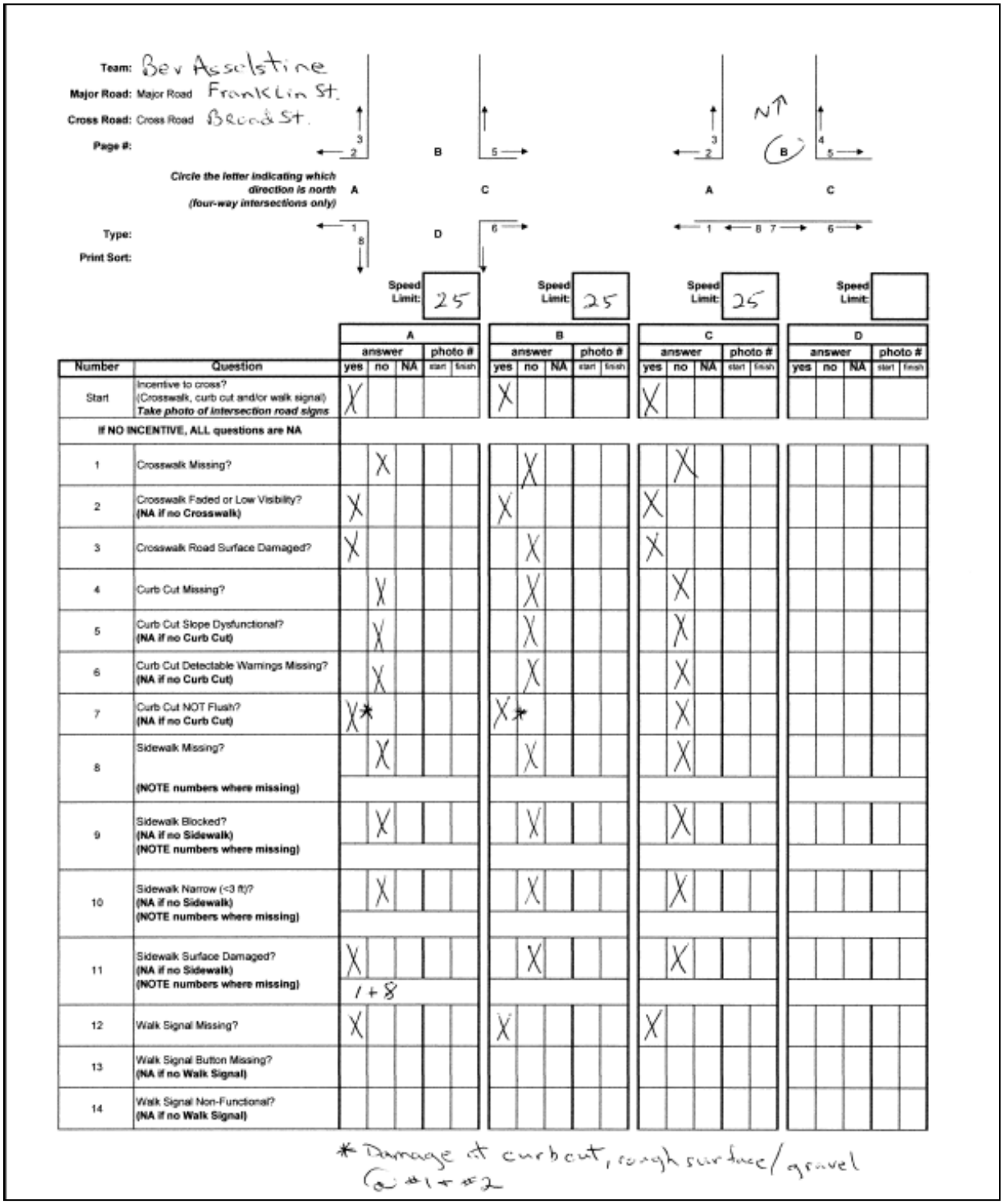
NE corner

SW corner

SE corner

Defects

NW corner ramp, drainage SW ramp and sidewalk



Team: Bev Asselstine
Major Road: Major Road Franklin St.
Cross Road: Cross Road Broad St.
Page #:

Circle the letter indicating which direction is north (four-way intersections only)

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Print Sort:

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		A					B					C					D				
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Number	Question	yes	no	NA	start	finish	yes	no	NA	start	finish	yes	no	NA	start	finish	yes	no	NA	start	finish
Start	Incentive to cross? (Crosswalk, curb cut and/or walk signal) *Take photo of intersection road signs*	X					X					X									
	If NO INCENTIVE, ALL questions are NA																				
1	Crosswalk Missing?		X					X					X								
2	Crosswalk Faded or Low Visibility? **(NA if no Crosswalk)**	X					X					X									
3	Crosswalk Road Surface Damaged?	X						X				X									
4	Curb Cut Missing?		X					X					X								
5	Curb Cut Slope Dysfunctional? **(NA if no Curb Cut)**		X					X					X								
6	Curb Cut Detectable Warnings Missing? **(NA if no Curb Cut)**		X					X					X								
7	Curb Cut NOT Flush? **(NA if no Curb Cut)**	X*					X*						X								
8	Sidewalk Missing? **(NOTE numbers where missing)**		X					X					X								
9	Sidewalk Blocked? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
10	Sidewalk Narrow (<3 ft)? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
11	Sidewalk Surface Damaged? **(NA if no Sidewalk)** **(NOTE numbers where missing)**	X						X					X								
		1 + 8																			
12	Walk Signal Missing?	X					X					X									
13	Walk Signal Button Missing? **(NA if no Walk Signal)**																				
14	Walk Signal Non-Functional? **(NA if no Walk Signal)**																				

* Damage at curbcut, rough surface/gravel @ #1 + #2

Intersection of North Main Street (County Route 539) and Monmouth Street (County Route 633)

Description

The intersection is located to the north of the Downtown Hightstown central business district on a main thoroughfare. It is a T-intersection with Monmouth Street ending at a stop sign. North Main Street is a two lane road running north-south and Monmouth Street is a two lane road running east-west.

North Main is a busy county route and this intersection is in the 25 mph zone. Monmouth Street is also a county route and carries heavy traffic through a residential area. There is one existing crosswalk across Monmouth Street with damaged handicapped ramps. The sidewalks are in poor condition. Crosswalk paint is faded.

Monmouth was recently repaved by Mercer County. The stop line at North Main Street was repainted, but work stopped short of the crosswalk. Work in recent years on North Main Street by Mercer County stopped short of the crosswalk as well, leaving it unaddressed despite a county level complete streets policy.

Analysis

There is heavy traffic in this area. Monmouth is used to bypass traffic in the downtown area. There are many people turning right onto North Main and many others turning left off of North Main onto Monmouth. Traffic moves faster than the speed limit. Site lines are blocked by parked cars on North Main Street.

The only crosswalk to safely travel across North Main Street is at the intersection with Franklin Street in downtown.

The signage along Monmouth is old and faded. It's difficult to determine what signs mean, although some may indicate no parking in the block before the intersection.

Recommendations

A new crosswalk should be added across North Main Street from the southeast corner. A curb cut should be installed on the West side of North Main and no parking signs installed for at least two car lengths in the area to give more visibility to pedestrians attempting to cross the road.

High visibility crosswalk signs should be installed, along with high visibility paint markings (continental stripe).

Existing handicap ramps should be brought up to standard.

New signage should be installed on Monmouth, as appropriate, to replace existing faded signs.

NJ Complete Streets Design Guide references:

- Crosswalks, pages 42-43
- Curb Ramps, page 45

North Main Street (County Route 539) and Monmouth Street (County Route 633)

North Main and Monmouth

NE corner

SE corner

Defects

Ramp damage, SE corner

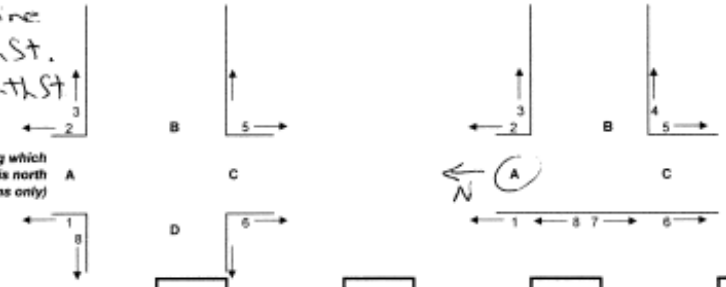
No safe passage to West side of North Main

Team: Bev Asselstine

Major Road: Major Road North Main St.

Cross Road: Cross Road Monmouth St

Page #:



Circle the letter indicating which direction is north (four-way intersections only)

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Start	Incentive to cross? (Crosswalk, curb cut and/or walk signal) *Take photo of intersection road signs*		X				X						X								
	If NO INCENTIVE, ALL questions are NA																				
1	Crosswalk Missing?	X						X				X									
2	Crosswalk Faded or Low Visibility? **(NA if no Crosswalk)**						X														
3	Crosswalk Road Surface Damaged?							X													
4	Curb Cut Missing?							X													
5	Curb Cut Slope Dysfunctional? **(NA if no Curb Cut)**						X														
6	Curb Cut Detectable Warnings Missing? **(NA if no Curb Cut)**						X														
7	Curb Cut NOT Flush? **(NA if no Curb Cut)**						X*														
8	Sidewalk Missing? **(NOTE numbers where missing)**		X					X					X								
9	Sidewalk Blocked? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
10	Sidewalk Narrow (<3 ft)? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
11	Sidewalk Surface Damaged? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
12	Walk Signal Missing?	X					X					X									
13	Walk Signal Button Missing? **(NA if no Walk Signal)**																				
14	Walk Signal Non-Functional? **(NA if no Walk Signal)**																				

* damage

Intersection of South Main Street (County Route 539) and Etra Road (County Route 571)

Description

The intersection is located between the Hightstown central business district and Hightstown High School. This is a residential area. The Peddie School is located on the northeast corner of the intersection.

South Main Street (County Route 539) runs roughly north-south. Etra Road (County Route 571) intersects South Main Street at an approximately 60 degree angle, extending to the east only, creating a "T" intersection. The single crosswalk at the intersection crossing Etra Road is supported by curb ramps on both ends. Both streets support two-way vehicular traffic. Vehicular traffic must stop on Etra before turning onto South Main Street. There is no stop sign on South Main Street for either direction.

There are curbs and sidewalks in good condition on both roads at this intersection. There are no marked bicycle routes along ether road. The crosswalk markings are standard parallel lines, but there are no signs or warning lights. There is no detectable warning surface at the curb ramps.

This is one of five staggered T-intersections between Ward Street and the Borough line along South Main Street. None have crosswalks. They are, from north to south: South Street, Etra Road, Springcrest Drive, Schuyler Avenue and Leshin Lane.

Analysis

There is no marked pedestrian crossing at South Main Street at this intersection. The nearest marked crossing of South Main Street is 3/10 mile to the north at Ward Street, a four-way stop intersection. This forces pedestrians to cross outside of a crosswalk, or select an inefficient route. This is a major route to Hightstown High School and students are in danger from heavy morning traffic as they navigate across South Main Street.

The angle of the intersection of Etra Road with South Main Street results in poor sight lines and makes it difficult for cars attempting to make a left turn onto South Main from Etra.

South Main Street traffic is consistent and frequently faster moving than the 25 MPH speed limit might suggest. There are no traffic calming measures in place on South Main Street from the south prior to this intersection. Traffic coming into Hightstown from the east on Etra Road also tends to exceed the speed limit. However, recent work in that area has added a continental stripe crosswalk and flashing cross-walk beacon at John Plant Drive, as well as right side paint to narrow the lanes and calm traffic as it approaches this heavily used pedestrian and bike area.

Recommendations

There are three primary recommendations:

1. Provide a crosswalk with continental stripes at the north side of this intersection across South Main Street with ramp connecting to the sidewalk on the west side of South Main,

2. Warn traffic heading into the intersection of the pedestrian crossings using high visibility signage and/or warning lights, and
3. Provide bicycle pathways along both routes. Additionally, detectable warning surfaces should be added to the existing curb ramps and included in any new ramps.

NJ Complete Streets Design Guide references:

- Crosswalks, pages 42-43
- Curb Ramps, page 45
- Rectangular Rapid Flashing Beacons, page 46
- Bike Lanes, page 55

South Main Street (County Route 539) and Etra Road (County Route 571)

View of Etra Road at South Main Street

View looking North along South Main Street (Etra Road is to the right)

View Looking south along South Main Street (Etra Road is to the left)

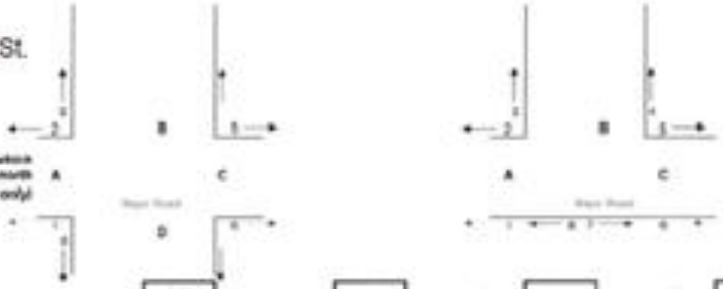
Team: Zaiser

Major Road: Major Road South Main St.

Cross Road: Cross Road Etra Rd.

Page #:

Circle the letter indicating which direction is north (four-way intersections only)



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Start	Incentive to cross? (Crosswalk, curb cut and/or walk signal) **Take photo of intersection road signs**		X			X					X						
	A NO INCENTIVE, ALL questions are NA																
1	Crosswalk Missing?	X					X			X							
2	Crosswalk Faded or Low Visibility? **(NA if no Crosswalk)**			X		X						X					
3	Crosswalk Road Surface Damaged?		X				X				X						
4	Curb Cut Missing?	X					X			X							
5	Curb Cut Slope Dysfunctional? **(NA if no Curb Cut)**		X			X					X						
6	Curb Cut Detectable Warnings Missing? **(NA if no Curb Cut)**		X			X					X						
7	Curb Cut NOT Flush? **(NA if no Curb Cut)**		X				X				X						
8	Sidewalk Missing? **(NOTE numbers where missing)**		X				X				X						
9	Sidewalk Blocked? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X				X				X						
10	Sidewalk Narrow (<3 ft)? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X				X				X						
11	Sidewalk Surface Damaged? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X				X				X						
12	Walk Signal Missing?	X				X				X							
13	Walk Signal Button Missing? **(NA if no Walk Signal)**		X				X				X						
14	Walk Signal Non-Functional? **(NA if no Walk Signal)**		X				X				X						

Downtown Hightstown Walk Audit 11/29/18

Intersection: Etra at South Main Street Segment: _____

Overall Ratings Place a check mark in one column for each area	Excellent	Good	Fair	Poor
Crossing Streets and Intersections			X	
Sidewalks	X			
Driver Behavior			X	
Safety			X	
Comfort and Appeal for Pedestrians			X	
Comfort and Appeal for Bicyclists			X	

Ratings: Excellent: Very pedestrian/bicycle-friendly and safe Good: Moderately pedestrian/bicycle-friendly and safe
Fair: Somewhat pedestrian/bicycle-friendly and safe Poor: Not pedestrian/bicycle-friendly or safe

Attribute	Notes
Crosswalk Not Marked, Faded or Low Visibility (circle)	No crosswalk at S. Main; Etra crosswalk faded
Crosswalk Road Surface Damaged? Road Damaged? (describe)	Road surface in good condition
Curb Cut Missing, Slope Dysfunctional, Detectable Warnings Missing, Not Flush? (circle)	No detectable warnings at curb cuts, no crosswalk or curb cuts at S. Main.
Sidewalk Missing, Blocked, Narrow, Surface Damaged? (circle)	All sidewalks in good condition
Walk Signal Missing, Button Missing, Non-Functional, Inaccessible or Obstructed, Wait Time, Length of Time to Cross? (circle)	No walk signals
Pedestrian Sign Missing, Obstructed, Low Visibility? (circle)	No pedestrian crossing signs
Sight Lines Blocked (describe)	Sight lines difficult from Etra to South on South Main.
Buffer Between Traffic and Pedestrians? Bicyclists?	No bicycle paths
Drivers Speeding, Obeying Traffic Signals/Stop Signs, Yielding to Pedestrians, Bicyclists, Distracted/On Cell Phone? (circle)	Traffic tends to exceed speed limit on both roads.

Overall comments or significant challenges:

Bicycle safety: Creation of bicycle lanes on both roadways would greatly improve bicycle safety.
Pedestrian Safety: Crossing at Etra would be improved by addition of detectable warning surfaces, improved crosswalk paint. Creation of a new crosswalk across S. Main would greatly improve pedestrian safety and overall convenience. New crosswalk should be combined with warning signal.

Intersection of South Main Street (County Route 539) and Springcrest Drive

Description

The Intersection of South Main and Springcrest is a non-signaled T-intersection. South Main is a heavily traveled County Road (County Route 539) with a Speed Limit of 25 mph. However traffic generally exceeds this limit. Springcrest is a walking route to Hightstown High School.

There is a marked standard crosswalk with parallel lines and curb cuts across Springcrest. One side is missing the detectable warning. There are sidewalks in the immediate vicinity on both sides of South Main Street but there are no sidewalks on either side of Springcrest. There is no crosswalk signage.

This is one of five staggered T-intersections between Ward Street and the Borough line along South Main Street. None have crosswalks. They are, from north to south: South Street, Etra Road, Springcrest Drive, Schuyler Avenue and Leshin Lane.

Analysis

The nearest marked crosswalk across South Main is at the intersection of Ward Street at a four-way stop. This is 4/10 of a mile away. There is poor lighting and poor sight triangles which make the intersection dangerous to pedestrians especially at night. According to the police chief, the lack of sidewalks on Springcrest would prevent the county from allowing a marked crosswalk to be provided across South Main. Since South Main Street is a county road, all improvements are subject to county approval.

Recommendations

The following are immediate recommendations:

1. Restripe the existing crosswalk with continental type striping for better visibility.
2. Install a street lamp at the intersection.

Longer term recommendations:

1. A sidewalk should be constructed along the entire length of Springcrest in order to provide a safe walking route to the High School. If there is a grant funding program available for this type of work an application should be made. If not, the Borough should undertake this project on its own as part of its capital plan, since it is a local road.
2. Provide curb cuts and detectable warning strips at the sidewalks on South Main Street where the new sidewalk on Springcrest will be provided.
3. Request that the county provide a marked continental stripe crosswalk and signage with blinking warning lights.
4. Request that the county provide a traffic calming device such as a road narrowing or island.

5. Fill in the missing gaps of sidewalk on the east side of Main Street in this vicinity (3 lots between Springcrest and Schuyler and 4 lots between Schuyler and the Peddie Golf Course.

NJ Complete Streets Design Guide references:

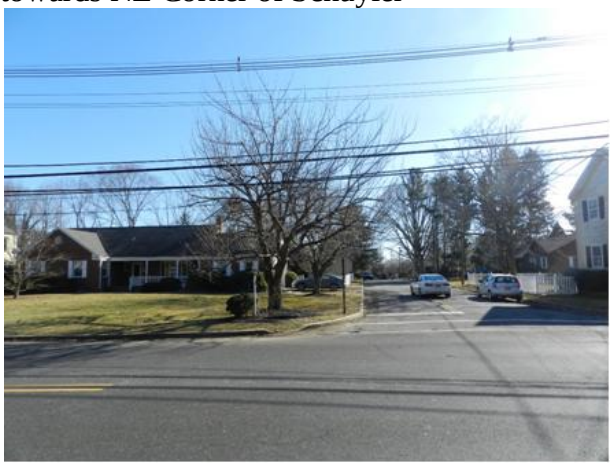
- Crosswalks, pages 42-43
- Curb Ramps, page 45

South Main Street (County Route 539) and Springcrest Drive

NW Corner at Springcrest facing across South Main

NW Corner at Springcrest looking South down South Main Street

West side of South Main looking towards NE Corner of Schuyler



West side of South Main looking towards SE Corner of Schuyler

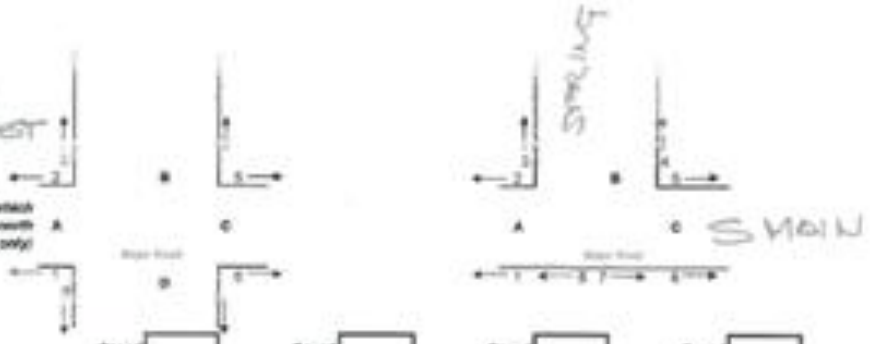
Town:

Major Road: Major Road S. MAIN

Cross Road: Cross Road SPRUCE ST

Page #:

Circle the letter indicating which direction is north (Four-way intersections only)



Type:

Print Sort:

		A					B					C					D				
		Speed Limit:					Speed Limit:					Speed Limit:					Speed Limit:				
		answer			photo #		answer			photo #		answer			photo #		answer			photo #	
Number	Question	yes	no	NA	out	back	yes	no	NA	out	back	yes	no	NA	out	back	yes	no	NA	out	back
Start	Intending to cross? (Crosswalk, curb cut and/or walk signal) *Take photo of intersection round signs*		X				X						X								
	IF NO INCENTIVE, ALL questions are NA																				
1	Crosswalk Missing?	X						X				X									
2	Crosswalk Faded or Low Visibility? **(NA if no Crosswalk)**			X			X							X							
3	Crosswalk Road Surface Damaged?			X				X						X							
4	Curb Cut Missing?	X						X				X									
5	Curb Cut Slope Dysfunctional? **(NA if no Curb Cut)**			X				X						X							
6	Curb Cut Detectable Warnings Missing? **(NA if no Curb Cut)**			X			X							X							
7	Curb Cut NOT Flush? **(NA if no Curb Cut)**			X				2						X							
8	Sidewalk Missing? **(NOTE numbers where missing)**		X				X						X								
							3, 4														
9	Sidewalk Blocked? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
10	Sidewalk Narrow (<3 ft)? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		2					X					X								
11	Sidewalk Surface Damaged? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
12	Walk Signal Missing?	X					X					X									
13	Walk Signal Button Missing? **(NA if no Walk Signal)**			X				X						X							
14	Walk Signal Non-Functional? **(NA if no Walk Signal)**			X				X						X							

Intersection of South Main Street (County Route 539) and Leshin Lane

Description

The Intersection of South Main and Leshin Lane is a non-signaled T-intersection. South Main is a heavily traveled County Road (Route 539) with a Speed Limit of 25 mph. However traffic generally exceeds this limit. Leshin Lane is a pedestrian and vehicle route to Hightstown High School.

There is a marked crosswalk with detectable warning and curb cuts across Leshin Lane. There are sidewalks on the west side of the intersection on South Main, but not on the east side in the immediate location. There is no crosswalk signage. Leshin Lane is a major bus exit from the high school in the afternoon.

This is one of five staggered T-intersections between Ward Street and the Borough line along South Main Street. None have crosswalks. They are, from north to south: South Street, Etra Road, Springcrest Drive, Schuyler Avenue and Leshin Lane.

Analysis

The nearest marked crosswalk across South Main is at the intersection of Ward Street at a four-way stop. This is 6/10 of a mile away. According to the police chief, the lack of sidewalks on South Main would prevent the county from allowing a marked crosswalk to be provided across South Main. Since South Main Street is a county road, all improvements are subject to county approval.

Recommendations

Short term recommendation:

1. Restripe existing crosswalk with continental stripping.

Longer term recommendations:

1. Fill in the missing gaps of sidewalk on the east side of Main Street in this vicinity (3 lots between Springcrest and Schuyler and 4 lots between Schuyler and the Peddie Golf Course.
2. Provide curb cuts and detectable warning strips at the new sidewalks on South Main Street across from Leshin Lane.
3. Request that the county provide a marked crosswalk with continental stripes and signage with blinking warning lights.
4. Request that the county provide a traffic calming device such as a road narrowing or island.
5. Consider a bike lane on South Main Street and a bike route on Leshin Lane.

NJ Complete Streets Design Guide references:

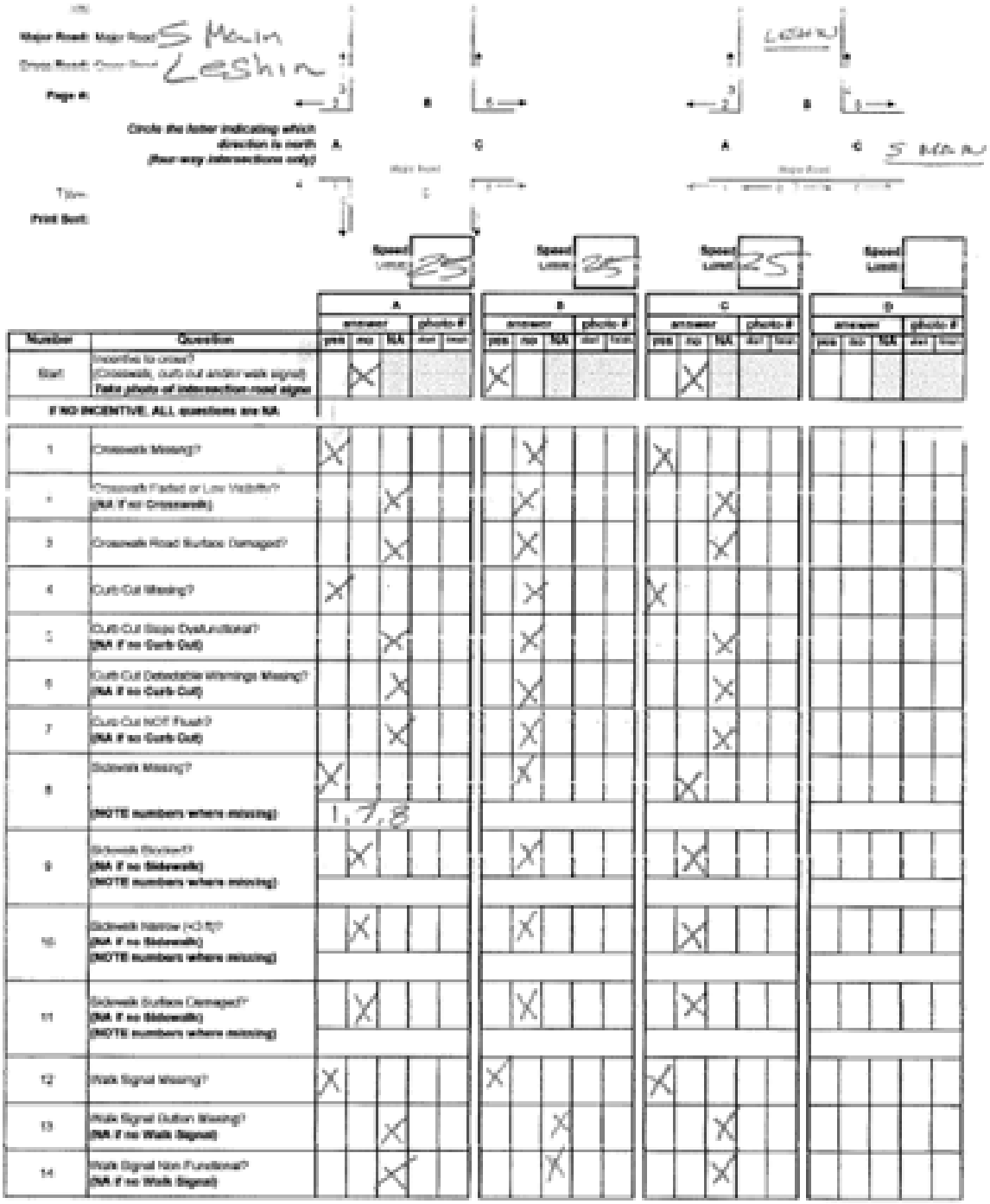
- Crosswalks, pages 42-43
- Curb Ramps, page 45
- Bike Lanes, page 55

South Main Street (County Route 539) and Leshin Lane

SW Corner of Leshin Lane, looking across South Main.

Looking Towards NW Corner of Leshin Lane from SW Corner

NW Corner of Leshin Lane looking across South Main Street.


Major Road: S Main
Cross Road: Leshin
Page #:
Circle the letter indicating which direction is north (four-way intersections only)
Town:
Print Sort:
Speed Limit: 25
Speed Limit: 25
Speed Limit: 25
Speed Limit:
A
B
C
D
answers
photo #
Number
Question
yes
no
N/A
Start
Incentive to cross? (Crosswalk, curb cut and/or walk signal) Take photo of intersection road signs
If NO INCENTIVE, ALL questions are NA
1
Crosswalk Missing?
2
Crosswalk Faded or Low Visibility? (NA if no Crosswalk)
3
Crosswalk Road Surface Damaged?
4
Curb Cut Missing?
5
Curb Cut Slope Dysfunctional? (NA if no Curb Cut)
6
Curb Cut Detectable Warnings Missing? (NA if no Curb Cut)
7
Curb Cut NOT Flush? (NA if no Curb Cut)
8
Sidewalk Missing? (NOTE numbers where missing)
1, 7, 8
9
Sidewalk Blocked? (NA if no Sidewalk) (NOTE numbers where missing)
10
Sidewalk Narrow (<3 ft)? (NA if no Sidewalk) (NOTE numbers where missing)
11
Sidewalk Surface Damaged? (NA if no Sidewalk) (NOTE numbers where missing)
12
Walk Signal Missing?
13
Walk Signal Button Missing? (NA if no Walk Signal)
14
Walk Signal Non Functional? (NA if no Walk Signal)

Intersection: Mercer Street (State Route 33) and Grape Run Drive

Description

The Intersection of Mercer Street and Grape Run is a non-signaled T-intersection. Mercer Street is a heavily traveled State Highway (Route 33) with a Speed Limit of 35 mph. However traffic generally exceeds this limit. Mercer Street consists of one lane in each direction but it is wide enough for two cars to pass in each direction. There are no lane markings other than the solid double line down the center. Grape Run leads to a residential area and is a primary access route to Hightstown High School, including buses, staff and student drivers. There is a gas station / convenience store on the northeast corner, which drives heavy traffic into and out of the parking lot from both Mercer and Grape Run during times when there is heavy traffic accessing or leaving the high school. The intersection is in a school zone.

There are marked standard crosswalks, curb cuts, detectable warnings and sidewalks at all corners of the intersection. All are in good condition. Crosswalk signage is provided in both directions on Mercer Street. There is no crossing guard at this intersection during school travel times.

Analysis

Due to the heavy volume of traffic, the speed of traffic and the excessive width of Mercer Street, crossing Mercer Street for pedestrians is unsafe even though the crosswalk is relatively well marked. There have been numerous vehicle/pedestrian accidents at this location. In some instances, traffic in one direction will yield while traffic in the other direction does not, thereby stranding the pedestrian in the middle of the street. In other instances, a vehicle may yield and the vehicle behind it will go around the stopped vehicle on the right, creating a blind spot for pedestrians in the crosswalk. There are additional stripes on the road starting at the end of the cemetery adjacent to this intersection and extending to the Borough line to the south. This narrows the lanes in that area, but has no impact on frequent right-side passing at the intersection itself.

The speed limit on Mercer is 45 at the Borough line, heading north. It steps down to 35 mph at Summit Street, which is 1/10 of a mile from the intersection. It steps down again to 25 mph 1/10 of a mile after the intersection, in the middle of a residential block. Since this is a school zone, the speed limit is 25 mph during school travel times.

Since this is a state highway, any improvements are subject to approval by the NJDOT.

Recommendations

The following are immediate recommendations:

1) Restripe the crosswalk with continental type striping for better visibility.

2) Install pedestrian crossing signage with blinking warning lights on Mercer Street.
3) Extend the shoulder striping on Mercer Street, past the intersection to clearly indicate that Mercer Street is one lane in each direction.
4) Reduce the Speed Limit to 25 mph all the time, starting at Summit Street. Step down to 35 mph at the Borough line to create a better glide path to slower traffic speeds.

Long Term Recommendations:

Efforts should be made, (possibly through DVRPC grant funding), to improve the overall streetscape along this portion of Mercer Street. The improvements should create a stronger connection to the downtown towards the East and to Summit Street towards the West. As part of this streetscape improvement, traffic calming measures should be taken such as narrowing the street and shortening the length of the crosswalk by incorporating a center island, curb extensions and/or widening the sidewalks to create a pinch point in the road.

Aesthetic improvements are also needed, such as adding trees, decorative street lamps, decorative median and decorative pavers, so that the overall appearance is that of a town center and not a state highway. DOT Complete Street guidelines should be followed.

NJ Complete Streets Design Guide references:

- Crosswalks, pages 42-43
- Rectangular Rapid Flashing Beacons, page 46
- Crossing Islands, page 51-52

Mercer Street (State Route 33) and Grape Run Drive

West side of Mercer Street, facing north

West side of Mercer Street, facing south

East side of Mercer Street, facing south

Grape Run, facing West

Team:

Major Road: Major Road Mercer St

Cross Road: Cross Road GRAVES RUN

Page #:

Circle the letter indicating which direction is north (Non-way intersections only)

Type:

Front Sort:

		A					B					C					D				
		Speed Limit: 35					Speed Limit: 25					Speed Limit: 35					Speed Limit:				
		answer			photo #		answer			photo #		answer			photo #		answer			photo #	
Number	Question	yes	no	NA	dist	trans	yes	no	NA	dist	trans	yes	no	NA	dist	trans	yes	no	NA	dist	trans
Start	Incentive to cross? (Crosswalk, curb cut and/or walk signal) **Take photo of intersection road signs**	X					X					X									
IF NO INCENTIVE, ALL questions are NA																					
1	Crosswalk Missing?		X					X					X								
2	Crosswalk Faded or Low Visibility? **(NA if no Crosswalk)**	X					X					X									
3	Crosswalk Road Surface Damaged?		X					X					X								
4	Curb Cut Missing?		X					X					X								
5	Curb Cut Slope Dysfunctional? **(NA if no Curb Cut)**		X					X					X								
6	Curb Cut Detectable Warnings Missing? **(NA if no Curb Cut)**		X				X					X									
7	Curb Cut NOT Flush? **(NA if no Curb Cut)**		X					X					X								
8	Sidewalk Missing? **(NOTE numbers where missing)**		X					X					X								
9	Sidewalk Blocked? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
10	Sidewalk Narrow (<3 ft)? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
11	Sidewalk Surface Damaged? **(NA if no Sidewalk)** **(NOTE numbers where missing)**		X					X					X								
12	Walk Signal Missing?	X					X					X									
13	Walk Signal Button Missing? **(NA if no Walk Signal)**			X					X					X							
14	Walk Signal Non-Functional? **(NA if no Walk Signal)**			X					X					X							

Intersection of Stockton Street (County Route 571), Harron Avenue and Oak Lane and adjacent Intersection of Harron Avenue and Dutchneck Road

Description

The intersection is located east of the Route 130 corridor, in front of the Walter C. Black Elementary School and the East Windsor Regional School District building. The Rogers Elementary School surrounds the school district building and fronts on Stockton Street to the east and Oak Lane to the north. The speed limit is 25 mph on all streets in this area.

Stockton Street runs east-west. Harron Avenue and Oak Lane intersect Stockton Street at nearly 90-degree angles. Dutchneck Road intersects Harron Avenue just south of the intersection of Stockton Street and Harron Avenue, creating an awkward five point intersection overall. All streets mentioned support two-way vehicular traffic. Stockton Street has the right-of-way and no stop signs at the intersection. All other roads have stop signs at the intersection. There are sidewalks on both sides of Stockton Street. There are sidewalks only on the east sides of Harron Avenue and Oak Lane. Dutchneck Road has no sidewalks.

There are three crosswalks. One continental stripe crosswalk is on the east across Stockton Street. A faded crosswalk warning sign is on Stockton on the approach from the east. Standard crosswalks are across Oak Lane and Harron Avenue at Stockton. Dutchneck Road has no crosswalk.

There is a marked left turn lane on Stockton from the east. There are stop lines painted on Dutchneck at Harron and on Oak Lane at Stockton and on Harron at Stockton. There is a crosshatch pavement marking at Dutchneck, which tries to channel the Stockton traffic onto Dutchneck and the Dutchneck traffic onto Harron. Similarly, there are short stretches of faded double yellow lines down Dutchneck and Oak Lane to guide traffic to stay in lanes.

There are numerous speed limit signs along Stockton Street of various sizes. There are many other types of signs as well that can be distracting. An end of school zone sign is located on the south side of Stockton past the Black School, but before the bus driveway along the Rogers School across the street on the north side of Stockton.

Analysis

Crossing any of these roads at the intersection is not easy. There are no electronic pedestrian "Walk" lights to stop traffic for pedestrian crossing. During the school year, crosswalk guards stop traffic to get kids safely across the streets to Walter C. Black and Grace Rogers elementary schools in the immediate vicinity to the intersection. This school year a new well marked continental crosswalk across Stockton has been added one block to the east at Joseph Street in an

attempt to avoid the larger intersection altogether for children. The crossing guard has now moved to this location.

The intersection of Dutchneck Road and Harron Avenue is poorly designed. Cars routinely cut off access to Harron Avenue for traffic turning right onto Harron from Stockton Street. Visibility is very limited for cars stopped at the end of Dutchneck trying to turn left or right onto Harron. Pedestrians using the crosswalks at the intersection of Stockton Street and Harron Avenue have long distances to cover to get safely through the intersection and have to deal with cars moving at speed turning off Stockton onto either Harron Avenue or Dutchneck road. This whole area needs to be re-worked to address the needs of cars, pedestrians and bicycles.

All streets have 25 mph speed limits, but motorists frequently exceed this speed limit.

Recommendations

Have crosswalks marked out with continental stripes across all streets at the intersection, including the west side of Stockton Street which currently has no crosswalk.

Use of warning lights in the crosswalks will alert motorists and slow / stop the cars for safe pedestrian crossing.

Study the feasibility of adding a roundabout to reduce the width of roadway pedestrians have to cross, slow traffic, but keep it moving in an efficient way.

Change Harron to a one-way street from Morrison north to Stockton, eliminating one of the turn points.

Review signage in the area to ensure consistency and improved visibility for speed limits, school zones and pedestrian warnings.

NJ Complete Streets Design Guide references:

- Crosswalks, pages 42-43
- Curb Ramps, page 45
- Rectangular Rapid Flashing Beacons, page 46
- Roundabout, page 56-57

Stockton Street (County Route 571), Harron Avenue, Oak Lane and Dutchneck Road

Stockton Street crosswalk, facing north

Stockton Street crosswalk, facing south

Harron Avenue at Dutchneck, facing west

Harron Avenue at Dutchneck, facing south

Dutchnectk and Stockton, facing west

Harron Avenue, approaching Stockton
(Black School parking lot entrance)

Harron Avenue at Dutchneck, facing south

Stockton, south side bus stop

Stockton, facing east, new crosswalk

Stockton Street, new crosswalk sign

Oak Lane crosswalk, facing east

Oak Lane crosswalk, facing west

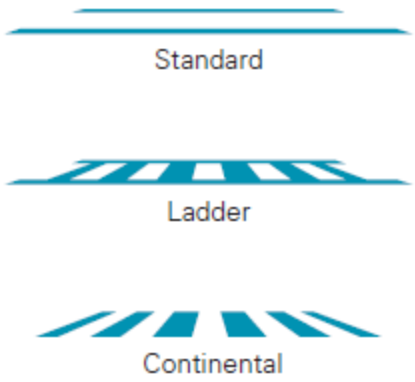
Recommendation references from NJ Complete Streets Design Guide

Crosswalk Design

Marked crossings are a critical component of a Complete Street. Crosswalks delineate a clear path for pedestrians, connecting sidewalk segments to create a complete pedestrian network and a more walkable environment. Effective crosswalk striping improves pedestrian safety, enhances visibility of the crossing to motorists, improves motorist awareness and creates an expectation of potential pedestrian activity, and indicates to pedestrians a preferred crossing location.

Striping design can significantly impact the visibility of a crosswalk. Transverse striping, typically a pair of parallel lines oriented perpendicular to the driver, has a very limited visual profile to motorists. Conversely, longitudinal striping (often referred to as "continental" striping) is oriented parallel to motor vehicle travel, which significantly improves the visibility of the crossing to motorists. On low volume and low speed roadways, crosswalk striping alone is often sufficient. However, on higher volume and higher speed roadways, additional pedestrian treatments are recommended to enhance the crossing and supplement crosswalk striping.

Types of Crosswalk Designs



Standard crosswalk striping, shown at top, often has very poor visibility to motorists, particularly on higher-speed roadways or where the striping has faded. Ladder or Continental striping is preferable in most situations because it significantly improves the visibility of the crossing to motorists and maintains this visibility better as it ages.

Design Guidance

- Crosswalks should typically be marked at all crossings of a signalized intersection. Crosswalk placement should also consider other aspects of the intersection design, such as signal phasing and sight lines.
- At uncontrolled crossings and mid-block locations, a crosswalk alone should not be used on streets with:
  - Vehicle speeds greater than 40 mph
  - Four or more lanes without a raised median or pedestrian refugee island and an average daily traffic (ADT) of 12,000 or greater
  - Four or more lanes with a raised median or pedestrian refugee island and an ADT of 15,000 or greater

  On these roadways, additional supplemental design tools should be used to enhance the visibility of the crossing, improve pedestrian safety, and/or slow vehicular traffic.
- On streets with low volumes (ADT less than 3,000), low speeds (less than 20 mph), and few lanes (1 or 2 lanes), crosswalks may not always be necessary at uncontrolled intersections. They should, however, be provided at major pedestrian destinations, such as schools, parks, transit stops, and major public buildings.
- Crosswalks should be marked to create the shortest pedestrian crossing distance, but also consider pedestrians desire lines. This is particularly an issue at skewed intersections.
- Crosswalk design should reflect the street context. High-visibility striping should be used to enhance pedestrian crossings and is preferable on crossings with significant pedestrian activity, crossings that provide access to major destinations (e.g., walking routes to schools and transit stops), and at mid-block locations.
- Transverse crosswalks must be a minimum of 6 feet wide (measured as the gap between the parallel lines). Crosswalks should be at least as wide as the paths they are connecting. This enables pedestrians moving in opposite directions to comfortably pass each other.
- Stop bars should be placed a minimum of 4 feet from the edge of a crosswalk. A larger buffer is preferred to create a more welcoming pedestrian environment.

Further Guidance

- NCHRP Report 600 *Human Factors Guidelines for Road Systems*

Signage

MUTCD guidance should be followed for signs. Signs should not be placed within the pedestrian zone. For font recommendations, the MUTCD references the Standard Alphabets for Highway Signs and Pavement Markings, which permits a series of six letter types on signs. ADAAG Section 4.30 also provides guidelines for signage. ADAAG specifications are targeted at indoor facilities and might not be applicable to all outdoor spaces. According to ADAAG, "letters and numbers on signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10" (ADAAG, U.S. Access Board, 1991). MUTCD requirements for size and stroke meet, and may even exceed, ADAAG specifications. ADAAG Section 4.30 also provides guidelines for character height, raised and brailled characters and pictorial symbol signs, finish and contrast, mounting location and height, and symbols of accessibility.

Signalized Intersections

The allocation of time at a signalized intersection is equally important as the allocation of space. In combination, time and space determine the quality of a street and transportation network, how it operates, and how it meets the mobility, safety, and public space needs of its users and the community. Signal timing should reflect the context and needs of the street. Just as the distribution of space within an intersection geometry and cross-section can make a street feel more or less welcoming to a given mode, the way in which time is distributed by a traffic signal has a similar impact: an inadequate pedestrian crossing time or lack of pedestrian signals can create a barrier to walking and discourage walking; transit priority signaling can improve the performance of a transit service and encourage higher ridership; and excessive delay at an intersection for any mode can create a bottleneck and cause users to violate the signal or take unsafe risks.

The following discussion highlights some key principles, tools, and design considerations for signalized intersections.

Pedestrian Signal Heads

Per MUTCD requirements, signalized intersections should include pedestrian signal heads with countdown timers. These accommodations provide clarity to pedestrians and increase safety by clearly indicating when it is appropriate to cross the intersection and how long they have to do so.

Pedestrian Clearance Time

The pedestrian clearance time is the amount of time a pedestrian has to cross the intersection and should provide adequate time for a pedestrian leaving the curb at the end of the "walk" interval to reach the opposite curb before the traffic signal changes to green for on-coming traffic. The minimum crossing time for the signal timing is a function of the width of the crossing and the pedestrian walk speed. For most locations, a **walk speed of 3.5 feet per second** is used (per MUTCD). However, in locations commonly used by pedestrians who walk more slowly or those in wheelchairs, a slower walk speed should be used.

Princeton, NJ

Pedestrian Push Buttons

The use of actuated pedestrian detection, typically through the use of push buttons, is discouraged. In downtowns and business districts, the pedestrian phase should be provided for all crossings during each cycle.

In the case that pedestrian actuation is deemed appropriate, typically where pedestrian volumes are low on suburban and rural streets, the following strategies can be considered to reduce pedestrian delay while limiting impacts to vehicle traffic:

- Provide the pedestrian phase during each cycle when pedestrian volumes are expected to be high, such as commuting times
- Eliminate the need for actuation by reducing the crossing length (and therefore time) through the use of curb extensions
- Reduce the cycle length

For semi-actuated signals, typically used where a high-volume street meets a lower-volume street, the pedestrian interval should always be provided with the higher-volume green phase. For the minor crossing, effort should be made to reduce wait times.

Curb Ramps

ADA guidelines require appropriately designed curb ramps at all pedestrian crossings. Curb ramps are essential to provide easy access to crossings for pedestrians of all ages and abilities, benefiting not only those with mobility or visibility disabilities, but also children, seniors, or those with strollers, carts, bicycles, or delivery dollies. Curb ramps enable a smooth transition from the sidewalk level to street level at intersections and mid-block crossing locations.

Design Guidance

- Curb ramp placement should reflect the desired pedestrian path through an intersection.
- Directional curb ramps (i.e., typically two curb ramps per corner) are preferred over a single curb ramp located at the apex of the corner. The directional curb ramps provide direct access to their associated crossing along the pedestrian's direction of travel, whereas a single diagonal curb ramp attempts to accommodate pedestrians on different travel paths by opening toward the center of the intersection.
- Drainage design should prevent water and debris from accumulating at the bottom of a curb ramp.
- Drainage grates, utility access covers, and other appurtenances should not be placed on curb ramps, landings, or along the pedestrian crossing.
- Curb ramp width should generally be the same as that of the pedestrian zone on the sidewalk approach.
- Curb ramps must be designed to meet ADA requirements, including a:
  - Stable, firm, and slip-resistant surface
  - Detectable warning surface to alert the visually impaired of the transition from the sidewalk to the roadway that extends across the full width of the curb ramp and includes a series of raised, truncated domes in a high contrast color relative to the surrounding sidewalk
  - Maximum sidewalk cross slope of 2 percent
  - Maximum ramp slope of 8.33 percent
  - Maximum running slope of 5 percent along the crosswalk

Accessible curb ramps in Highland Park, NJ

Rectangular Rapid Flashing Beacons

Rectangular Rapid Flashing Beacons (RRFBs) can be used to enhance a pedestrian crossing. The combination of signage and irregular flash pattern of the amber LED lights increases the visibility of a crossing, and studies show that they improve driver compliance with stopping for pedestrians at a marked crosswalk. A study in St. Petersburg, FL, found an increase in driver yielding behavior from 18 percent for a marked crossing with no beacon, to 81 percent with the installation of two beacons, and 88 percent with the installation of four beacons.

Design Guidance

- RRFBs should be used in conjunction with a marked crosswalk and curb ramps. They may be combined with other pedestrian crossing enhancements, such as curb extensions.
- RRFBs can be used on single-lane or multi-lane roadways. They are often used at unsignalized locations with significant pedestrian activity, such as mid-block crossings near major destinations or trail crossings, or where high traffic volumes, speeds, and/or driver behavior make pedestrian crossings challenging.
- Designers should consider the surrounding context. Existing sign clutter or visual noise, particularly in an urban area, may decrease the visual impact of the RRFB.
- RRFBs can be installed with active or passive actuation.
- On divided roadways, RRFBs can be included in the median or center island to further increase visibility and driver yielding behavior.
- RRFBs are typically freestanding and powered by a solar panel unit. They are therefore easily implementable at trail crossings or other locations without easy access to a traditional power source.

RRFB on Alexander Street in Princeton, NJ

Further Guidance

- MUTCD, FHWA

Pedestrian Hybrid Beacons

A pedestrian hybrid beacon, also known as a high intensity actuated crosswalk (HAWK), is a pedestrian-actuated traffic control device for mid-block pedestrian crossing locations. They enable pedestrians to cross high-speed and high-volume roadways while traffic is stopped. As the name implies, it is essentially a hybrid between a RRFB and a full traffic signal. It provides planners and engineers with an intermediary option for locations that do not meet requirements for a traffic signal warrant, but where traffic conditions exceed the limitations of an RRFB.

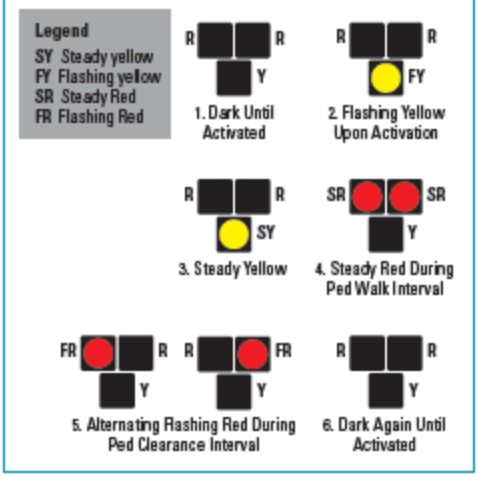
A pedestrian hybrid beacon consists of an overhead mast arm with two red lights and one yellow light, as well as pedestrian signal heads. When actuated by a pedestrian, the beacon goes through a sequence of flashing and steady yellow light intervals, followed by a steady red light to stop vehicular traffic, at which point a "walk" signal is indicated to pedestrians. At the conclusion of the "walk" phase, the pedestrian signal switches to a flashing orange hand, and the hybrid beacon switches to alternating flashing red lights. The beacon goes dark at the conclusion of the cycle, and traffic resumes as normal.

HAWK signal along NJ 27 improves access to the Metropark Train Station in Iselin, NJ

Design Guidance

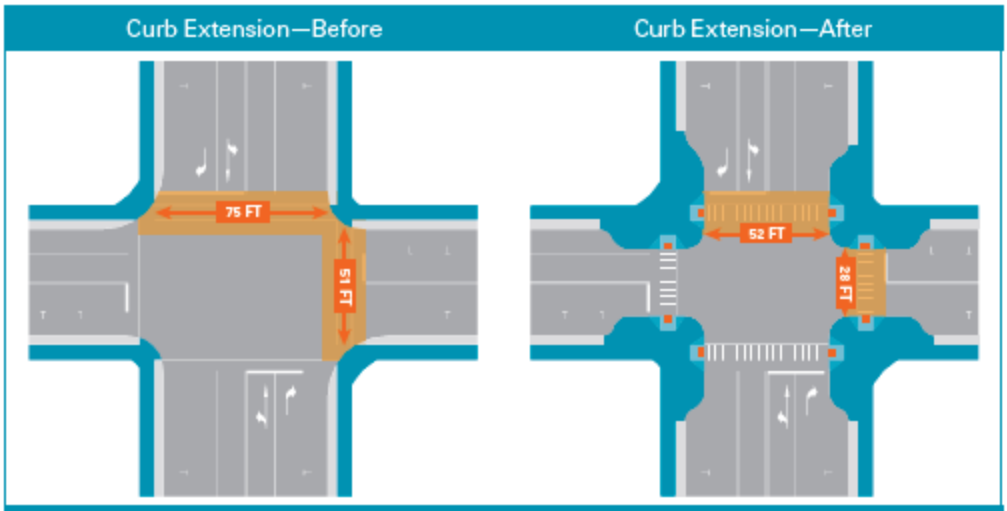
- Pedestrian hybrid beacons should be used in conjunction with a marked crosswalk and curb ramps. They may be combined with other pedestrian crossing enhancements, such as curb extensions.
- Pedestrian hybrid beacons are typically installed at mid-block locations and roadways with heavy traffic volumes, wide cross-sections, or high traffic speeds that create difficult pedestrian crossings. They are a useful tool where gaps in traffic are insufficient to allow pedestrian crossings or where there is excessive pedestrian delay.
- Pedestrian hybrid beacons are often installed near schools, transit stops, or near major pedestrian destinations.

Display Sequence for HAWK Signal



Further Guidance

- MUTCD, FHWA



Curb extensions improve visibility for pedestrians and drivers, reduce the pedestrian crossing distance, calm traffic, and shield on-street parking at intersection approaches. In the above example, the addition of curb extensions shortens pedestrian crossing distances from 75 feet to 52 feet in one direction and 51 feet to 28 feet in the other direction without reducing the number of travel lanes.

Design Guidance

- Curb extensions are typically used at intersections or mid-block locations on streets with on-street parking.
- Curb extensions are well-suited for areas with significant pedestrian activity, wide intersections, intersections with high traffic volumes and/or speeds, or near schools or pedestrian routes to other major destinations.
- Curb extensions should not extend into the travel lane or bicycle lane.
- There is no prescribed width for curb extensions, but typically they extend the width of a parked vehicle, approximately 6 feet. The selected width is intended to achieve an effective curb radius that is compatible with the context and the street's desired design speed and design vehicle.
- The minimum length of a curb extension is the width of the crosswalk (minimum of 6 feet). The designer should consider extending the length to 20 feet—the minimum setback for on-street parking near an intersection (per the MUTCD).
- The designer should consider the impact of curb extensions on the effective curb radius and, particularly, potential impacts to larger turning vehicles. A narrower curb extension width may be used, as needed, to reduce the impact.

Channelized Right-Turn Lane

Channelized right-turn lanes, also referred to as slip lanes, facilitate right-turn movements for motorists. They may be necessary to enable right turns when the intersection geometry would otherwise make the turn infeasible, such as an acute angle. Channelized right-turn lanes can also be used to improve the operation of an intersection for motorists, particularly where there is a high volume of right-turn movements.

By widening the intersection and enabling higher turning speeds, channelized right-turn lanes generally create a less inviting environment for bicyclist and pedestrians. They are therefore best suited for contexts that need to prioritize truck movements and auto-centric corridors, and should be avoided in areas with higher levels of bicycle and pedestrian activity. The drawbacks of channelized right-turn islands, however, can be mitigated through proper design, including minimizing curb radii and integrating pedestrian refuge islands into the turn island.

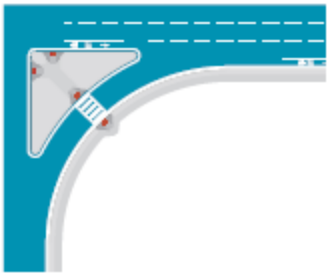
Design Guidance

- Channelized right-turn lanes are most appropriate where:
  - Geometric constraints make right turns difficult, such as an acute angle intersection
  - There is high demand for right-turn movements, particularly by large vehicles
- Channelized right-turn lanes should be avoided in areas with high levels of bicycle and pedestrian activity, such as downtowns, mixed-use areas, and residential neighborhoods
- Design features:
  - Minimize the angle at which the right-turn lane intersects the cross street (e.g., 110 degrees)
  - Minimize the curb radius (depending on the design vehicle) to slow vehicle speeds and improve visibility
  - Minimize the width of the turn lane using edge and gore striping to narrow the perceived roadway width while still accommodating larger vehicles, if necessary
  - Locate the crosswalk one car length back from the curb line
  - Orient the crosswalk perpendicular to the flow of traffic
  - Design the turn island as a pedestrian crossing island
  - Do not provide an acceleration lane coming out of the turn which encourages motorists to take the turn quickly and not stop or yield at the intersection

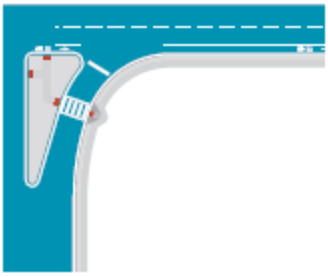
Channelized Right Turns

Where channelized right turns are necessary, they should be designed to slow driver turning speed and improve visibility of pedestrians, bicyclists, and on-coming motor vehicle traffic for the turning driver.

Before



After



Stormwater Management

A variety of sustainable stormwater management techniques help to collect, treat, and slow runoff from impervious roadways, sidewalks, and building surfaces. Urban development generally includes a generous amount of pollution-generating and non-pollution-generating impervious surfaces that change natural drainage patterns. This often results in flooding issues and the need for expensive drainage flow control storage and water quality treatment facilities. Impervious surfaces, such as concrete and asphalt, prevent rainwater from being absorbed at the source. As a result, stormwater flows (including pollutants) enter the pipe network and are discharged into receiving water bodies or become an additional burden to municipal wastewater systems.

Innovative stormwater management techniques can help reduce the impact of development by managing stormwater at the source and mimicking natural or pre-development conditions. These techniques are sustainable, generally less expensive, and can add aesthetic and ancillary social benefits to the built environment. In addition, these techniques can help reduce pollution to rivers and other water bodies, decrease flooding, increase groundwater recharge, and reduce energy consumption. The following are examples of stormwater management techniques that can easily be implemented and should be considered as primary best management practices (BMPs) where technically feasible. They can be used within the public right-of-way or as part of a private development to offset the impacts of impervious development.


Highland Park, NJ

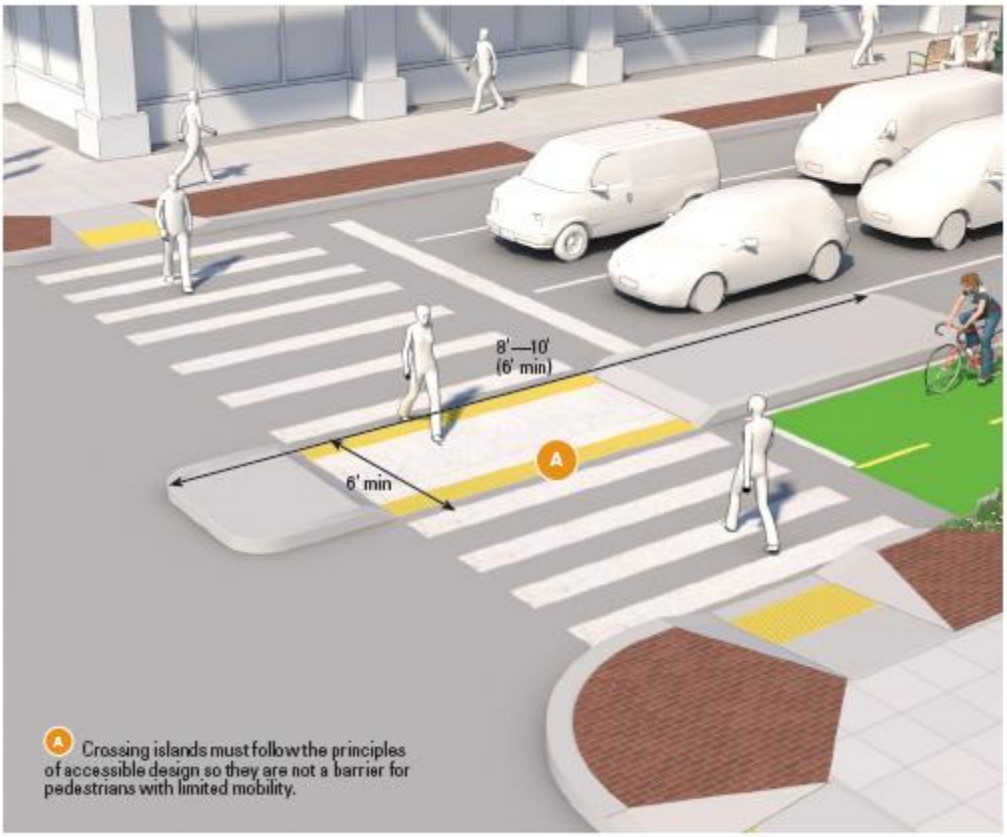
Design Guidance

Bioretention Facilities

Bioretention facilities are vegetated retention systems that are designed to manage and treat stormwater by using a conditioned planting soil bed and organic materials that filter runoff stored within shallow depressions or cells. Biofiltration facilities can be flow-through filtration systems with an underground perforated collection pipe that captures and conveys treated runoff to the final discharge point. They also may be designed as pure retention facilities, relying on natural soil infiltration as a primary discharge. Both systems rely on an amended or engineered soil filtration specifically designed to remove particulates and pollutants before proceeding to a self-contained discharge location.

Crossing Islands

Crossing islands, or pedestrian refuge islands, are a means to calm traffic and improve pedestrian safety. They enable pedestrians to make a crossing in two stages—crossing one direction of vehicular travel lanes, pausing at the island, and then completing the crossing. This reduces the exposure time of pedestrians to vehicular traffic.



A Crossing islands must follow the principles of accessible design so they are not a barrier for pedestrians with limited mobility.

Medians

Medians separate traffic flows heading in opposite directions. Medians can be used to provide pedestrians refuge while crossing the road. At wide intersections, medians can help people with slower walking speeds cross the street safely. Medians can also serve as traffic-calming devices and green space.

Medians should be raised to separate pedestrian and motorists but must follow the principles of accessible design so they are not a barrier for pedestrians with limited mobility, people in wheelchairs, and people with strollers. Raised medians should be designed with a cut-through at street level or a ramp. Detectable warning surfaces should be placed at the edge of both ends of the median in order for the street to be recognized by the visually impaired. If the corner includes a pedestrian-actuated control device, one should also be located at the median.

If the median is ramped, the slope of the ramps must not exceed 8.33 percent. Additionally, a level area at least 36 inches wide and 48 inches long is required (60 inches by 60 inches is preferred). If a raised median has a cut-through level with the street, it should be at least 36 inches wide and 48 inches long (60-inch width preferred). The median width should be at least 72 inches for pedestrian safety.

Design Guidance

- Crossing islands are typically in locations where pedestrian crossings feel unsafe because of exposure to vehicular traffic. This often occurs on multi-lane roadways, where pedestrians must cross more than three lanes of traffic, and/or on roadways with high traffic volumes or speeds.
- Crossing islands may be used at intersections or mid-block pedestrian crossings.
- Where intersections require slip lanes to accommodate turning vehicles, either because of geometry or operational issues, the resulting "pork chop" islands should be designed as pedestrian crossing islands.
- Roadways with an existing median space provide an opportunity to retrofit the median as a crossing island.
- Crossing islands must meet ADA requirements for pedestrian access.
- Crossing islands should be a minimum of 6 feet wide, with a preferred width of 8 to 10 feet, and a minimum of 6 feet long.
- Crossing islands should have a "nose" that extends beyond the crossing to protect pedestrians from turning vehicular traffic.
- Impacts to the effective curb radius for turning vehicles and the street design vehicle should be considered.

Raised Crossings and Intersections

Raised crossings prioritize pedestrian movement through an intersection or mid-block crossing. They improve the visibility of pedestrians and force vehicular traffic to slow down as they pass through the crossing. They also increase the rate at which motorists comply with the "stop for pedestrians law." Raised crossings may be implemented for an individual crossing or expanded to cover an entire intersection to create a wide public space level with the sidewalk.

Design Guidance

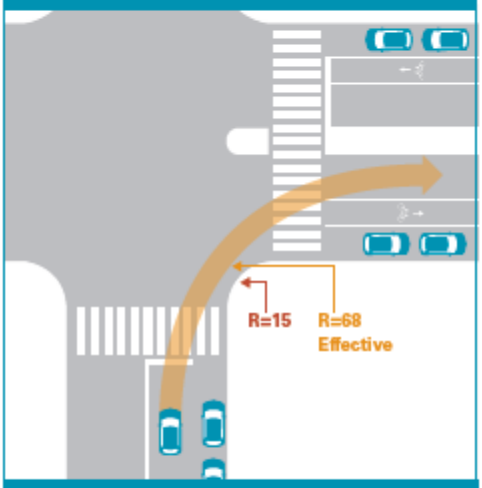
- Raised crossings and intersections should be flush with the sidewalk.
- ADA-requirements must be followed for pedestrian access.
- Vertical deflection should be gradual, following similar design guidance as a speed hump.
- Raised crossings and intersections calm traffic and are typically applied on minor streets with access to major pedestrian destinations, such as routes to school.

Design Guidance

Design should seek to optimize the curb radii to best fit the context, allowing safe and practical operation by typical vehicles while also minimizing vehicular turning speed and maximizing pedestrian safety and comfort. Key concepts include the following:

- Minimize the actual curb radii in locations with higher densities, where there is more pedestrian activity, or where traffic calming is desired, such as downtown and residential environments
- Maintain an adequate effective curb radius to accommodate larger vehicles, as necessary, such as along bus routes or designated truck routes
- Select the smallest possible desired design vehicle, taking into account traffic volumes and how often larger vehicles are expected to access the street
- Include all roadway elements and geometry in the evaluation of the effective curb, such as the angle of the intersection, curb extensions, the number of receiving lanes, on-street parking, bicycle lanes, medians, the number of travel lanes, and lane width
- Implement a variety of mitigation measures to increase the effective curb radius, helping to balance the needs of pedestrians (desiring a small actual curb radius) with those of larger vehicles (desiring a larger effective curb radius), such as:
  - Integrate other features such as bicycle lanes or on-street parking into street design
  - Utilize an advanced stop bar adjacent to the receiving lanes
  - Prohibit parking at least 20 feet from an intersection to increases the effective turn radius for vehicles and to "daylight" the intersection to improve visibility for pedestrians, bicyclists, and drivers
  - Provide an apron on medians or mountable curbs to better accommodate large vehicles
  - Allow the use of adjacent travel lanes on multi-lane streets and use of the full street width on low volume, local roadways

Effective Turning Radius



It is important for designers to account for the distinction between the corner radius and the effective turning radius. Curb radii are often designed based solely on the intersection geometry and overlook the effective radius, which is the result of the presence of on-street parking, bicycle lanes, the number of travel lanes, medians, and traffic control devices. As a result, curb radii are often larger than necessary and drivers routinely turn as wide as possible to maintain travel speeds.

Mountable curb in Portland, OR creates tighter curb radius and slower turning speeds for most vehicles while allowing larger vehicles to mount the curb and negotiate the turn

(Photo: Central Seattle Greenways)

Bicycle Lane Intersection Markings

Bicycle Lanes and Intersection Markings

Bicycle markings should be extended through intersections and major driveways to enhance the continuity of the bicycle facility, guide bicyclists through the intersection, and mitigate bicyclist stress.

This treatment has several benefits:

- Increases the visibility of bicyclists
- Reduces bicyclist stress by clearly delineating roadway space for bicyclists and guiding them through the intersection in a direct path
- Reinforces that through bicyclists have priority over turning vehicles or vehicles entering the roadway
- Helps bicyclists position themselves within the intersection
- Improves driver awareness of bicycle activity and movement through a high conflict area
- Makes bicyclist movement at intersections more predictable to motorists

Design Guidance

There are several common treatment types for intersection markings. The standard treatment is a white dotted line extension of the bicycle lane, which maintains the continuity of the bicycle lane through the intersection. The MUTCD contains guidance on this treatment in Section 3B.08.

This treatment may be enhanced to improve the visibility of the bicycle facility through various combinations of pavement markings, colored pavement, or higher visibility striping. Several treatment options are illustrated above. The use of colored pavement helps improve the visibility of the bicycle facility and increases awareness of potential conflict areas between bicyclists and motorists.

Further Guidance

- *Urban Bikeway Design Guide*, NACTO

Roundabouts

The modern roundabout has been gaining in popularity in the past decade and offers an alternative to a traditional signal- or stop-controlled intersection design. The modern roundabout differs significantly from its predecessor, the traffic circle. Unlike a traffic circle, the modern roundabout is designed with a much smaller diameter and yield control on all entries, leading to a reduction in vehicular speed and significant safety and operational improvements.

Compared to a traditional four-way intersection, roundabouts reduce the total number of vehicle conflicts points by 75 percent and eliminate conflicts with crossing traffic, which are often associated with more severe crashes. As a result, roundabouts generally have a lower number of crashes and lower injury crash rate for motor vehicle occupants. However, consideration must be given to accommodations for bicyclists and pedestrians, as they are often involved in a relatively higher proportion of injury crashes compared to other intersection designs.

Roundabouts can also improve the operation of the roadway. Since vehicles do not need to come to a complete stop at a roundabout, vehicles typically experience less delay than other intersection designs, particularly at off-peak times. All approaches have equal priority in roundabout design, as all vehicles must yield to traffic when entering the roundabout. Therefore, it is also important to consider the comparative volumes on each approach and the potential undesired delay for the major movements.

In addition to safety and operational improvements, other benefits associated with roundabouts include:

Operation and maintenance costs: Roundabouts do not have as many on-going maintenance costs compared to signalized intersections. Roundabouts typically have a service life of 25 years, compared to 10 years for a signalized intersection.

Traffic calming: By requiring all approaches to yield, a roundabout or series of roundabouts can have a traffic-calming effect on a street network

Aesthetics: The central island of a roundabout provides opportunities to create signature entries or centerpieces of a community.

Environment: The reduction in vehicle delay and the number and duration of vehicle stops have a positive impact on fuel consumption, carbon dioxide emissions, and noise and air quality impacts.

Spatial Requirements: The spatial advantages and disadvantages of a roundabout vary by the alternative intersection design. While roundabouts generally require more land area than a typical four-way stop-controlled intersection, they can be more space-efficient than intersections with jug-handles, highway interchanges with large infield areas, or signalized intersections with several turn lanes on multiple approaches.

Roundabouts can be scaled to fit a wide range of contexts and street typologies. Mini-roundabouts and neighborhood traffic circles can be used on local residential streets to provide traffic calming and efficient vehicle flow; urban compact roundabouts can balance efficient vehicle flow with the needs of bicyclists and pedestrians; and multi-lane urban and rural roundabouts can provide safe and efficient operation on higher-volume streets.

Design Guidance

Roundabout design should create conditions that reduce vehicle speed and provide a consistent speed into, through, and out of the roundabout. Lower speeds reduce crash frequency and severity for all roadway users, allow safer and easier merging of traffic, provide more reaction time for drivers, and make the facility more accessible for novice users. The diameter chosen for the roundabout must balance safety with the capacity demand of the intersection. Maximum entry design speeds range from 15 mph for mini-roundabouts to 30 mph for a rural double-lane roundabout.

Design considerations include the following:

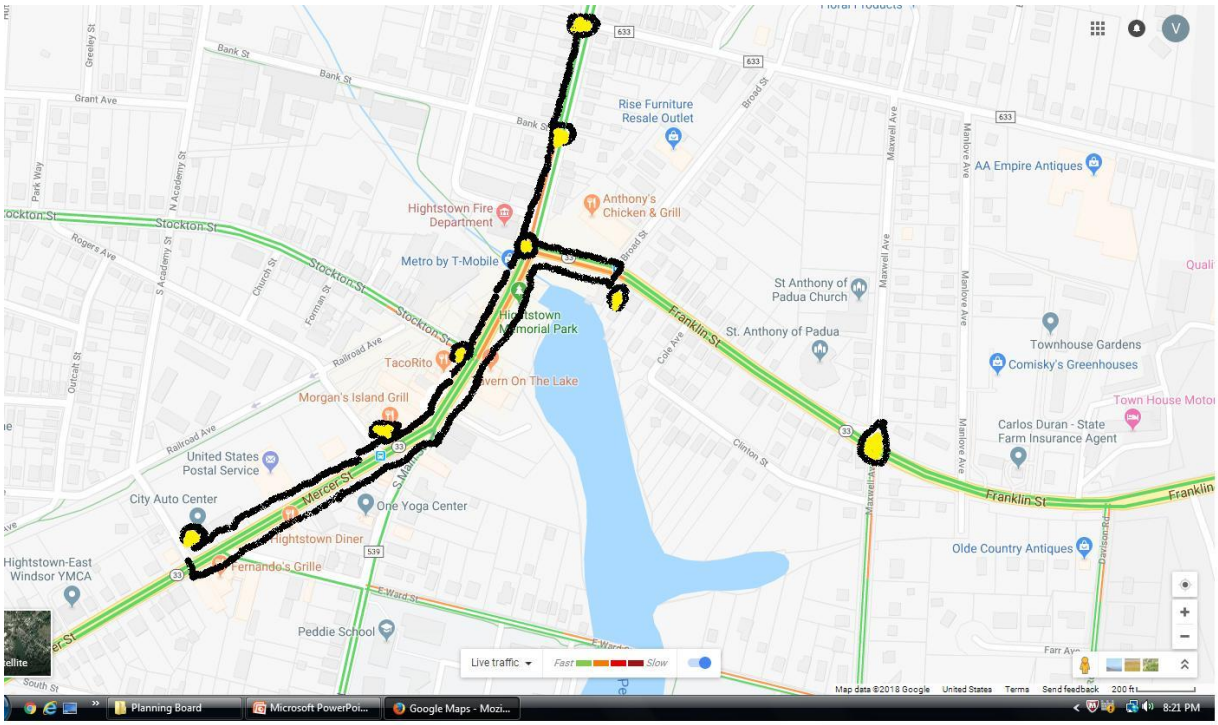
- Design entry points that require vehicles to deflect around the central island. Entry points that enable a path tangent to the central island support faster vehicle speeds.
- Provide pedestrian crossings at all approaches. Raised crossing islands with high-visibility striping at each approach create a more comfortable crossing for pedestrians, reduce vehicle speeds, and improve driver awareness of pedestrians as they enter/exit the roundabout. Pedestrian crossings should generally be located one car length from the roundabout entry/exit point, which both minimizes vehicular speed and improves pedestrian visibility at the crossing point.
- Minimize vehicle speed to allow more comfortable navigation of the roundabout by bicyclists. On larger roundabouts or multi-lane roundabouts, deflect bicycle routes to a shared-use path around the perimeter of the roundabout to allow bicyclists to navigate the roundabout as pedestrians. This provides separation from vehicular traffic, creates a more comfortable environment for most bicyclists, and enables them to use the pedestrian crossings.
- Provide truck aprons to accommodate freight traffic and emergency vehicles on roundabouts with a smaller diameter and/or on designated truck routes.
- If the roundabout is on a transit route, ensure that the design comfortably accommodates operation of the transit vehicle without the need to use the truck apron.

Further Guidance

- FHWA's *Roundabouts: An Informational Guide*

Downtown Walk Audit

Downtown Hightstown Walk Audit Route



Methodology

Participants started at the Borough offices on Bank Street to discuss our objectives for the day, the route and the data collection forms.

At each intersection the group stopped and had a discussion about the existing conditions, issues and potential solutions. Each participant completed a data collection form for each intersection.

At the end of the walk, data collection forms were collected and tabulated. Overall ratings were averaged for participants. All comments noted on individual collections forms were consolidated and key discussion points for each intersection were summarized.

Participants

Streets and Sidewalks Committee

- Steve Misuira, Council President
- Beverly Asselstine, Planning Board
- Joe Cicalese, Planning Board and Environmental Commission

Borough Staff and Professionals

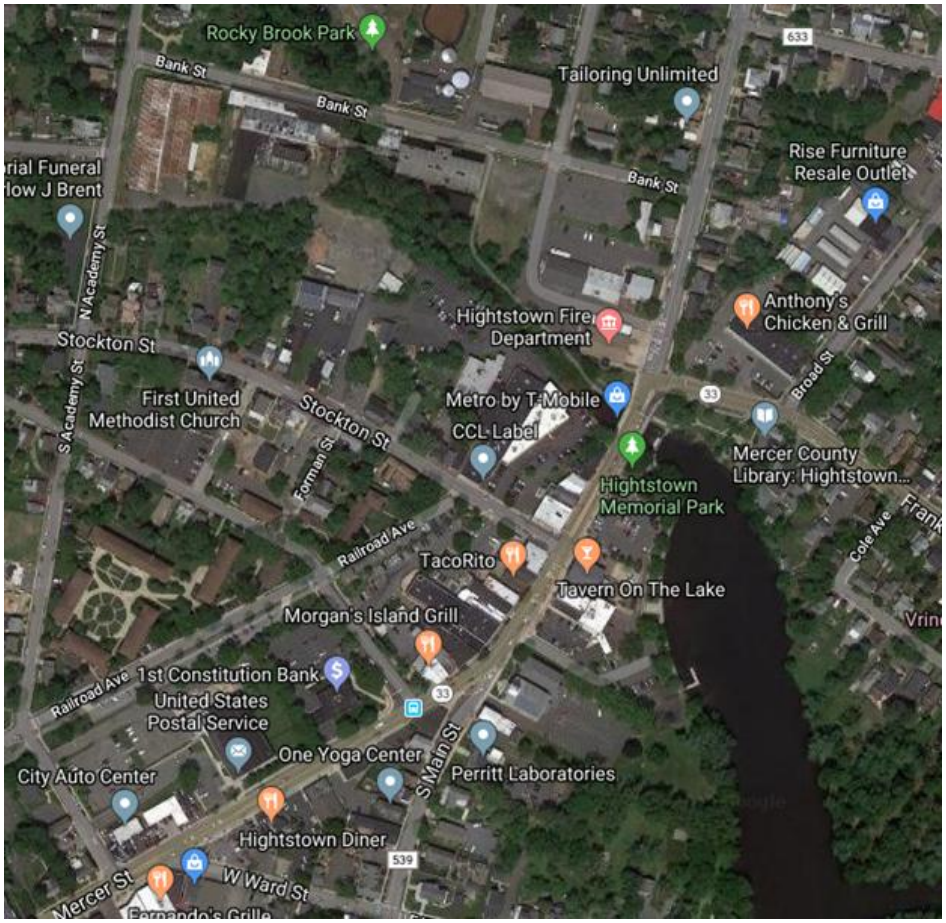
- Ken Lewis, Superintendent of Public Works
- Frank Gendron, Police Chief
- Carmela Roberts, Borough Engineer

Mercer County Planning Department

- Matthew Zochowski, Assistant Planner

Community Organizations

- Brian Clissold, Downtown Hightstown, Inc., also member West Windsor Bicycle and Pedestrian Alliance
- Jack Curry, RISE
- Cheryl Kastrenakes, Executive Director, Greater Mercer TMA
- Ian Henderson, Greater Mercer TMA
- Jerry Foster, Greater Mercer TMA



Downtown Walk Audit principal findings and issues:

- Pedestrians are at risk in the downtown area. Crosswalks are not marked where people frequently cross. Those that are marked are not aligning to complete streets design guidance with the highest visibility paint markings, most current signal designs and frequently don't have additional warning signage for approaching cars.
    - Downtown has the highest concentration of traffic accidents, including those involving pedestrians and injuries.
- The approaches to Downtown Hightstown on State and County routes do not employ enough design and traffic calming techniques to slow traffic before it reaches downtown.
    - North Main and South Main Streets have long stretches without crosswalks and are notable for a series of T-intersections with low visibility and unmarked crossings with high pedestrian usage, particularly students walking to Hightstown High School from all parts of the Borough.
    - Both the State and County have complete streets policies, but road work has been completed without coordination or discussion with the Borough about improvements for bicycle and pedestrian users, including bringing handicapped ramps up to standards, repainting crosswalks at intersections and adding marked crosswalks.
    - Route 33 includes the only road segments in the Borough with speed limits in excess of 25 miles per hour. Mercer and Franklin Streets also have difficult T-intersections, odd intersection angles and few marked crosswalks.
- Some creative engineering and design adjustments are needed to address existing conditions in the downtown area. While some suggestions and ideas are included here, further research and partnership with the New Jersey Department of Transportation and Mercer County is needed.

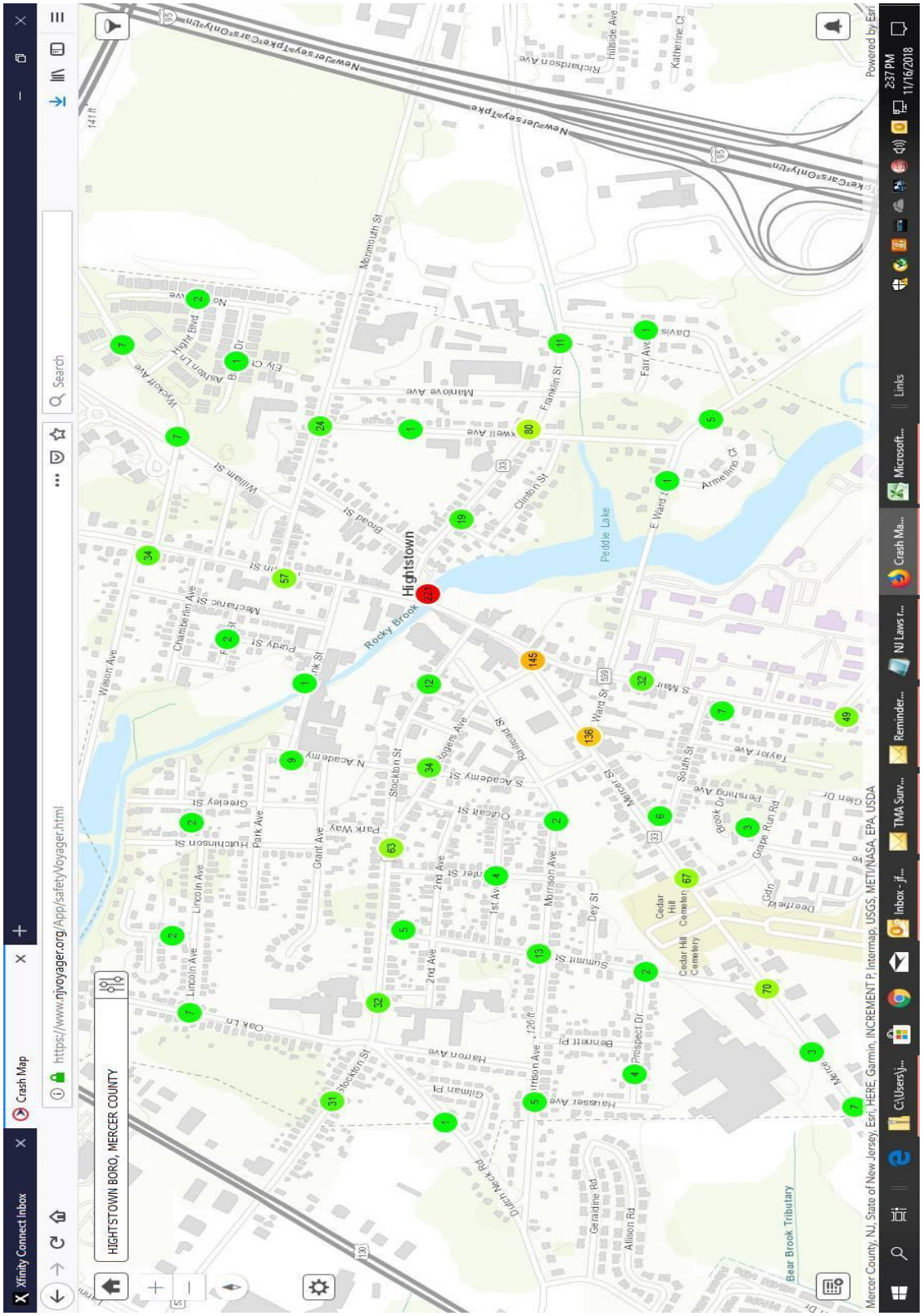
Action Step: At the Walk Audit event the team discussed the NJ DOT Transportation Problem Statement Form and the process for initiating a review of a problem on a NJ state highway. The representative of the Mercer County Planning Department said there is no similar formal process initiation for the county, but a written request would initiate a review. The Committee recommends that these findings be reviewed with Council and steps should be taken to formalize a NJDOT Transportation Problem Statement request and a similar formal letter to Mercer County.

Specific Recommendations

1. Crosswalks on streets approaching downtown
    a. Add more crosswalks along North Main and South Main Streets with high visibility markings and signage
    b. Improve visibility, markings and signage for crosswalks on Franklin and Mercer Streets. Expand traffic calming and crosswalks at Franklin and Maxwell.

2. Improvements can be made in accessibility
    a. North Main and Monmouth Street: crosswalk does not meet current ADA standards
    b. North Main and Bank Street: crosswalk does not meet current ADA standards
    c. Upgrade crossing signal at Franklin and Main to latest standard with accessible buttons at all crossings, countdown lights and sound.
    d. Investigate broken crossing signal at Main and Stockton; replace if needed.
    e. Repair ramp at crosswalks at the Point and Rogers (damaged, not flush)
3. Investigate opportunities to improve safety at crossings on Route 33
    a. Franklin and Main: Discuss options with the State, such as a full stop for all traffic to allow for pedestrian crossing and adding a crosswalk on the south side of the intersection with expanded island for pedestrian refuge.
    b. Main and Stockton: Add crosswalk on north side of intersection.
    c. South Main, Mercer and Rogers: Assess sight lines and review options, including high visibility paint markings, lighted signal at the Point, permanent removal of parking spaces at the Point and at Rogers (with potential addition of bike corrals and street furniture) and reduction of span across Rogers with an island.
        i. After the Walk Audit, the Borough Engineer did a feasibility analysis of an island and determined it would not work with the turning radius of truck traffic at that intersection. See Appendix.
        ii. Upon further review of the options in the New Jersey Complete Streets Design Manual, the team determined a mountable curb extension should also be explored. This would allow trucks to go onto the curb in order to turn when needed, while still providing a high visibility refuge for pedestrians. See page 54.
    d. Ward, Mercer and Academy: Review options for extending the "feel" of downtown into this area with landscaping, lane narrowing and high visibility crosswalk markings. Review feasibility of adding a crosswalk on Mercer at Ward with a pedestrian island. Consider other measures to slow or stop traffic through this area, including a traffic light.
    e. Franklin and Broad: Discuss options with the State for traffic calming and improving visibility at this high traffic, poor visibility location.
4. Proceed with the development of a comprehensive mobility plan for the Borough of Hightstown that will more fully address bicycle and pedestrian facilities throughout the community, including safe routes to all schools, enhanced safety in downtown and improved access to parks and other key destinations. This plan should also provide key tools, such as checklists and review documents, that can help ensure implementation of our complete streets policy.

Source: NJDOT Safety Voyager, Crash Records 2002 to 2017



Downtown Hightstown Walk Audit 11/29/18

Intersection: N. Main St. (539, 33) & Bank St. (33) Street Segment: N. Main from Monmouth (633 to Bank)

Overall Ratings Place a check mark in one column for each area	Excellent	Good	Fair	Poor
Crossing Street and Intersections				
Sidewalks				
Driver Behavior				
Safety				
Comfort and Appeal for Pedestrians				
Comfort and Appeal for Bicyclists				

Ratings: Excellent: Very pedestrian/bicycle-friendly and safe Good: Moderately pedestrian/bicycle-friendly and safe
Fair: Somewhat pedestrian/bicycle-friendly and safe Poor: Not pedestrian/bicycle-friendly or safe

Attribute	Notes
Crosswalk Not Marked, Faded or Low Visibility (circle)	Painted Brick Finish, Faded, Low Visibility across Bank. No markings across Main.
Crosswalk Road Surface Damaged? Road Damaged? (describe)	Some road damaged, worn, but otherwise good condition
Curb Cut Missing, Slope Dysfunctional, Detectable Warnings Missing, Not Flush? (circle)	No ADA warning bumps, diagonal cut, slope too steep
Sidewalk Missing, Blocked, Narrow, Surface Damaged? (circle)	
Walk Signal Missing, Button Missing, Non-Functional, Inaccessible or Obstructed, Wait Time, Length of Time to Cross? (circle)	No signal
Pedestrian Sign Missing, Obstructed, Low Visibility? (circle)	No signage
Sight Lines Blocked (describe)	Trees cause low visibility, parked cars are obstruction to cyclists
Buffer Between Traffic and Pedestrians? Bicyclists?	No buffers
Drivers Speeding, Not Obeying Traffic Signals/Stop Signs, Not Yielding to Pedestrians/Bicyclists, Distracted/On Cell Phone? (circle)	Speeding along Main Street

Overall comments or significant challenges: Difficult left turn off Main onto Bank

Downtown Hightstown Walk Audit 11/29/18
Intersection: N. Main St. (539) & Monmouth St. (633)

Overall Ratings Place a check mark in one column for each area	Excellent	Good	Fair	Poor
Crossing Street and Intersections				
Sidewalks				
Driver Behavior				
Safety				
Comfort and Appeal for Pedestrians				
Comfort and Appeal for Bicyclists				

Ratings: Excellent: Very pedestrian/bicycle-friendly and safe Good: Moderately pedestrian/bicycle-friendly and safe
Fair: Somewhat pedestrian/bicycle-friendly and safe Poor: Not pedestrian/bicycle-friendly or safe

Attribute	Notes
Crosswalk Not Marked, Faded or Low Visibility (circle)	No marked crossing for N. Main, low visibility across Monmouth
Crosswalk Road Surface Damaged? Road Damaged? (describe)	
Curb Cut Missing, Slope Dysfunctional, Detectable Warnings Missing, Not Flush? (circle)	No ADA bumps, diagonal cut, slope dysfunctional
Sidewalk Missing, Blocked, Narrow, Surface Damaged? (circle)	Surface damaged, old, narrow
Walk Signal Missing, Button Missing, Non-Functional, Inaccessible or Obstructed, Wait Time, Length of Time to Cross? (circle)	No walk signal
Pedestrian Sign Missing, Obstructed, Low Visibility? (circle)	No pedestrian sign, obstructed
Sight Lines Blocked (describe)	Difficult sight lines with parked cars, frequent turns
Buffer Between Traffic and Pedestrians? Bicyclists?	No
Drivers Speeding, Not Obeying Traffic Signals/Stop Signs, Not Yielding to Pedestrians/Bicyclists, Distracted/On Cell Phone? (circle)	Speeding

Overall comments or significant challenges: Repaving of Monmouth stopped short of crosswalk. County Planner – County should redo crosswalk when work is done on North Main Street next. Note, North Main was resurfaced a few years ago and crosswalk was not addressed then either.

Downtown Hightstown Walk Audit 11/29/18

Intersection: N. Main St. (539, 33) & Franklin St. (33) Street Segment: N. Main from Bank to Franklin

Overall Ratings Place a check mark in one column for each area	Excellent	Good	Fair	Poor
Crossing Street and Intersections				
Sidewalks				
Driver Behavior				
Safety				
Comfort and Appeal for Pedestrians				
Comfort and Appeal for Bicyclists				

Ratings: Excellent: Very pedestrian/bicycle-friendly and safe Good: Moderately pedestrian/bicycle-friendly and safe
Fair: Somewhat pedestrian/bicycle-friendly and safe Poor: Not pedestrian/bicycle-friendly or safe

Attribute	Notes
Crosswalk Not Marked, Faded or Low Visibility (circle)	Low visibility markings,
Crosswalk Road Surface Damaged? Road Damaged? (describe)	
Curb Cut Missing, Slope Dysfunctional, Detectable Warnings Missing, Not Flush? (circle)	
Sidewalk Missing, Blocked, Narrow, Surface Damaged? (circle)	
Walk Signal Missing, Button Missing, Non-Functional, Inaccessible or Obstructed, Wait Time, Length of Time to Cross? (circle)	Button missing, automatic setting causes long waits at firehouse
Pedestrian Sign Missing, Obstructed, Low Visibility? (circle)	
Sight Lines Blocked (describe)	
Buffer Between Traffic and Pedestrians? Bicyclists?	Need bike lanes!
Drivers Speeding, Not Obeying Traffic Signals/Stop Signs, Not Yielding to Pedestrians/Bicyclists, Distracted/On Cell Phone? (circle)	Drivers speeding

Overall comments or significant challenges: Could we expand island as refuge and add crosswalk on south side of intersection? Need traffic calming on Route 33, low visibility at night, state should improve/upgrade signal lamps, no count down for pedestrians, DOT should implement handicapped improvements. Signal does not stop traffic turning right from Main to Franklin unless there is traffic making a left onto Franklin from the north, leaving no opportunity to cross Franklin.
Note: previous request for crosswalk at municipal lot was refused by DOT.

Downtown Hightstown Walk Audit 11/29/18

Intersection: Main St. (539, 33) & Stockton St. (571) Street Segment: Main from Franklin to Stockton

Overall Ratings Place a check mark in one column for each area	Excellent	Good	Fair	Poor
Crossing Street and Intersections				
Sidewalks				
Driver Behavior				
Safety				
Comfort and Appeal for Pedestrians				
Comfort and Appeal for Bicyclists				

Ratings: Excellent: Very pedestrian/bicycle-friendly and safe Good: Moderately pedestrian/bicycle-friendly and safe
Fair: Somewhat pedestrian/bicycle-friendly and safe Poor: Not pedestrian/bicycle-friendly or safe

Attribute	Notes
Crosswalk Not Marked, Faded or Low Visibility (circle)	2 line crosswalks, low visibility, no signs
Crosswalk Road Surface Damaged? Road Damaged? (describe)	Storm water pooling in ramp area
Curb Cut Missing, Slope Dysfunctional, Detectable Warnings Missing, Not Flush? (circle)	
Sidewalk Missing, Blocked, Narrow, Surface Damaged? (circle)	
Walk Signal Missing, Button Missing, Non-Functional, Inaccessible or Obstructed, Wait Time, Length of Time to Cross? (circle)	Sound broken on signal, length of time to cross not adjusted appropriately
Pedestrian Sign Missing, Obstructed, Low Visibility? (circle)	Corner limits motorists visibility
Sight Lines Blocked (describe)	
Buffer Between Traffic and Pedestrians? Bicyclists?	Need bike lanes or share the road signage
Drivers Speeding, Not Obeying Traffic Signals/Stop Signs, Not Yielding to Pedestrians/Bicyclists, Distracted/On Cell Phone? (circle)	Excessive car traffic

Overall comments or significant challenges: No crosswalk on north side of intersection, Island height – Note: Island intended to be mountable for emergency vehicles. Many attempts have been made to post signage on island, but trucks illegally coming down Stockton have knocked them over during left turn.

Downtown Hightstown Walk Audit 11/29/18
Intersection: S. Main St. (539, 571), Mercer St. (539, 571, 33) & Rogers Ave (571 Truck Route)
Street Segment: Main from Stockton to Rogers

Overall Ratings Place a check mark in one column for each area	Excellent	Good	Fair	Poor
Crossing Street and Intersections				
Sidewalks				
Driver Behavior				
Safety				
Comfort and Appeal for Pedestrians				
Comfort and Appeal for Bicyclists				

Ratings: Excellent: Very pedestrian/bicycle-friendly and safe
Good: Moderately pedestrian/bicycle-friendly and safe
Fair: Somewhat pedestrian/bicycle-friendly and safe
Poor: Not pedestrian/bicycle-friendly or safe

Attribute	Notes
Crosswalk Not Marked, Faded or Low Visibility (circle)	2 line, low visibility markings.
Crosswalk Road Surface Damaged? Road Damaged? (describe)	Road surface damaged
Curb Cut Missing, Slope Dysfunctional, Detectable Warnings Missing, Not Flush? (circle)	Not flush
Sidewalk Missing, Blocked, Narrow, Surface Damaged? (circle)	Surface damaged
Walk Signal Missing, Button Missing, Non-Functional, Inaccessible or Obstructed, Wait Time, Length of Time to Cross? (circle)	Good place for a signaled crosswalk
Pedestrian Sign Missing, Obstructed, Low Visibility? (circle)	
Sight Lines Blocked (describe)	Slight curve in road blocks sight lines, particularly at the Point crossing Mercer.
Buffer Between Traffic and Pedestrians? Bicyclists?	Need bike lanes/share the road signs
Drivers Speeding, Not Obeying Traffic Signals/Stop Signs, Not Yielding to Pedestrians/Bicyclists, Distracted/On Cell Phone? (circle)	Excessive traffic and speeding

Overall comments or significant challenges: Traffic does not stop for pedestrians. Traffic moving too fast. Poor visibility. Sight lines are a real problem with the road curve. Consider adding an island across Rogers for refuge. The biggest pedestrian issues are at these intersections. Note: Truck route is not the county's responsibility (Rogers Avenue). DOT paint at Rogers faded, but was an attempt to remove parking lane for better visibility.

Downtown Hightstown Walk Audit 11/29/18
Intersection: Mercer St. (539, 571, 33) & Ward (539, 571) & Academy St.
Street Segment: Mercer from Rogers to Academy

Overall Ratings Place a check mark in one column for each area	Excellent	Good	Fair	Poor
Crossing Street and Intersections				
Sidewalks				
Driver Behavior				
Safety				
Comfort and Appeal for Pedestrians				
Comfort and Appeal for Bicyclists				

Ratings: Excellent: Very pedestrian/bicycle-friendly and safe
Good: Moderately pedestrian/bicycle-friendly and safe
Fair: Somewhat pedestrian/bicycle-friendly and safe
Poor: Not pedestrian/bicycle-friendly or safe

Attribute	Notes
Crosswalk Not Marked, Faded or Low Visibility (circle)	Low visibility, Ward Street crossing too wide and odd angle makes sight lines challenging for cars and pedestrians. Academy hard to see.
Crosswalk Road Surface Damaged? Road Damaged? (describe)	
Curb Cut Missing, Slope Dysfunctional, Detectable Warnings Missing, Not Flush? (circle)	Ramp damaged
Sidewalk Missing, Blocked, Narrow, Surface Damaged? (circle)	Some damage near Rogers
Walk Signal Missing, Button Missing, Non-Functional, Inaccessible or Obstructed, Wait Time, Length of Time to Cross? (circle)	
Pedestrian Sign Missing, Obstructed, Low Visibility? (circle)	
Sight Lines Blocked (describe)	Hard to see cars turning at Ward
Buffer Between Traffic and Pedestrians? Bicyclists?	
Drivers Speeding, Not Obeying Traffic Signals/Stop Signs, Not Yielding to Pedestrians/Bicyclists, Distracted/On Cell Phone? (circle)	People drive too fast into downtown and through these intersections

Overall comments or significant challenges: Add an island at Ward Street where left turn land is. Straighten Ward to meet Mercer at right angle. Add shade trees to improve streetscape and calm traffic. Note: A large culvert exists under the east side sidewalk, preventing any digging for tree wells. Utilities under west side sidewalk, preventing any digging for tree wells. Potential tree planters.

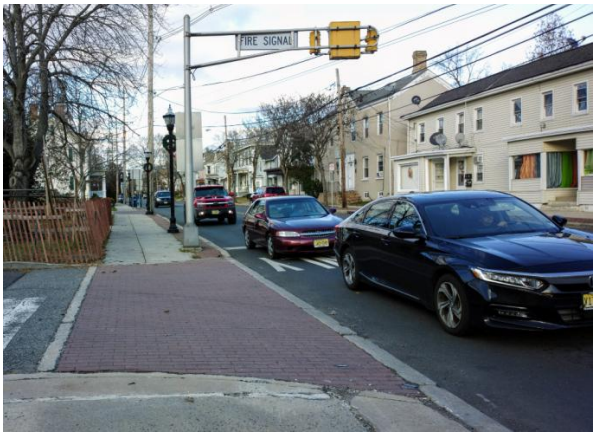
Downtown Hightstown Walk Audit 11/29/18
Intersection: Franklin St. (33) & Broad St. Street Segment: Franklin from Main to Broad

Overall Ratings Place a check mark in one column for each area	Excellent	Good	Fair	Poor
Crossing Street and Intersections				
Sidewalks				
Driver Behavior				
Safety				
Comfort and Appeal for Pedestrians				
Comfort and Appeal for Bicyclists				

Ratings: Excellent: Very pedestrian/bicycle-friendly and safe Good: Moderately pedestrian/bicycle-friendly and safe
Fair: Somewhat pedestrian/bicycle-friendly and safe Poor: Not pedestrian/bicycle-friendly or safe

Attribute	Notes
Crosswalk Not Marked, Faded or Low Visibility (circle)	
Crosswalk Road Surface Damaged? Road Damaged? (describe)	
Curb Cut Missing, Slope Dysfunctional, Detectable Warnings Missing, Not Flush? (circle)	
Sidewalk Missing, Blocked, Narrow, Surface Damaged? (circle)	
Walk Signal Missing, Button Missing, Non-Functional, Inaccessible or Obstructed, Wait Time, Length of Time to Cross? (circle)	Need lighted signal
Pedestrian Sign Missing, Obstructed, Low Visibility? (circle)	Sign obstructed by trees.
Sight Lines Blocked (describe)	Low visibility for cars. Slight curve of road.
Buffer Between Traffic and Pedestrians? Bicyclists?	Need bike lanes!
Drivers Speeding, Not Obeying Traffic Signals/Stop Signs, Not Yielding to Pedestrians/Bicyclists, Distracted/On Cell Phone? (circle)	Drivers speed through downtown; complicated intersection with lots of destinations (park, library, bus stop, strip mall stores)

Overall comments or significant challenges: Difficult to see. Busy roads. No safe crossing for kids to library. Try signs in intersection, "flag" program (holder for flags placed at crosswalk, pedestrians wave flag to get driver attention). Note: There were previous attempts to put bollard signs in center of crosswalk at yellow line. Many were run over and damaged.


FIRE SIGNAL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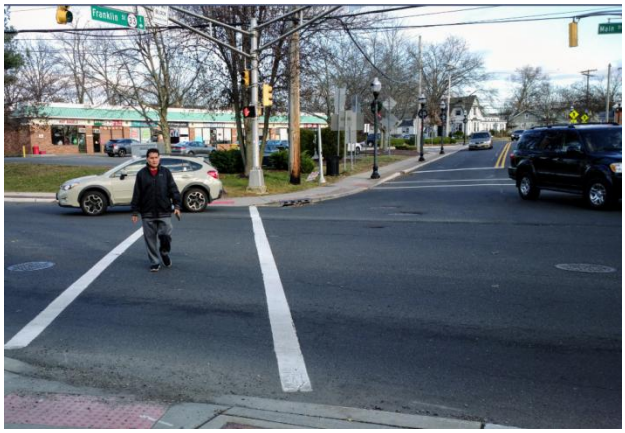


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LIMIT
25


SPEED
LIMIT
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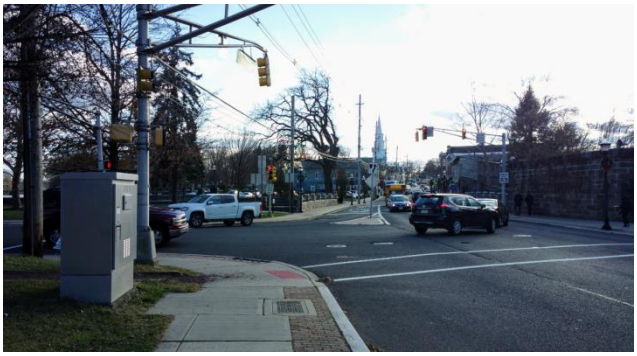

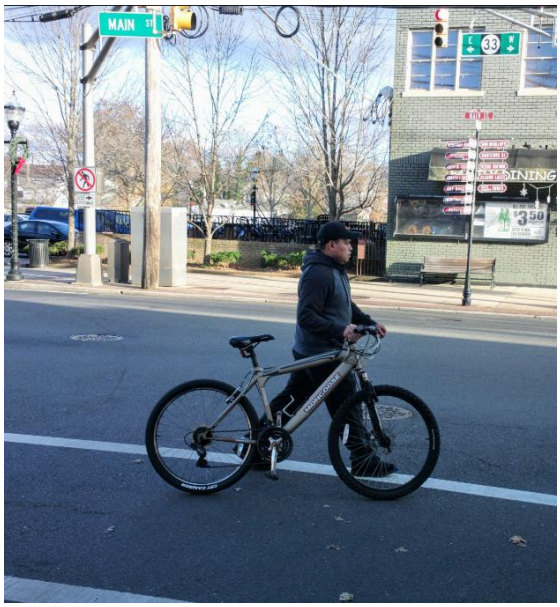
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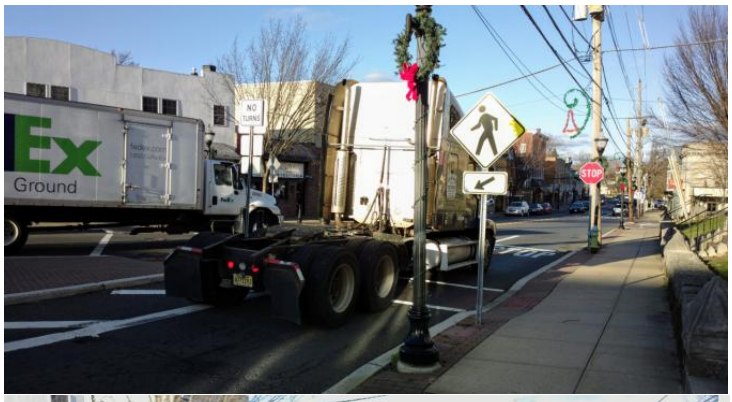
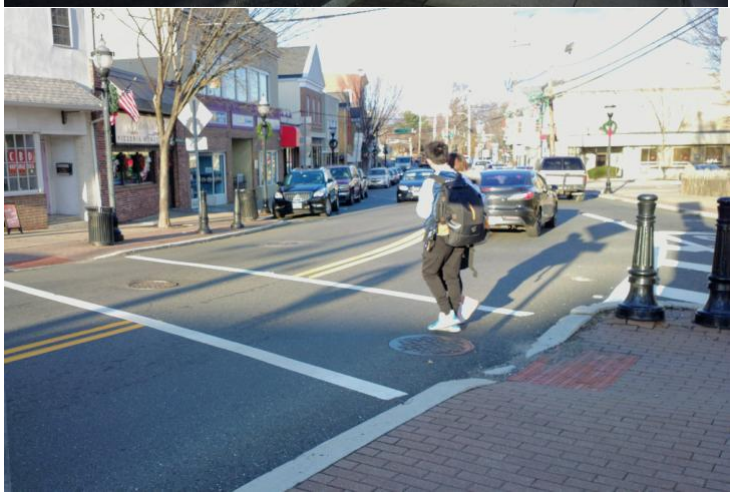
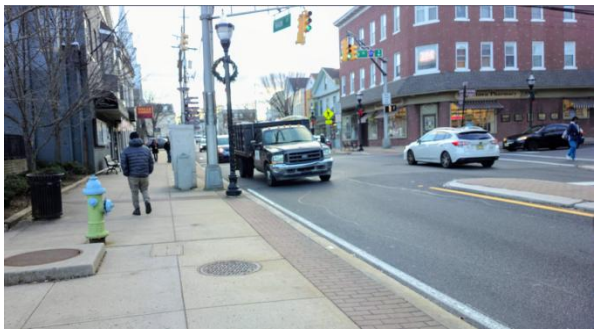
CLAYTON

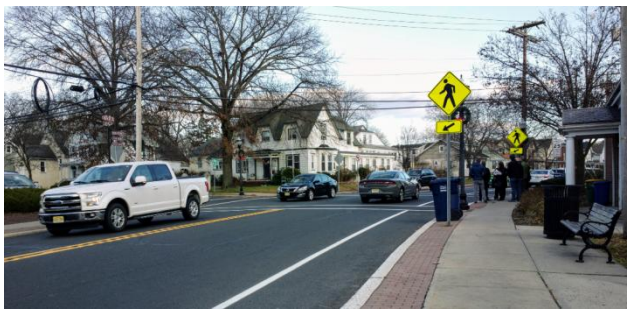

EAST WINDSOR REGIONAL SCHOOL DISTRICT


Walmart


Ground
STOP







Appendix

Roberts
ENGINEERING GROUP LLC
Woman Business Enterprise Certified

1670 Whitehorse-Hamilton Square Rd.
Hamilton, New Jersey 08690
609-586-1141 fax 609-586-1143
www.RobertsEngineeringGroup.com

November 22, 2017

Debra Sopronyi, RMC, CMR, QPA, Borough Administrator/Clerk
Borough of Hightstown
156 Bank Street
Hightstown, New Jersey 08520

Re: Capital Sidewalk Improvements Program
Borough of Hightstown, Mercer County
Our File No.: H1606

Dear Debra:

Attached with this letter, please find the following:

1. Plan entitled, "Location Plan, Sidewalk Capital Improvements, Borough of Hightstown, Mercer County, New Jersey. Dated November 21, 2017."

As requested by Council at their September 5, 2017 meeting, we have prepared a list for a proposed Capital Improvement Program for sidewalks on Borough owned roads. The following is a listing of roads that do not have a continuous sidewalk on at least one side of the roadway. In general, most of the quantities provided in the list below can be doubled to determine length of sidewalk required should Council determine that sidewalks are to be constructed on both sides of a given roadway.

The roads have been listed in an order that corresponds with the proposed Capital Road Improvements Program prepared by this office. However, Council may reorganize/prioritize sidewalk improvements at their discretion.

Roads that we definitively know do not have enough room to accommodate new sidewalks (due to property limits, environmental constraints, extreme slopes, etc.) are not included in the list below.

Road	Approx. Length Required
1. Lincoln Avenue	1,300-ft.
2. Hagemount Avenue	1,200-ft.
3. Rocky Brook Court	500-ft.
4. Sunset Avenue	1,200-ft.
5. Bennet Place	575-ft.
6. Hausser Avenue	750-ft.
7. Prospect Drive	1,000-ft.
8. Schuyler Avenue	400-ft.
9. Dey Street	600-ft.
10. Dutch Neck Road	1,200-ft.
11. Taylor Avenue	400-ft.
12. Van Rensaller Avenue	200-ft.
13. Maxwell Avenue	1,400-ft.
14. Spring Crest Drive	1,200-ft.
15. Glen Road	200-ft.
16. William Street	500-ft.
17. Chamberlin Avenue	1000-ft.
18. Clinton Street	800-ft.
19. Clover Lane	700-ft.
20. East Ward Street	400-ft.

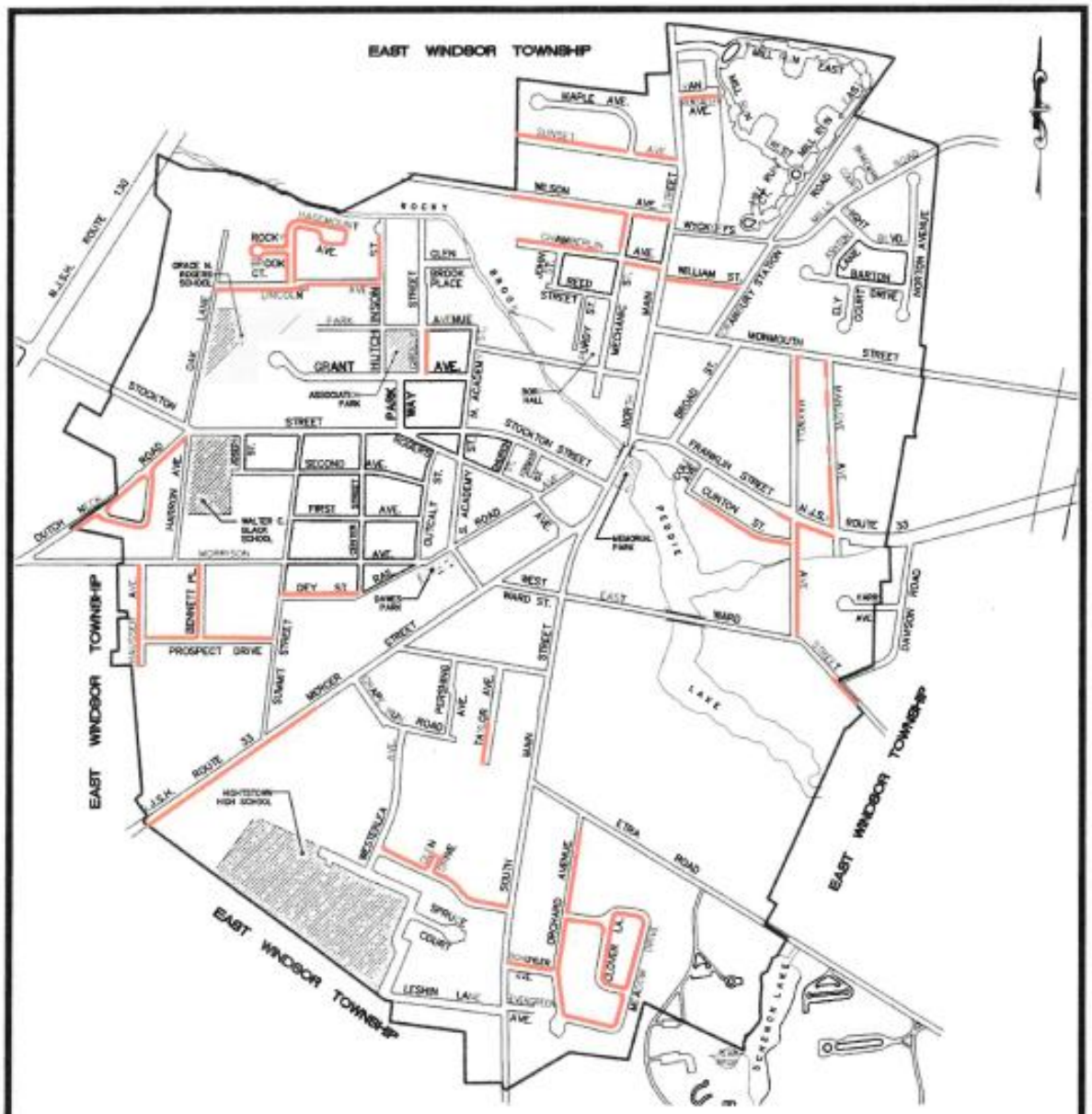
21. Franklin Street	500-ft.
22. Gilman Place	900-ft.
23. Greeley Street	500-ft.
24. Manlove Avenue	800-ft.
25. Meadow Drive	1,700-ft
26. Mechanic Street	250-ft.
27. Mercer Street	1,700-ft.
28. Orchard Avenue	1,300-ft.
29. Wilson Street	1,300-ft.

Should you have any questions or concerns, please do not hesitate to contact this office.

Very truly yours,

Carmela Roberts, PE, CME
Borough Engineer

cc: Mayor and Council
Cameron Corini, EIT, Roberts Engineering Group, LLC



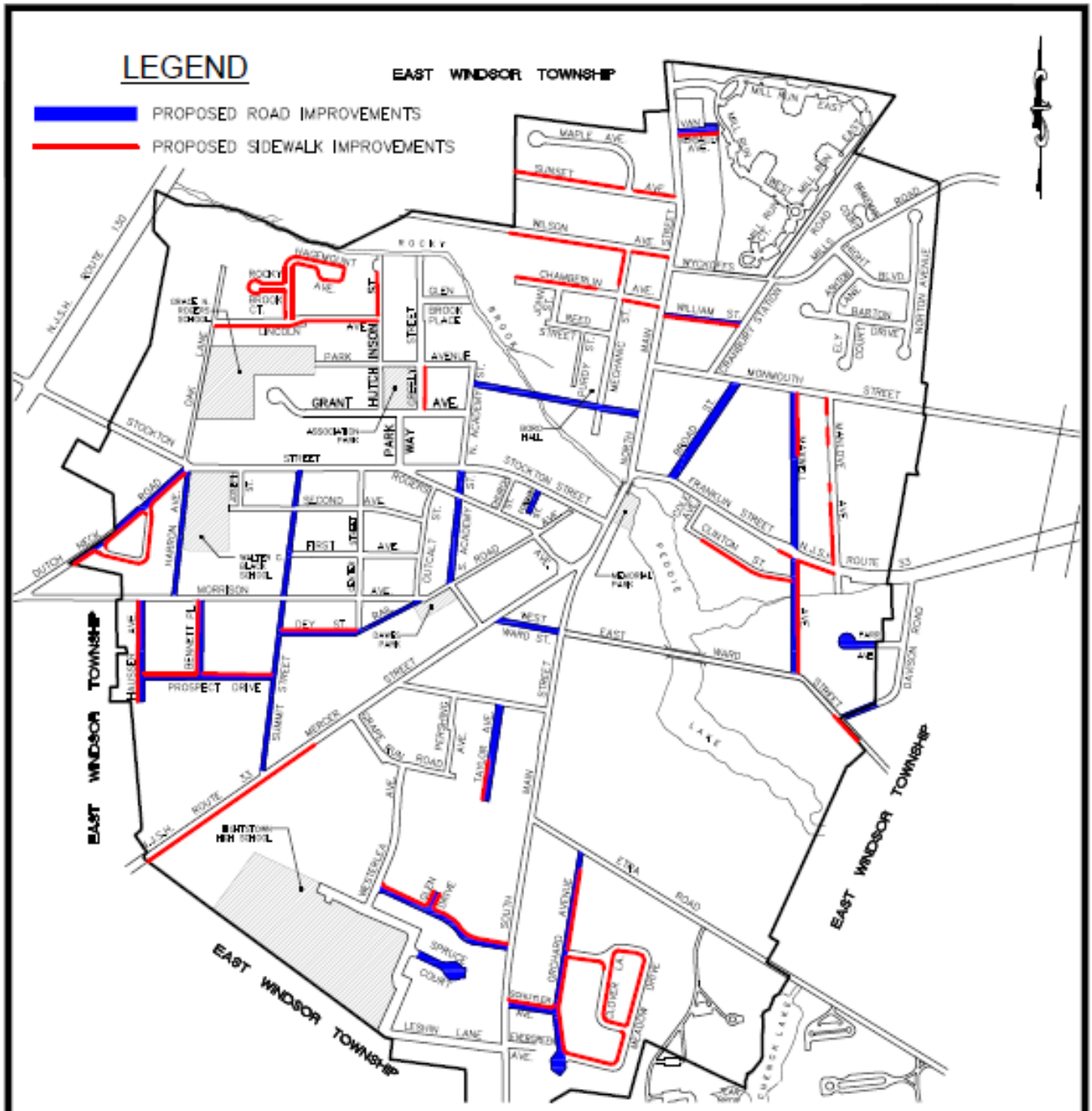
Roberts
ENGINEERING GROUP LLC
Woman Business Enterprise Certified
CERTIFICATE OF AUTHORIZATION: 24GA28159100
1670 Whitehorse-Hamilton Square Rd.
Hamilton, New Jersey 08690
609-586-1141 fax 609-586-1143
www.RobertsEngineeringGroup.com

LOCATION PLAN

SIDEWALK CAPITAL IMPROVEMENTS
BOROUGH OF HIGHTSTOWN
MERCER COUNTY, NEW JERSEY

SCALE: N.T.S.

DWG. No: H1606
DATE: 11/21/2017



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CERTIFICATE OF AUTHORIZATION: 24GA28159100

1670 Whitehorse-Hamilton Square Rd.
Hamilton, New Jersey 08690
609-586-1141 fax 609-586-1143
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LOCATION PLAN

ROAD AND SIDEWALK CAPITAL IMPROVEMENTS
BOROUGH OF HIGHTSTOWN
MERCER COUNTY, NEW JERSEY

SCALE: N.T.S.

DWG. No: H1606
DATE: 12/7/2017

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Hamilton, New Jersey 08690
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www.RobertsEngineeringGroup.com

MEMORANDUM

TO: Steven Misura, Council Member
Borough of Hightstown

FROM: Carmela Roberts, P.E., C.M.E. CR
Borough Engineer

RE: Sidewalks
Borough of Hightstown, Mercer County, New Jersey
Our File No.: H1504

DATE: April 20, 2018

As requested, the list below is of all the roads where sidewalks have been installed/replaced since 1995:

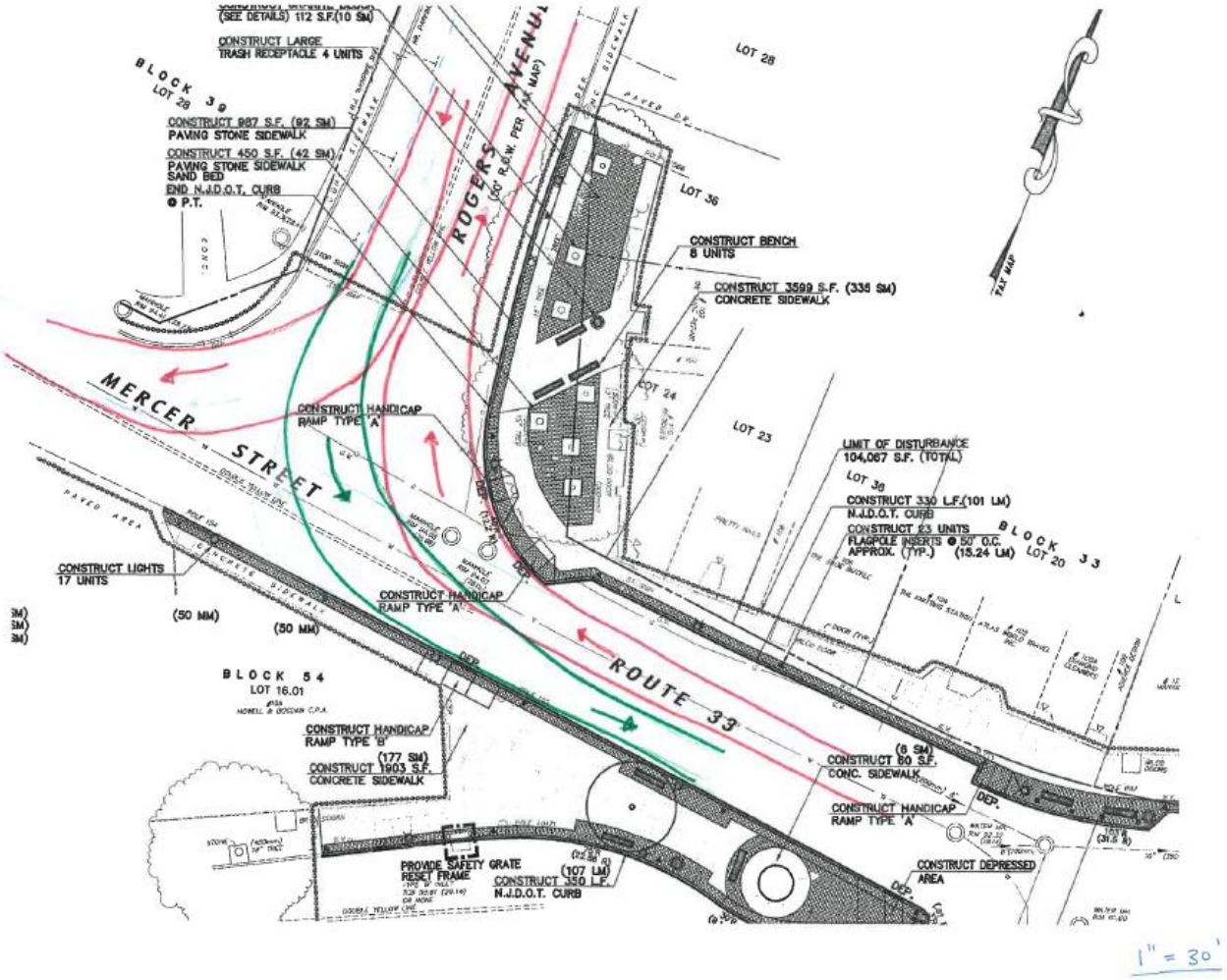
Street Name	Constructed Year
East Ward Street	2016
Etra Road	2015
Park Avenue/Greeley Street/Glen Brook Place/Hutchinson Street/Grant Avenue/Park Way	2015
Grape Run Road and Pershin Avenue	2013
Summit Street	2012
Mechanic/Chamberlin/Reed/Rev. Williams/Purdy	2011
Leshin Lane	2010
Memorial Park	2010
Stockton Street Historic District and Rogers Avenue	2009
Outcalt Street	2008
Morrison Avenue	2008
Westerlea Avenue	2008
Cole and Clinton Avenue	2007
Wilson Avenue	2006
Oak Lane	2005
Center Street	2004
Meadow Drive	2004
North Main Street and Bank Street	2004
Center Street	2003
Second Avenue	2003
Wyckoffs Mill Road	2003
Church and Forman Street	2002

Street Name	Constructed Year
Church Street and Forman Street	2001
Outcalt Street	2001
South Academy Street	2001
South Street	2001
Bank Street	1999
South Academy Street	1999
North Academy Street	1998
Summit Street and Harron Avenue	1996
Manlove Avenue	1995

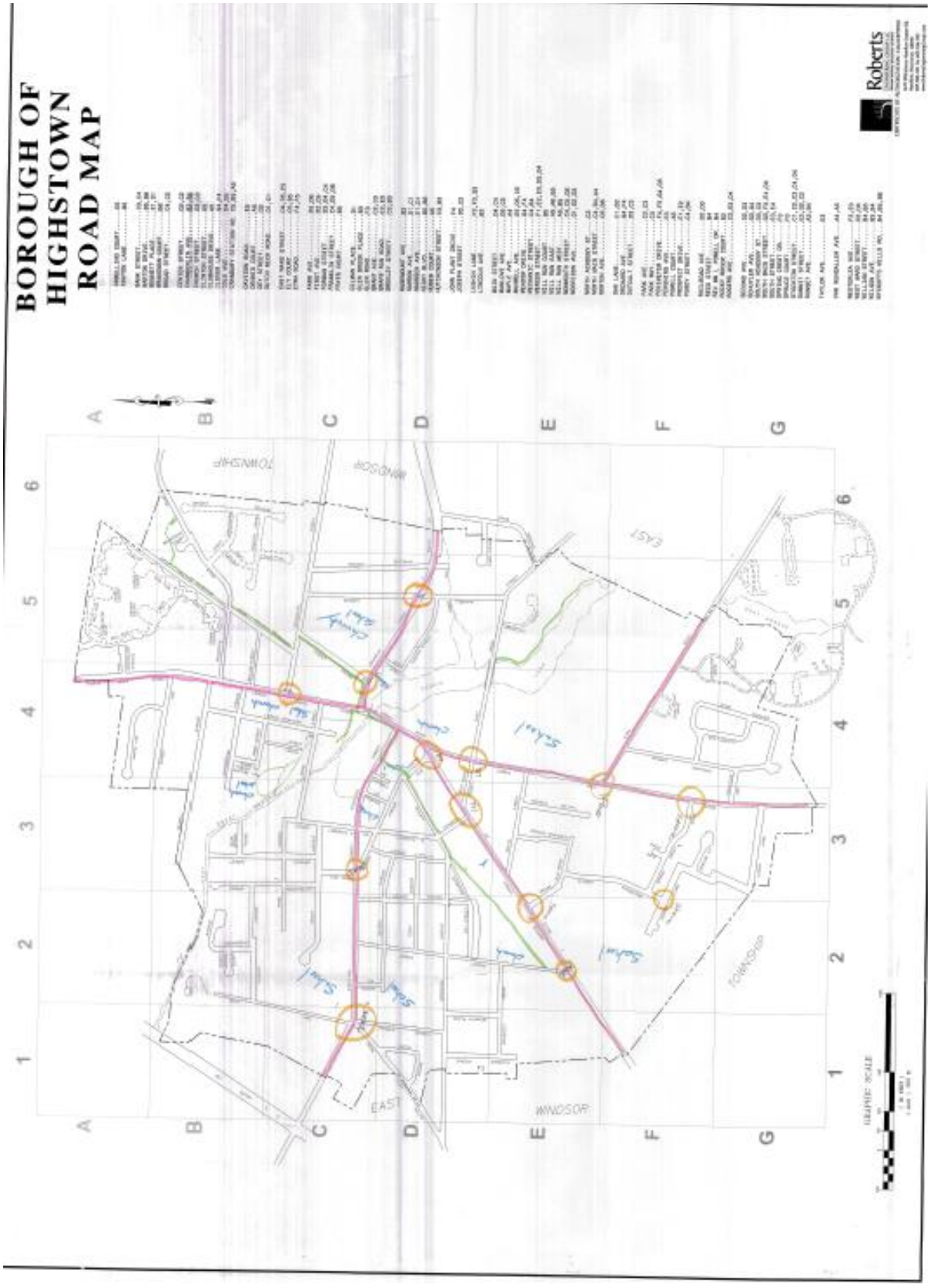
The list below is of all the roads where sidewalks are being funded and constructed in the near future:

Street Name	Constructed Year Expected
Maple Avenue and Sunset Drive	2018
Stockton Street and Joseph Street	2019
First Avenue	2019
Lincoln Avenue, Rocky Brook Court and Hagemount Avenue	2019

cc:


(SEE DETAILS) 112 S.F.(10 SM)
CONSTRUCT LARGE TRASH RECEPTACLE 4 UNITS
BLOCK 39 LOT 28
CONSTRUCT 987 S.F. (92 SM) PAVING STONE SIDEWALK
CONSTRUCT 450 S.F. (42 SM) PAVING STONE SIDEWALK SAND BED
END N.J.D.O.T. CURB @ P.T.
ROGERS AVENUE
(50' R.O.W. PER TAX MAP)
LOT 28
LOT 36
CONSTRUCT BENCH 8 UNITS
CONSTRUCT 3599 S.F. (335 SM) CONCRETE SIDEWALK
TAX MAP
MERCER STREET
CONSTRUCT HANDICAP RAMP TYPE 'A'
LOT 24
LOT 23
LIMIT OF DISTURBANCE 104,067 S.F. (TOTAL)
LOT 38
CONSTRUCT 330 L.F.(101 LM) N.J.D.O.T. CURB
CONSTRUCT 63 UNITS FLAGPOLE INSERTS @ 50' O.C. APPROX. (TYP.) (15.24 LM)
BLOCK 33 LOT 20
CONSTRUCT LIGHTS 17 UNITS
(50 MM)
(50 MM)
CONSTRUCT HANDICAP RAMP TYPE 'A'
BLOCK 54 LOT 16.01
ROUTE 33
CONSTRUCT HANDICAP RAMP TYPE 'B'
(177 SM)
CONSTRUCT 1903 S.F. CONCRETE SIDEWALK
(6 SM)
CONSTRUCT 60 S.F. CONC. SIDEWALK
CONSTRUCT HANDICAP RAMP TYPE 'A'
PROVIDE SAFETY GRATE RESET FRAME
(107 LM)
CONSTRUCT 350 L.F. N.J.D.O.T. CURB
CONSTRUCT DEPRESSED AREA
1" = 30'

Committee Priorities for Intersection Analysis, Summer 2018



Committee Priorities for Action, May 2019

TBD, placeholder