CITY OF NEWARK PEDESTRIAN AND BICYCLE SAFETY ACTION PLAN

FEBRUARY 2016

CITY OF NEWARK
Mayor Ras J. Baraka

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NJTPA
NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

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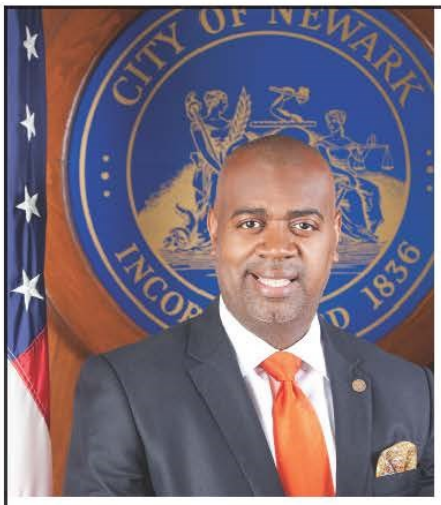

CITY OF NEWARK
Mayor Ras J. Baraka

August 25, 2015

Dear Fellow Newarkers:

As a Newark native, I – like thousands of other residents and visitors – have taken walks along many streets throughout the five wards of our City. From a stroll along Broad Street to a saunter down Ferry Street, Newark was designed from its founding 350 years ago with pedestrians in mind. And we are working to keep it that way.

The City has spent the last year working with stakeholders and the community to develop the City's first Pedestrian and Bicycle Safety Action Plan, which will guide us in improving pedestrian and bicycle safety across our City. Through a number of different design improvement areas, Newark is already proving to be a much safer place.

We have added street trees, better crosswalk lighting and safe bus stop locations. We also made many improvements at intersections by adding curb ramps, more cross walks, better pedestrian signals, mid-block crossing areas, pedestrian safety islands, and other crossing amenities throughout the city. To address auto safety, we have added speed humps, rumble strips and center medians.

The city has worked to make our streets safer for bicyclists. We have added shared roadways and bike lanes. We have added tools for bicycle intersections to ensure that bicyclists are given the right of way. We have also added new traffic safety policies and old ones are being strictly enforced.

I invite you to review the City of Newark Pedestrian and Bicycle Safety Action Plan, which can be found on our website: www.ci.newark.nj.us. You will see what we have done and are doing to transform Newark into a safer City we can all believe in, and one that is friendly to pedestrians, bicyclists, and motorists alike.

SIncerely,

Ras J. Baraka
Mayor

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Division of Traffic and Signals
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Division of Traffic Signals
255 Central Avenue
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Dear Friends,

We are pleased to present the *City of Newark Pedestrian and Bicycle Safety Action Plan*, a road map to safer streets and intersections. While the impetus for this plan was driven by an unacceptably high pedestrian fatality rate we are confident that the roadway design treatments, policy recommendations and educational strategies developed herein will produce real and lasting safety benefits for Newarkers and visitors alike. The primary goal of the plan is to improve all aspects of the street environment and to eliminate pedestrian and bicycle fatalities on our streets. This can only be accomplished by prioritizing pedestrian needs when designing streets, by educating all users about their roles and responsibilities for safely sharing the road and enforcing traffic laws. Using the plan's Implementation section as our call to action we will create a culture of safety and respect by addressing street design and behavior through education, engineering and enforcement.

Almost all trips, whether for work, school or pleasure begin and end with walking. Children walk to school or to the bus stop, commuters walk from the train station or parking lot to the office and residents walk to restaurants and shopping downtown and throughout the City's commercial corridors. Newark's pedestrians are vital to both the economic health and social vibrancy of our City. Designing better pedestrian and bicycle facilities will improve safety, improve quality of life and help businesses grow. By creating walkable and bike friendly streets, we will make our City a place where people want to live, work and play.

We invite you to read the following *City of Newark Pedestrian and Bicycle Safety Action Plan* to explore the issues and challenges facing our City as well as tools available to address these concerns. We are excited to put these tools to work to reshape our City's streets and build a transportation culture in Newark that is based on safety and respect for all roadway users.

Sincerely,

Jack M. Nata
Manager, Division of Traffic and Signals

Defining the Vision. Shaping the Future.

NJTPA
NORTH JERSEY
TRANSPORTATION
PLANNING AUTHORITY

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Dear Friends,

The North Jersey Transportation Planning Authority (NJTPA) is pleased to join the City of Newark in presenting the City's Pedestrian and Bicycle Safety Action Plan.

Safety for all travelers is the highest priority of the NJTPA Board of Trustees, which is why we regularly fund critical safety-related initiatives such as this one. The City and the NJTPA have a long history of working together to improve bicycle and pedestrian safety. With funding from the NJTPA's Local Safety Program, the City is making relatively low-cost, quick-fix safety improvements at many intersections throughout the city. These eight projects total nearly $11 million in safety investment.

Infrastructure improvements like those are critical to improving safety, but so too are education and enforcement. Newark also has been a leader in this area, particularly in implementing the NJTPA's Street Smart NJ pedestrian safety education campaign. The City was one of the first municipalities to join the campaign during its initial pilot phase in 2013, and we officially kicked off this effort at a well-attended event held at New Jersey Institute of Technology here in Newark. Through high-visibility messaging and targeted law enforcement, the campaign led to drivers and pedestrians alike making safer decisions when traveling in Newark.

The City of Newark Pedestrian and Bicycle Safety Action Plan builds on these great successes by providing a City-wide vision of how to make walking and biking safer. The NJTPA looks forward to working with the City of Newark to make this vision a reality.

Sincerely,

MK Murphy

Mary K. Murphy
Executive Director

EXECUTIVE SUMMARY

PEDESTRIAN FOCUS CITY

In 2011, the Federal Highway Administration (FHWA) designated the City of Newark as a Pedestrian Safety Focus City due to pedestrian fatality rates exceeding the national average. Cities are identified as pedestrian focus cities if they have more than 20 average annual pedestrian fatalities or a pedestrian fatality rate greater than 2.33 per 100,000 population. In addition to training and technical assistance related to pedestrian safety, the FHWA recommends that each pedestrian focus city develop and implement a Pedestrian Safety Action Plan to identify where to address pedestrian safety issues with the goal of reducing the frequency and severity of pedestrian crashes.

This plan is a collaborative effort between the City of Newark and the North Jersey Transportation Planning Authority (NJTPA) with input from stakeholders and the community. The plan's intent is two-fold: to serve as a guide for city staff prioritize locations of greatest concern and also to inform the public where the city intends to focus its efforts.

Funding for this plan was provided by the FHWA Highway Safety Improvement Program (HSIP) funds through the NJTPA.

VISION STATEMENT

The City of Newark is committed to reducing pedestrian fatalities to zero over the next 10 years by creating policy, developing education and enforcement programs and improving infrastructure to support and safely accommodate walking and bicycling on our streets.

SAFETY ACTION PLAN COMPONENTS

DATA AND ANALYSIS

OUTREACH

IMPLEMENTATION

TOOLBOX OF IMPROVEMENTS

*In **2010**, the year before Newark was designated a pedestrian focus city by FHWA, there were 506 pedestrian crashes, of which 12 were pedestrian fatalities and 10 were severe injury crashes.*

EXECUTIVE SUMMARY

PEDESTRIAN AND BICYCLE SAFETY ACTION PLAN

The City of Newark's Pedestrian and Bicycle Safety Action Plan is both a data-driven and community-driven plan that provides a roadmap for reducing pedestrian fatalities and serious injuries throughout the city. The Plan:

- Identifies the high crash locations (both intersections and corridors) from five years of crash data.
- Includes input from stakeholders and the community.
- Provides a toolbox of strategies incorporating the **three E's of Safety:** Engineering, Education and Enforcement.
- Provides screening methods to identify future locations for safety improvements.
- Provides implementation recommendations for safety improvements at high crash locations.
- Provides a bicycle master plan.
- Recommends funding opportunities and partnerships.

Goals

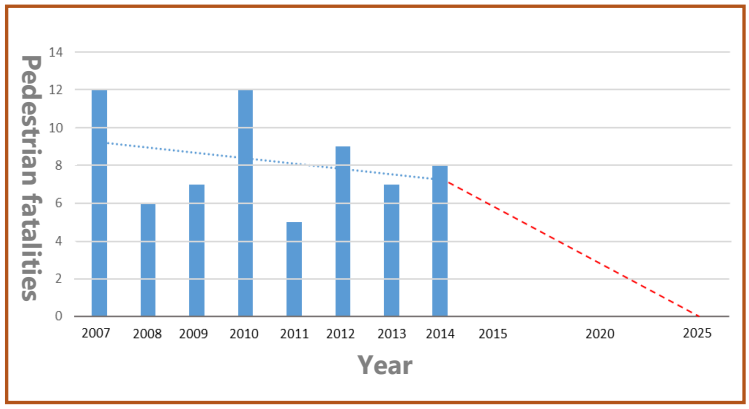
The **short-term goals** of this plan are to:

- Adopt a Vision-Zero Policy
- Implement low cost, high impact city-funded engineering safety improvement efforts at high crash locations identified in the plan.
- Adopt the Street Smart NJ pedestrian safety education campaign as a continuing effort for the city.
- Perform targeted enforcement details at high crash locations identified in the plan.

The **long-term goals** of this plan are to:

- Accelerate the downward trend in annual pedestrian fatality rates with the goal of reaching zero by **2025**.
- Create a Transportation Safety Committee.
- Secure federal funding for safety improvement projects at the high crash locations identified in this plan.
- Implement the bicycle master plan by 2025, which includes approximately 90 street miles of bike lanes .

Figure 1
Annual Pedestrian Fatalities
in the City of Newark from 2009-2014

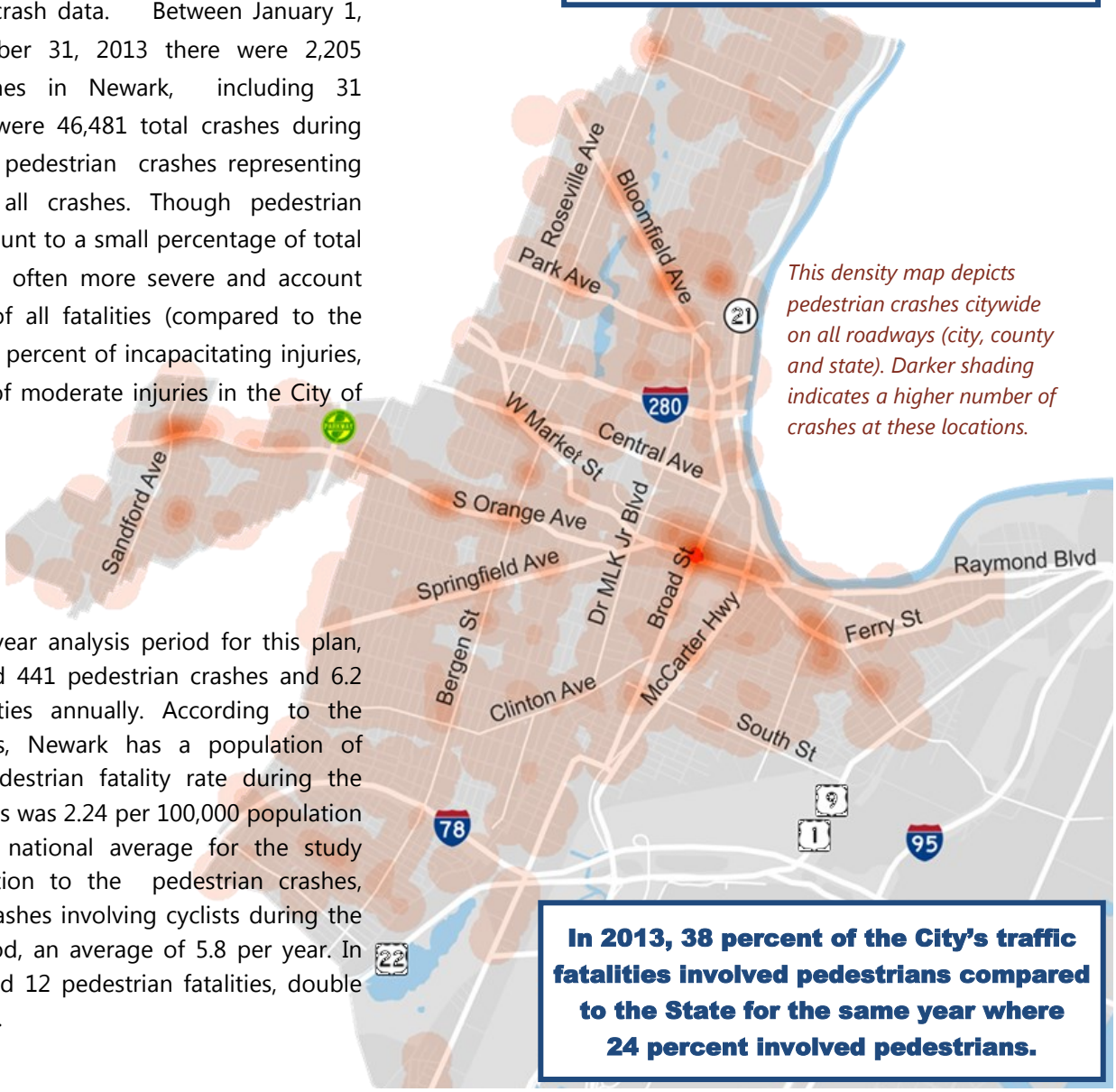


INTRODUCTION

RECENT CRASH HISTORY

The Newark Pedestrian Safety Action Plan looks at five years of crash data. Between January 1, 2009 to December 31, 2013 there were 2,205 pedestrian crashes in Newark, including 31 fatalities. There were 46,481 total crashes during this period, with pedestrian crashes representing 4.7 percent of all crashes. Though pedestrian crashes only amount to a small percentage of total crashes, they are often more severe and account for 34 percent of all fatalities (compared to the State at 29%), 28 percent of incapacitating injuries, and 24 percent of moderate injuries in the City of Newark.

Pedestrians account for fewer than 5 percent of all crashes, but 34 percent of all fatalities in the City.

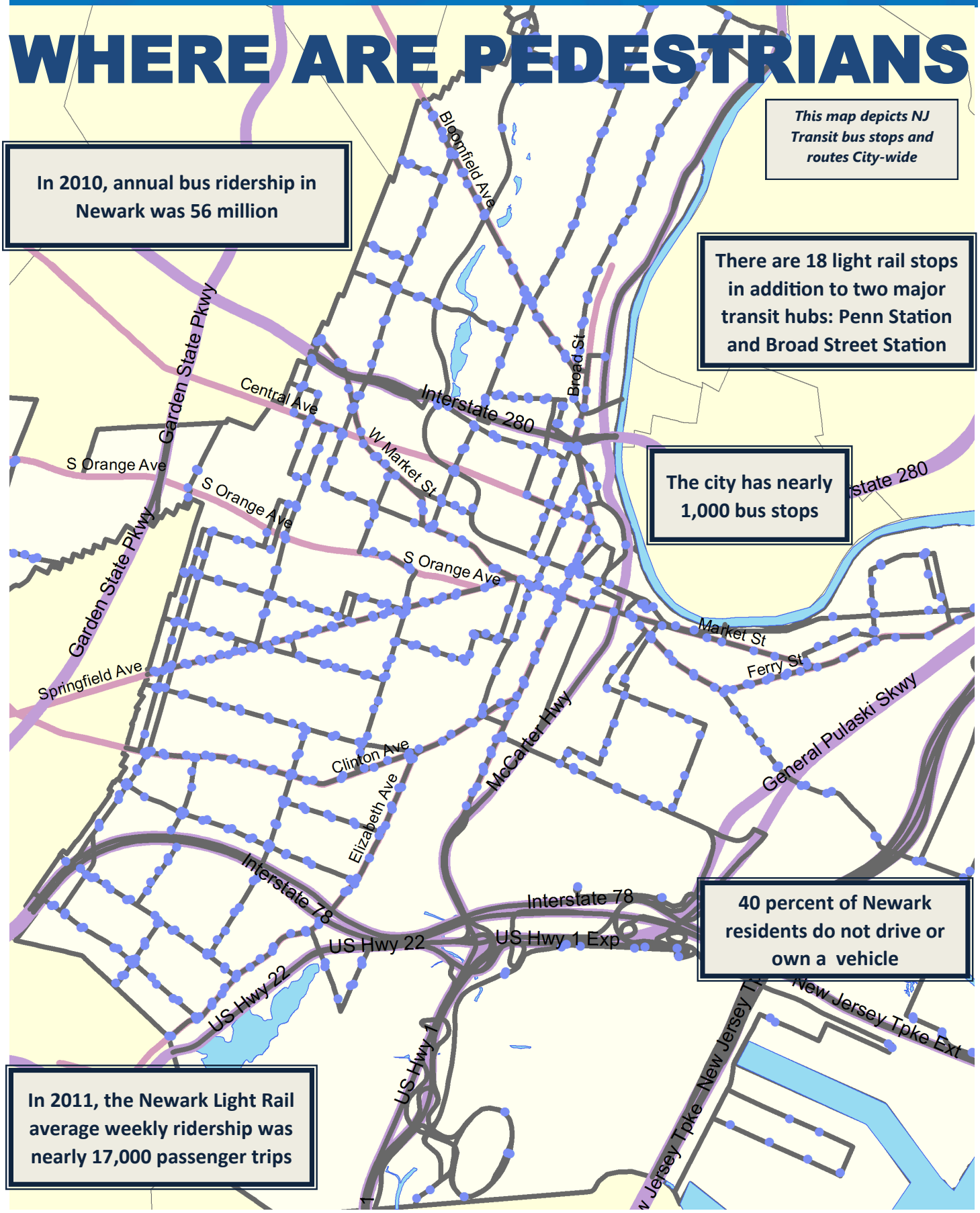


This density map depicts pedestrian crashes citywide on all roadways (city, county and state). Darker shading indicates a higher number of crashes at these locations.

During the five year analysis period for this plan, the city averaged 441 pedestrian crashes and 6.2 pedestrian fatalities annually. According to the 2010 US Census, Newark has a population of 277,140. The pedestrian fatality rate during the study period years was 2.24 per 100,000 population (slightly below national average for the study period). In addition to the pedestrian crashes, there were 29 crashes involving cyclists during the same study period, an average of 5.8 per year. In 2010, the city had 12 pedestrian fatalities, double the previous year.

In 2013, 38 percent of the City's traffic fatalities involved pedestrians compared to the State for the same year where 24 percent involved pedestrians.

WHERE ARE PEDESTRIANS



In 2010, annual bus ridership in Newark was 56 million

This map depicts NJ Transit bus stops and routes City-wide

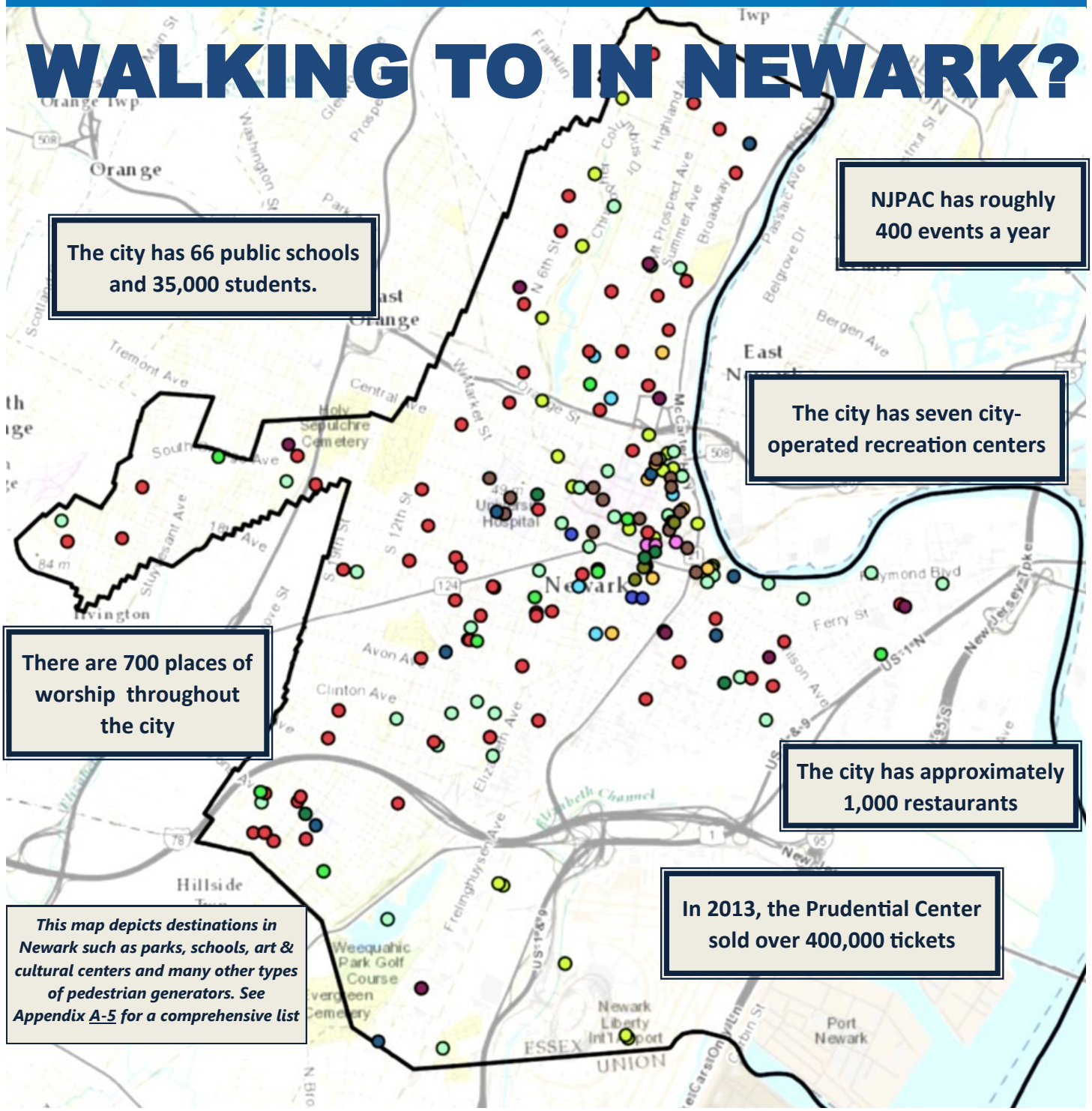
There are 18 light rail stops in addition to two major transit hubs: Penn Station and Broad Street Station

The city has nearly 1,000 bus stops

40 percent of Newark residents do not drive or own a vehicle

In 2011, the Newark Light Rail average weekly ridership was nearly 17,000 passenger trips

WALKING TO IN NEWARK?



The city has 66 public schools and 35,000 students.

NJPAC has roughly 400 events a year

The city has seven city-operated recreation centers

There are 700 places of worship throughout the city

The city has approximately 1,000 restaurants

In 2013, the Prudential Center sold over 400,000 tickets

This map depicts destinations in Newark such as parks, schools, art & cultural centers and many other types of pedestrian generators. See Appendix A-5 for a comprehensive list

Everyone is a pedestrian in Newark, whether you are a resident, student, employee or a visitor. Students walk to school, residents catch buses to work or make visits to the corner market, employees walk from transit to their places of work and to restaurants during lunch, kids walk with their parents to parks, families walk to places of worship, and out-of-towners walk to the Prudential Center or NJ PAC to catch a game or show.

INTRODUCTION

CURRENT AND PAST EFFORTS

For more than a decade, the City of Newark has been focused on providing safe streets for all users. Initially, in the early 2000s, efforts focused on school safety and pedestrian safety with the city employing numerous engineering measures. But more recently, education and enforcement have been introduced in an effort to employ the 3 E's of safety (engineering, education and enforcement). Additionally, in 2012 the city adopted a Complete Streets Policy. Current and past efforts by the city to increase pedestrian and bicycle safety are highlighted in the table below:

"The City of Newark is committed to creating street corridors and intersections that safely accommodate all users of all abilities" - excerpt from Newark's complete streets policy resolution adopted September 6, 2012

Projects	Description/Scope	Year Completed
School Flashing Signal Program	Established School Slow Zones at 32 schools by installing 67 school flashing signals. The speed limit is posted at 20 mph when school signals are flashing.	**2006**
School Safety Program	Installed advanced warning and school crossing signs at 315 intersections.	**2007**
Pedestrian Safety Program	Installed pedestrian crossing signs and restriped crosswalks at 185 intersections.	**2009**
West Ward Traffic Calming	Installed traffic calming measures along 43 streets including 60 speed humps, one speed table, corner bump-outs, lane diets (i.e. lane width reduction), rumble strips and warning signs.	**2012**
Central Ward Traffic Calming	Installed traffic calming measures along 10 streets including 15 speed humps, corner bump-outs, lane diets, rumble strips and warning signs.	**2012**
Citywide Traffic Calming	Installed 120 speed humps along neighborhood streets and school zones, and a Rectangular Rapid Flashing Beacon (RRFB) at W. Market Street and 4th Street/Littleton Avenue.	**2014**

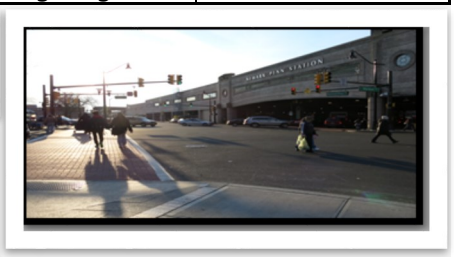
INTRODUCTION

Projects	Description/Scope	Year Completed
Dr. Martin King Jr. Blvd and Spruce St, Bloomfield Ave and Mt. Prospect Ave	Installed corner bump-outs, new traffic signals with pedestrian countdown signals, new signs, school flashing signals and center medians.	**2006**
West Market St, 4th St and Littleton Ave	Installed corner bump-outs, center medians with pedestrian refuge, new signs and high visibility stamped brick crosswalks.	**2005**
Raymond Blvd (between Freeman St and Somme St)	Installed two new traffic signals with pedestrian countdown signals, guide rails, high visibility stamped brick crosswalks, new signs and new pavement markings.	**2006**
Broad Street Streetscape Project (between Franklin St and New St)	Replaced eleven existing traffic signals and added pedestrian countdown signals, new curb and sidewalks, ADA curb ramps, corner bump-outs, landscaped center medians with pedestrian refuge, pedestrian fencing, new street lighting, street furniture, bus shelters, high visibility stamped brick crosswalks, new signs, lane diet and new pavement markings.	**2015**

Ferry Street Streetscape Project (between Raymond Plaza East and Merchant St)	Replaced six existing traffic signals and added pedestrian countdown signals, corner bump-outs, new curb and sidewalks, ADA curb ramps, new street lighting, street furniture, high visibility stamped brick crosswalks, a pedestrian safety island, new signs and new pavement markings.	**2012**
Norfolk Street, Jones Street and Irvine Turner Blvd Traffic Calming Project	Replaced six existing traffic signals and added pedestrian countdown signals. Upgraded three existing traffic signals to include pedestrian countdown signals and left turn signals. This project also included new curb and sidewalks, ADA curb ramps, raised intersections, new signs, lane diet, bike lanes and landscaping medians.	**2012**
Newark Greenway Bicycle Route Project	Installed bike lanes to connect Weequahic Park in the South Ward to Branch Brook Park in the North Ward.	**2015**
Wilson Ave Traffic Signals Project	Replaced two existing traffic signals and added pedestrian countdown signals and added two new traffic signals with pedestrian countdown signals. This project also included new ADA curb ramps, new sidewalks, warning and regulatory signs and new pavement markings.	**2014**

INTRODUCTION

Projects	Description/Scope	Year Completed
Clinton Ave and South Orange Ave Streetscape	Replaced eight existing traffic signals and added pedestrian countdown signals, new curb and sidewalks, ADA curb ramps, corner bump-outs, LED street lighting, lane diets, street furniture, new signs and new pavement markings.	**2014**
Mt. Prospect Ave and Lower Broadway Streetscape	Replaced seven existing traffic signals and added pedestrian countdown signals, new curb and sidewalks, ADA curb ramps, corner bump-outs, LED street lighting, lane diets, street furniture, new signs and pavement markings including reverse angle parking on Lower Broadway and protected bike lanes on Mt. Prospect Ave.	**2015**
Citywide Bike Lanes	Constructed ten miles of bike lanes, connecting city and county parks, Rutgers University and NJIT, schools and several commercial corridors.	**Ongoing Since 2011**
Penn Station Circulation	Replaced four existing traffic signals and added pedestrian countdown signals and audible push buttons, new ADA curb ramps, corner bump-outs, imprinted crosswalks and LED street lighting.	**2013**



Project Red Light - Red Light Photo Enforcement Pilot Program	Installed cameras at 19 high crash intersections. Cameras that were in operation for five years yielded a 100 percent reduction in right-angle crashes, 83 percent reduction in rear-end crashes and 83 percent reduction in total number of crashes.	**2014**
NJ Street Smart Pedestrian Safety Education Pilot Campaign	Participated in the Street Smart NJ pilot campaign, a public education, awareness and enforcement campaign. The city partnered with local businesses, business improvement districts, higher educational institutions, non-profit organizations and neighborhood associations.	**Ongoing Since 2013**
Pediatric Pedestrian Injury Prevention Partnership (PIPP)	Community coalition including public health professionals, law enforcement, school representatives, local governmental, advocacy and community-based agencies supporting each other's applications for grant funding and collaborating on local safety programs. The New Jersey Trauma Center (NJTC) partners with Newark Public Schools to provide pedestrian safety education programs to students to reduce the incidence of traumatic injuries due to pedestrian related crashes.	**Ongoing Since 2009**

INTRODUCTION

DATA AND ANALYSIS

Pedestrian and bicycle crash information citywide was analyzed during this study. Five years of crash data from 2009-2013 was used to rank the highest crash volume and most severe intersections and corridors throughout the city. From this ranking, the top 10 intersections and corridors under the city's jurisdiction were identified and further reviewed for potential safety improvements detailed in the Implementation chapter of this plan.

COMMUNITY OUTREACH

Concurrent with the data and analysis, there was community outreach throughout the development of this plan. Stakeholders and Steering Committee members were identified at the start of the project. Steering committee members helped guide decisions on public outreach, and provided input on the policies, toolbox of improvements and other recommendations in the plan. Stakeholder and steering committee members included community leaders, hospitals, higher learning institutions, large employers and venues in the Central Business District (such as Prudential, the Prudential Center and NJPAC), the Department of Education, business leaders, interested agencies (such as FHWA, NJ Department of Transportation, and the Essex County Sherriff's office), and other groups. A complete list of stakeholder and steering committee members can be found in the Acknowledgements.

Three public information centers were held in different locations in the city to gather input from different wards:

- November 12, 2014-Prospect Firehouse, East Ward
- March 26, 2015-La Casa de Don Pedro, Central Ward
- June 4, 2015-First Zion Hill Missionary Baptist Church, South Ward

At each meeting, the plan's progress was presented and workshop exercises were conducted to gather input from the public attendees.

In addition, visitors to the PSE&G Plaza Farmer's Market on June 11, 2015 were surveyed on their views of the project and its recommended improvements.

IMPLEMENTATION

The Pedestrian and Bicycle Plan is the Safety Action Plan "roadmap" to identify existing locations in need of improvements through data-driven and community-driven approaches, along with methods to identify additional locations in need of improvement. The plan will be used to guide the city's with future decisions in prioritizing safety improvements.

This section of the Pedestrian and Bicycle Safety Action Plan describes the recommended methods for implementing the 3-E strategies and policies developed through the data-driven and community-driven plan. First, the recommended implementation method of pedestrian and bicycle safety engineering improvements at high crash locations is described for intersections and corridors. Next, options for implementing bike facilities are presented. The partners and funding options to provide the capital investment, design and construction resources, and permitting and approvals for implementing projects developed under the Pedestrian and Bicycle Safety Action Plan strategies are named. Finally, the integration of the NJTPA's Street Smart NJ Campaign into the Pedestrian and Bicycle Safety Action Plan for its education and enforcement strategies is presented.

Many activities have been completed or are currently underway that can reduce the severity and frequency of pedestrian crashes. The City of Newark, NJTPA, NJ Division of Highway Traffic Safety (NJDHTS), NJ Department of Transportation (NJDOT) and Urban Enterprise Zones (UEZs) have funded these activities.

TOOLBOX OF IMPROVEMENTS

The toolbox is a set of potential strategies intended to improve pedestrian and bicycle safety citywide. It includes physical strategies (engineering), education, enforcement and policy strategies. The toolbox is a part of this plan beginning on page 6-1 where the strategies summarized below are explained in detail.

Engineering

A scan of current and feasible pedestrian and bicycle safety improvements and policies to potentially reduce the severity and frequency of pedestrian crashes was undertaken in Newark, New York City, New Jersey and nationally. The resulting research and recommended toolbox of improvements is presented herein. The City of Newark Pedestrian and Bicycle Safety Action Plan Toolbox is composed of five sections of engineering improvements:

Street Design – strategies to improve the safety and appearance of walking along city streets, such as sidewalks with adequate area for street furniture, pedestrian zones and building frontages, street trees to beautify the street and calm traffic, lighting to illuminate pedestrians, proper access to transit and bus stops, and, in the case that pedestrian crossings must be prohibited, pedestrian fencing.

Intersection and Crossing Design – curb ramps to provide access to crossings for all users, curb extensions to reduce the pedestrian crossing distance and calm traffic, crosswalks to establish a marked crossing for pedestrians, medians/center islands to provide pedestrian refuge while crossing streets, pedestrian signals to indicate when to legally cross a street, Rectangular Rapid Flashing Beacons and in-road "Stop for Pedestrians" signs to increase vehicular compliance with stop for pedestrians in crosswalk laws, midblock crossings to legally establish pedestrian right-of-way to cross and pedestrian signal timing strategies to increase crossing times or lead pedestrian intervals, which gives pedestrians a head start.

Sample strategies from the Toolbox

Speed Control – rumble strips, speed humps and speed tables, center medians, gateway treatments, chicanes, chokers, diverters, roundabouts, and road diets to calm traffic, dedicate more of the street space to pedestrian and bicycle use and for beautifying neighborhoods.

Bicycle Lanes, Paths and Routes – shared roadways or bicycle boulevards to provide warning to vehicles that bikes may be present, bike lanes (unbuffered, buffered and separated) to indicate a separate travel way for cyclists, contraflow or two-way separated bike lanes to provide more direct routes for cyclists against traffic, or a multiuse path that is completely separated from streets.

Bicycle Intersection Tools – bike boxes, bike signals, two-stage turn queue boxes, mixing zones and striping through intersections to facilitate turning movements for bikes across through traffic and navigating intersections.

TOOLBOX OF IMPROVEMENTS

Education, Enforcement and Policy

The toolbox also contains a section on pedestrian and bicycle safety policies, which include strategies and approaches toward the goal of reducing or eliminating pedestrian and bicycle fatalities in the City of Newark. Those policies are:

Vision Zero Policy – a policy with the message that no pedestrian or bicycle deaths are acceptable

Neighborhood Slow Zone – reduces speeds below prevailing limits in a residential area

Arterial Slow Zone – reduces speeds below prevailing limits in commercial area

School Slow Zone – reduces speeds near school

Lateral Clearance for Motor Vehicles When Passing Bicyclists – provides the city the option to pass a law to protect bicyclists from passing vehicles by providing a safe distance between cyclists and passing vehicles

Police Enforcement – allows for more aggressive enforcement of vehicle and traffic safety laws in support of the Pedestrian and Bicycle Safety Action Plan

Education & Outreach – advocates for the city to pursue additional community education and outreach activities such as Street Smart NJ to educate pedestrians, cyclists and motorists on the need to follow vehicle and traffic safety laws.

No-Turn-on-Red Prohibition – a citywide ban on turning while traffic signals are red

Reduced Speed Limit on County & State Roads – Newark's local streets are set at 25 miles per hour, but Essex County and state routes have higher speed limits

Automated Pedestrian Signals – the removal of pedestrian pushbuttons (except where Accessible Pedestrian Signals are needed) to reinforce the behavior of motorists to expect pedestrians crossing at signalized intersections at any time, citywide; also includes the option for pedestrian detection to actuate traffic signals or beacons to provide WALK phases

DATA AND ANALYSIS

HIGH CRASH LOCATIONS

Pedestrian and bicycle crash information throughout the city was obtained from Plan4Safety. Plan4Safety is a crash analysis tool created by the Rutgers Center for Advanced Infrastructure and Transportation which includes a database of all crash records within the state. Five years of pedestrian and bicycle crash data from 2009 – 2013 was used to identify and rank the highest, most severe crash intersections and corridors throughout Newark including city, county and state controlled roadways (see Appendix A-1 for the complete list). From this list, the 10 highest crash intersections and corridors under the city's jurisdiction were identified.

Intersections involving one or more Essex County routes or New Jersey state highway or interstate routes were excluded from the top 10 list because the action plan is focused on making improvements on streets and intersections under the city's jurisdiction.

For the high crash corridors, all crash types were included in the analyses to allow for longer segments to be identified as corridors in need of pedestrian, bicycle and traffic calming improvements. A standard safety metric was used, Killed & Seriously Injured per mile (KSI/mile), which gives the rate of total fatalities and incapacitating injuries per mile by calculating the total number of pedestrians, cyclists, drivers and occupants killed or seriously injured and dividing by the length of the corridor (in miles) for each of the corridors in the crash dataset. The corridors were ranked based on the KSI per mile metric to identify the 10 highest severe crash corridors.

In order to identify crash patterns and determine the statistical profile of roads, drivers and pedestrians involved, the crash data for the 10 highest crash intersections and corridors were further analyzed to review various crash attributes related to environmental, geometric, vehicular and human/behavioral factors.

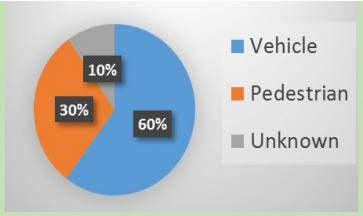
Environmental and geometric factors included:

- time of day
- light condition
- surface condition
- presence or absence of a median

Vehicular factors included vehicle approach direction

Human/behavioral factors (both driver and pedestrian) included:

- alcohol involvement
- age
- gender



Primary Contributing Factor – Intersections

Crash attributes are summarized in Appendix A-2. Select attributes are also shown in figures in the Implementation Section for the high crash locations.

HIGH CRASH INTERSECTIONS

1. Broad Street and Market Street
2. Market Street and Mulberry Street
3. Bergen Street and 12th Avenue
4. Ferry Street and Monroe Street
5. Raymond Boulevard and Raymond Plaza East
6. Walnut Street and McWhorter Street
7. Ferry Street and Adams Street
8. Raymond Boulevard and Mulberry Street
9. 7th Avenue and Colonnade Place
10. Market Street and Raymond Plaza East

HIGH CRASH CORRIDORS

1. Lincoln Park from Clinton Avenue to Broad Street
2. Dayton Street from Evergreen Avenue to Frelinghuysen Avenue
3. Broad Street from Poinier Street to dead end (near Oriental Street)
4. South Street from Pennsylvania Avenue to Delancy Street
5. Bergen Street from Grumman Avenue to W. Market Street
6. Clinton Avenue from S. 20th Street to Lincoln Park
7. 14th Avenue from S. 20th Street to Jones Street
8. 18th Avenue from Irvine Turner Boulevard to Sandford Avenue
9. Central Avenue Dr. MLK Jr. Boulevard to Broad Street
10. Orange Street from W. Market Street to Broad Street

PEDESTRIAN AND BICYCLE VOLUMES

Pedestrian and bicycle volume data was collected to compare the annual average number of pedestrian and bicycle crashes at a location to the number of pedestrians and cyclists crossing at the intersection or along the corridor to analyze the exposure. Volumes were collected at the 10 high crash intersections and one location along each of the 10 corridors during the a.m. and p.m. peak hours in May 2015 using a specialized app created for the Newark Pedestrian and Bicycle Safety Action Plan. Pedestrian and bike volumes were also collected at 10 control locations – five intersections and five midblock locations that are not high crash locations, i.e., had zero crashes during the study period – for comparison. The 10 comparison locations were chosen through a random number selection process and verified using maps to ensure that they were not dead-end streets or otherwise atypical locations. The rate of crashes by volume was calculated to compare the 10 high crash intersections and corridors to the 10 comparison locations as shown in Appendix A-3. Over 21,000 individual pedestrian and bicycle movements were collected during the AM and PM peak hours at 30 count locations. The pedestrian and bicycle crash and volume data were used to identify potential screening methods.

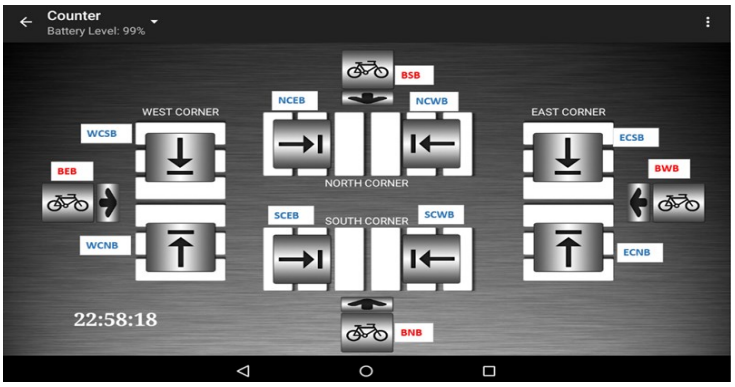
PHYSICAL INVENTORY OF HIGH CRASH LOCATIONS

In addition to crash history and pedestrian and bike a.m. and p.m. peak hour volumes, a physical inventory was conducted for each of the 10 high crash intersections, corridors, as well as 10 control locations. Aerial and street view images were used and verified in the field. Intersection inventory included:

- Presence or absence of signalized traffic control
- Pedestrian signals
- Crosswalks and pedestrian curb ramps
- Pedestrian warning signs
- Median refuge (pedestrian islands or raised medians)
- Street lighting

Corridors were inventoried for the entire length using online aerial and street view images and included:

- Road width and number of travel lanes
- Presence or absence of on-street parking
- Sidewalks
- Midblock crosswalks

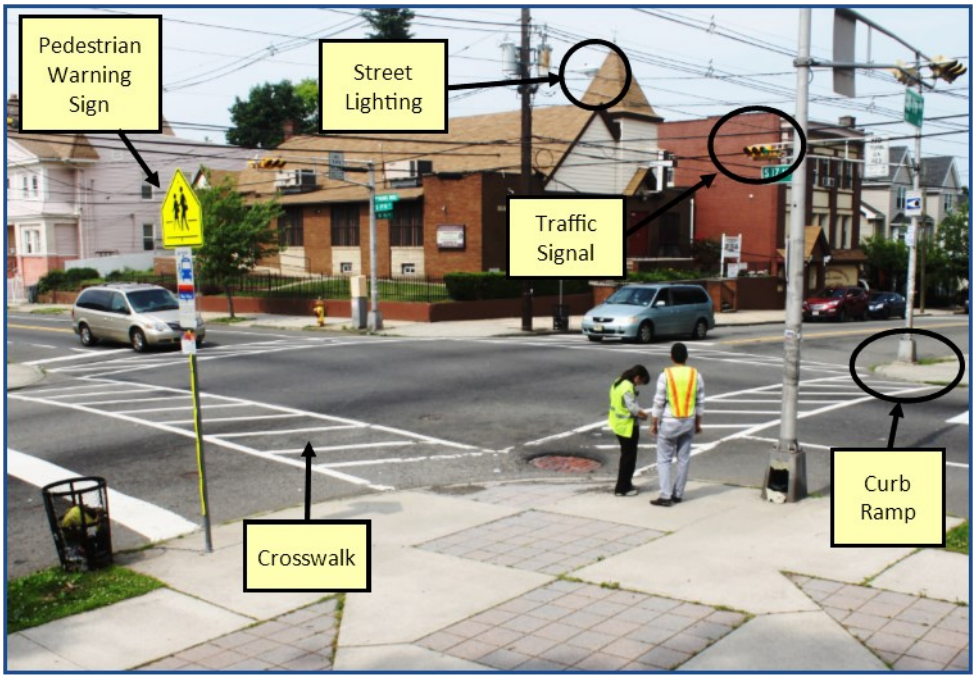


Screen shot of the app developed for this project to collect pedestrian and bicycle volumes.

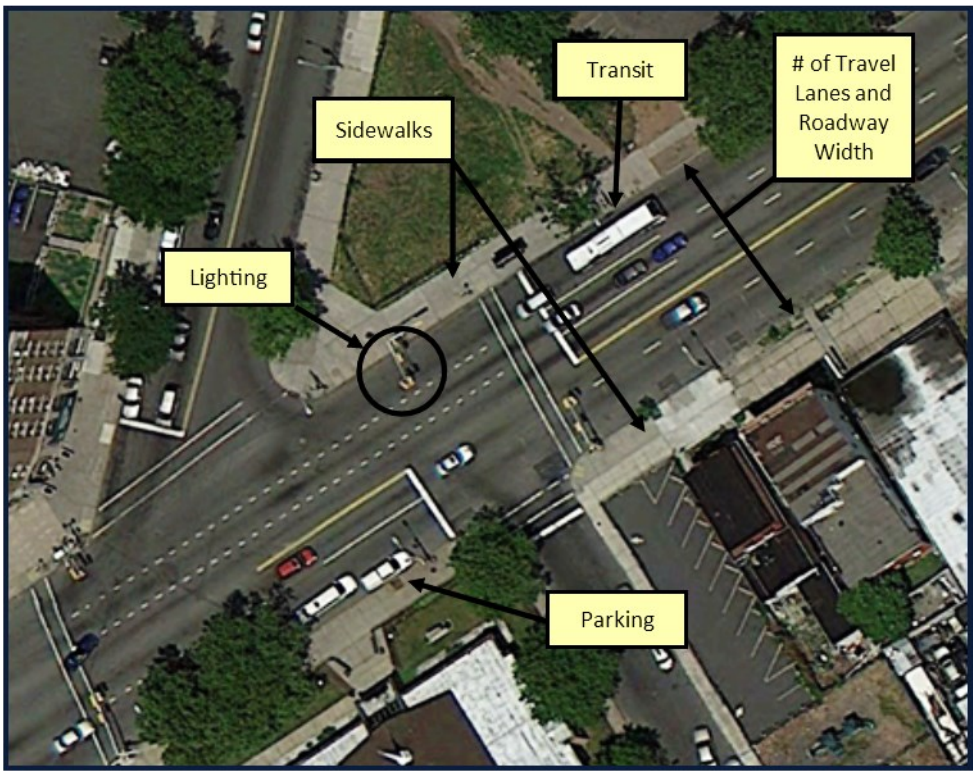
Table 3-1
Total crashes and volumes at high crash intersections

Intersection	Pedestrian Crashes	AM Peak Hour Pedestrian Volumes	PM Peak Hour Pedestrian Volumes	Bike Crashes	AM Peak Hour Bike Volumes	PM Peak Hour Bike Volumes
Broad Street at Market Street	17	2439	3556	-	9	20
Market Street at Mulberry Street	8	116	837	1	-	5
Bergen Street at 12th Avenue	7	313	412	-	4	5
Ferry Street at Monroe Street	5	333	778	-	5	9
Raymond Blvd at Raymond Plaza East	5	234	326	-	4	5
Walnut Street at McWhorter Street	5	97	140	-	2	8
Ferry Street at Adams Street	4	376	973	1	11	15
Raymond Blvd at Mulberry Street	4	419	394	1	-	9
7th Ave at Colonnade Plaza	3	314	42	1	7	1
Market Street at Raymond Plaza East	4	445	509	-	2	4

	Intersection Characteristics	Observation
1.	Crosswalk Style	Continental
2.	Pedestrian Warning Sign	Yes
3.	Pedestrian Ramp	Yes
4.	Median Refuge	No
5.	Traffic Signal	Yes
6.	Pedestrian Count-down Signals	No
7.	Street Lighting	Yes



	Corridor Characteristics	Observation
1.	Estimated No. of Travel Lanes	5
2.	Width of Roadway	75’
3.	Parking	Yes
4.	Parking Stripes	No
5.	Median/Pedestrian Refuge	No
6.	Sidewalks	Both Sides
7.	Midblock Crosswalks	No
8.	Street Lighting	Yes
9.	Transit Route	Yes

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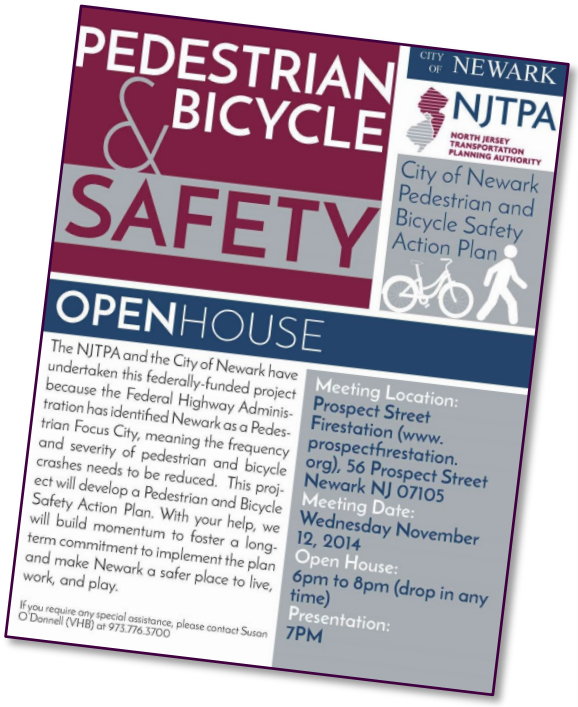
OUTREACH

The City of Newark Pedestrian and Bicycle Safety Action Plan process involved significant community outreach efforts, including four Stakeholder/Steering Committee meetings and three Public Information Centers, as well as a survey administered during a June 11, 2015 Farmer's Market. Based on input from Steering Committee/Stakeholder members, the stakeholder meetings were held on weekdays from 10 to 11 a.m. at NJTPA's offices and Public Information Centers were held on weekday evenings from 6 to 8 p.m. at three locations throughout the city.

For each Public Information Center, flyers were created advertising the location and agenda, which were posted on the City of Newark and NJTPA websites, along with Facebook and Twitter. Nearly 200 participants from different communities across the city helped shape the Newark Pedestrian and Bicycle Safety Action Plan through stakeholder and community outreach activities.



STAKEHOLDER OUTREACH

MEETING #1

When: August 7, 2014

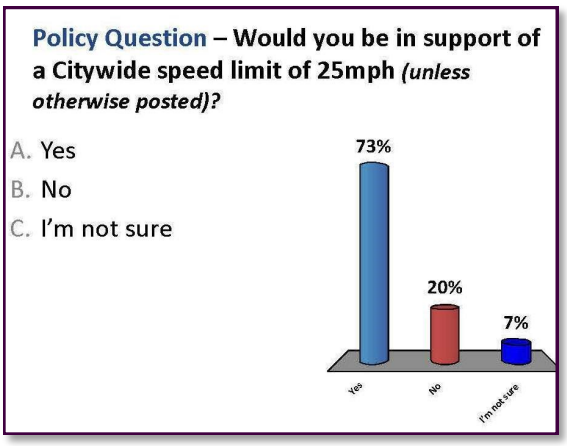
Where: NJTPA Offices

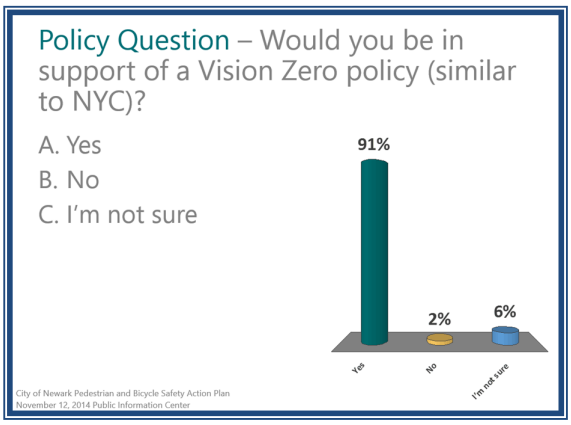
Purpose:

Presented project schedule, goals and tasks, explained that steering committee responsibilities were to get the public involved, provide input and ideas, and develop policies to reduce the severity and frequency of pedestrian and bicycle crashes in the city, showed top 10 high pedestrian and bicycle crash locations and top 10 severe crash corridors.

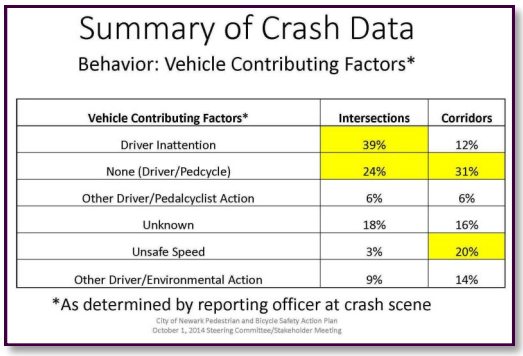
What was gained:

Input from participants using TurningPoint software on the topics of when and where to conduct Public Information Centers and input on policies toward achieving the goals of the project.





Sample policy question asked at the stakeholders at the meeting.



Summary of Crash Data

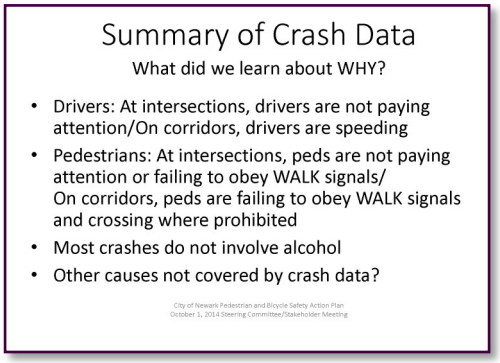
Behavior: Vehicle Contributing Factors*

Vehicle Contributing Factors*	Intersections	Corridors
Driver Inattention	39%	12%
None (Driver/Pedcycle)	24%	31%
Other Driver/Pedalcyclist Action	6%	6%
Unknown	18%	16%
Unsafe Speed	3%	20%
Other Driver/Environmental Action	9%	14%

*As determined by reporting officer at crash scene

City of Newark Pedestrian and Bicycle Safety Action Plan
October 1, 2014 Steering Committee/Stakeholder Meeting

Sample of City-wide crash data statistics presented to the Stakeholders at the meeting.



Summary of Crash Data

What did we learn about WHY?

- Drivers: At intersections, drivers are not paying attention/On corridors, drivers are speeding
- Pedestrians: At intersections, peds are not paying attention or failing to obey WALK signals/ On corridors, peds are failing to obey WALK signals and crossing where prohibited
- Most crashes do not involve alcohol
- Other causes not covered by crash data?

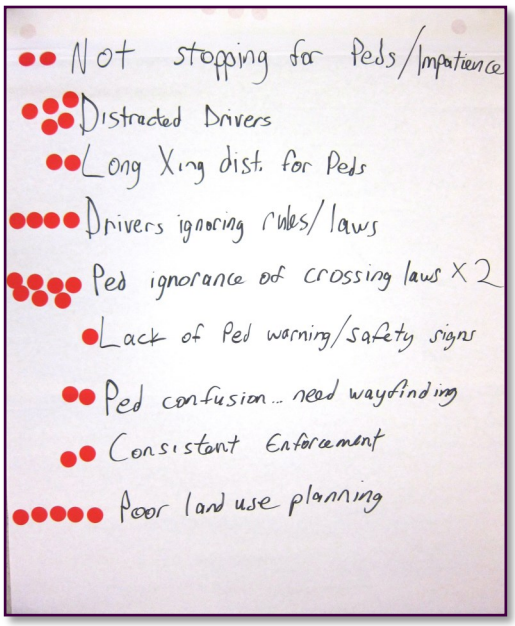
City of Newark Pedestrian and Bicycle Safety Action Plan
October 1, 2014 Steering Committee/Stakeholder Meeting

STAKEHOLDER OUTREACH

MEETING #2

When: October 1, 2014

Where: NJTPA Offices



Sample Policy questions asked at the meeting.

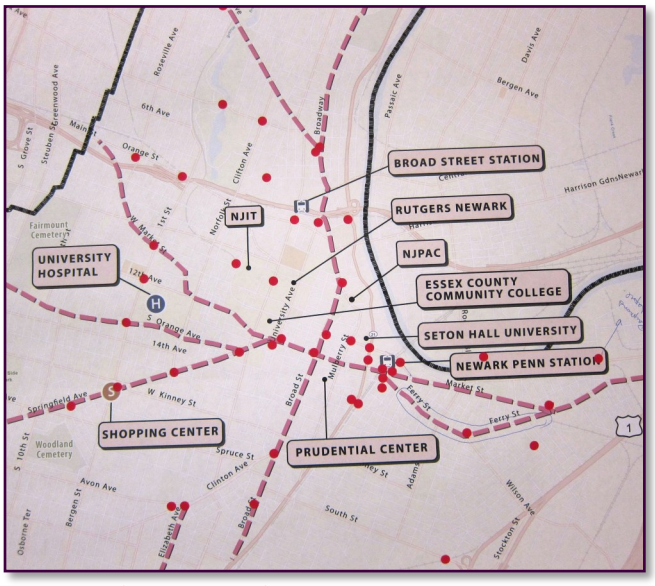
Purpose:

Presented citywide pedestrian and bicycle crash density maps and bike routes along with summary crash statistics from the combined 10 intersections and corridors.

What was gained:

Input from participants on locations considered to be unsafe crossing or biking intersections and corridors. Participants used maps to identify locations and explain why they felt certain pedestrian crossings and bike routes were unsafe. The most common reasons cited by participants included:

- Distracted drivers not paying attention to pedestrians
- Pedestrian confusion about/ignoring vehicle and traffic laws regarding legal street crossings
- Poor land use planning
- Drivers improperly/impatiently bypassing turning vehicles which jeopardizes pedestrians and cyclists
- Very wide streets



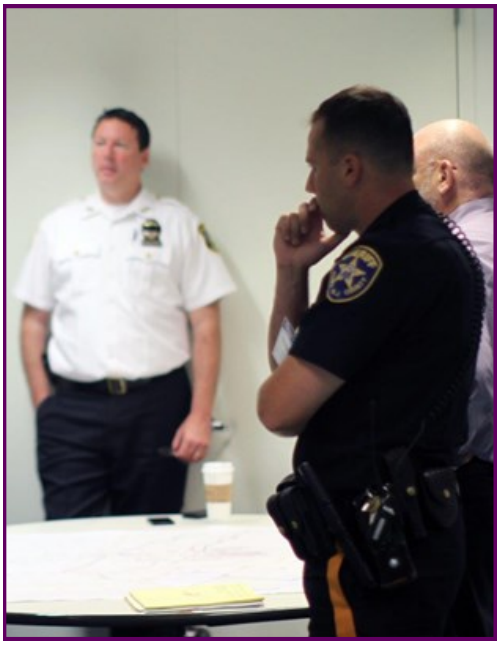
Locations of concern identified on a map

STAKEHOLDER OUTREACH

MEETING #3

When: February 23, 2015

Where: NJTPA Offices

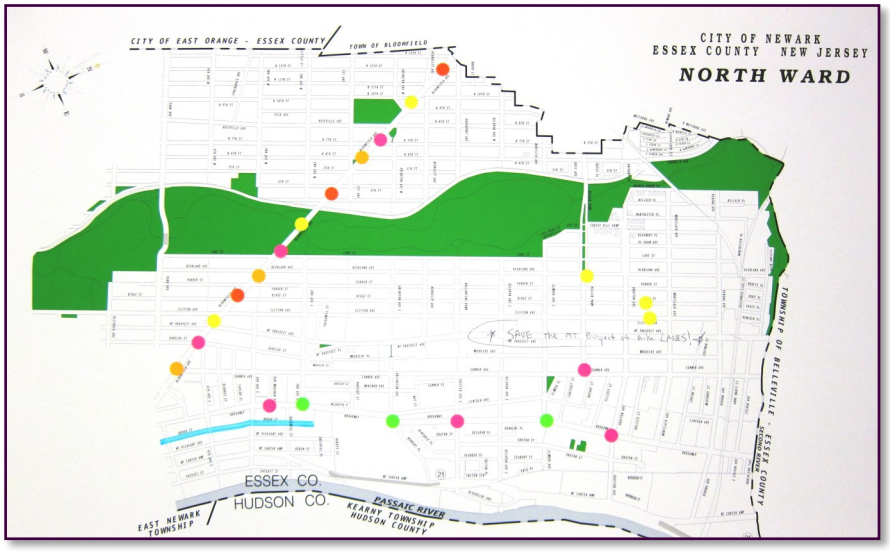


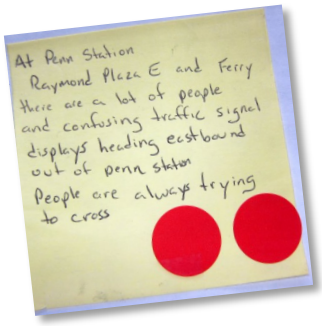
Purpose:

Presented progress and draft toolbox of improvements including engineering design and policies to reduce the frequency and severity of pedestrian and bicycle crashes.

What was gained:

Gathered input from steering committee and stakeholders on toolbox contents and policies. Presented an outline of the toolbox and ways to solicit input from the public at the next Public Information Center.





STAKEHOLDER OUTREACH

MEETING #4

When: May 28, 2015

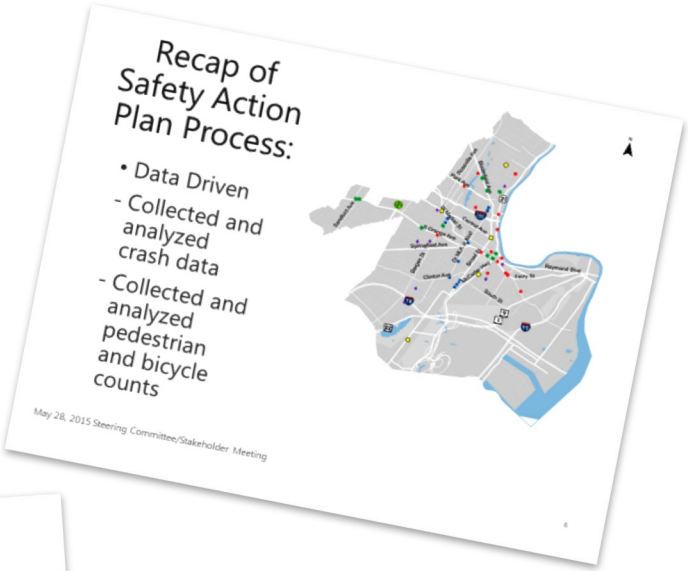
Where: NJTPA Offices

Purpose:

Recapped the goals of this effort and presented an outline of the Pedestrian and Bicycle Safety Action Plan. Presented a method for inventorying high-risk roadway attributes to guide the recommended improvements for the 10 high crash intersections and corridors. Presented an approach to gathering input from the public at the next Public Information Center.

What was gained:

Input on potential teaming partners and funding sources. Funding sources identified from meeting were Local Safety Program, Safe Routes to School, Transportation Alternatives Program, Municipal Aid, Safe Routes to Transit, Bikeways Program, NJ Division of Highway Traffic Safety Grants for Enforcement Activities, and Congestion Mitigation and Air Quality Improvement



COMMUNITY OUTREACH

MEETING #1

When: November 12, 2014

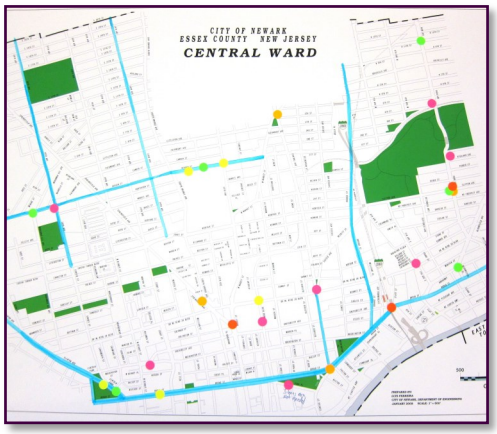
Where: Prospect Firehouse
56 Prospect Street
East Ward

Purpose:

Presented the project schedule, goals of the plan, tasks to be completed and synergies with other safety efforts including Street Smart NJ, FHWA Road Safety Audits and the Safe Routes to School program. Citywide pedestrian and bicycle crash density maps were presented along with crash statistics from the 10 high crash intersections and corridors.

What was gained:

Gathered input from participants on perceived unsafe crossings at intersections or along corridors using city's ward maps to help identify the locations. Participants placed dots on the maps and provided additional comments on Post-it notes explaining why certain locations were in need of improvements.



COMMUNITY OUTREACH

MEETING #2

When: March 26, 2015

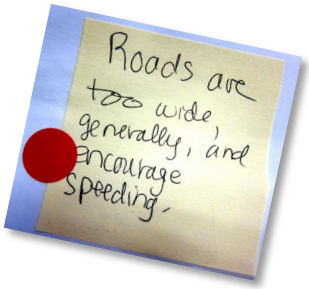
Where: La Casa de Don Pedro
23 Broadway
Central Ward

Purpose:

Presented the draft toolbox of improvements including engineering design and policies to reduce the frequency and severity of pedestrian and bicycle crashes.

What was gained:

Gathered public input on where certain types of improvements where needed based on the draft toolbox's broad categories (chapters) such as street design, crossing design, speed control, bike facilities and bike intersection design. Participants placed color-coded dots corresponding to each toolbox chapter on city ward maps to indicate where specific improvements were needed. Participants were also asked to prioritize safety policies with most requested policies being Vision Zero, Neighborhood Slow Zones, Arterial Slow Zones, Citywide No-Turn-On-Red, and Education & Outreach.

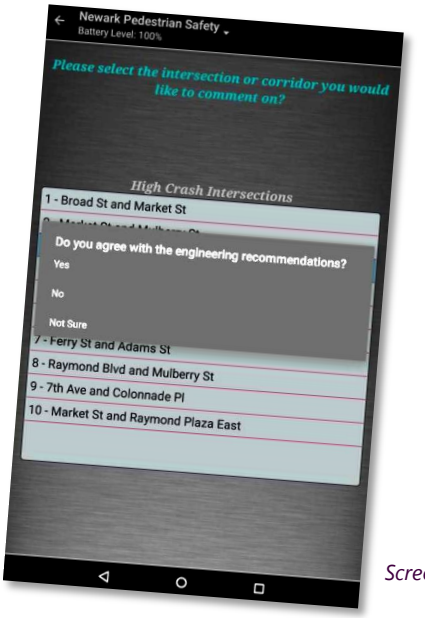


COMMUNITY OUTREACH

MEETING #3

When: June 4, 2015

Where: First Zion Hill Missionary Baptist Church
15 Leslie Street
South Ward



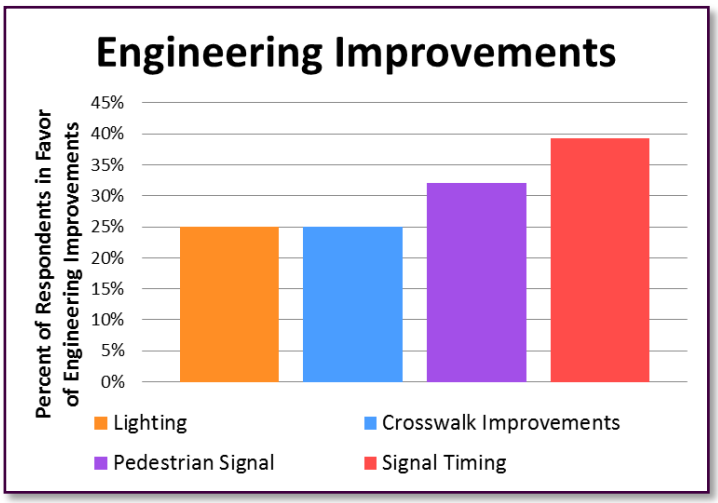
Screenshot taken from the survey app.

Purpose:

Presented an outline of the Pedestrian and Bicycle Safety Action Plan including the potential engineering improvements at the 10 high crash intersections and corridors utilizing the toolbox strategies.

What was gained:

Gathered public input on potential engineering improvements using a survey app developed specifically for the Pedestrian and Bicycle Safety Action Plan. Participants were asked questions including whether they generally agreed or disagreed with the recommended improvements at a specific location (or were unsure), what improvements they would recommend based on familiarity with the location and whether vehicle or pedestrian safety education or enforcement were needed.



This bar charts represent an aggregate of opinions on the recommended improvements and strategies at the 10 high crash intersections and corridors taken from the survey app.

COMMUNITY OUTREACH

MEETING #4

When: June 11 2015

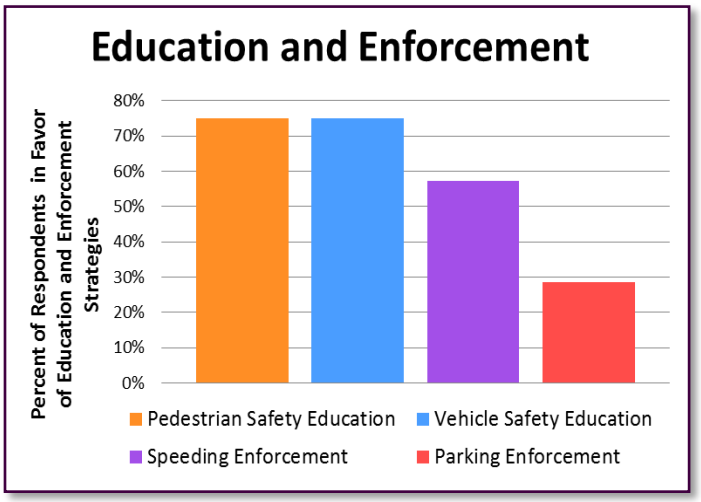
Where: PSE&G Plaza
Farmer's Market
Central Ward

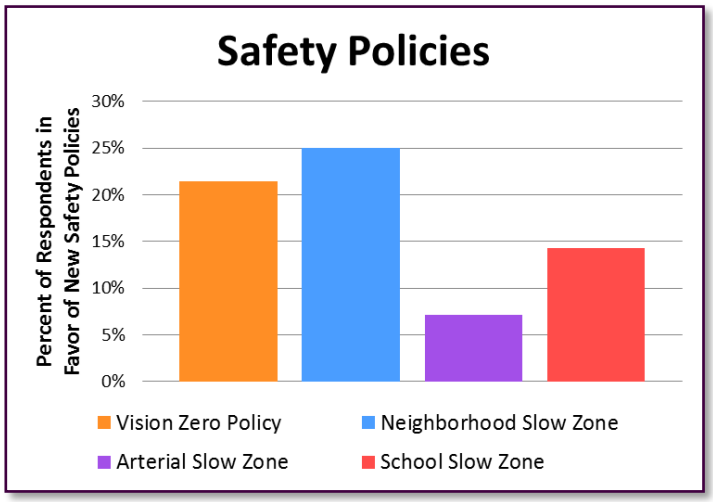
Purpose:

Gathered input from the public on potential engineering improvements.

What was gained:

Gathered public input on potential engineering improvements using a survey app developed specifically for the Pedestrian and Bicycle Safety Action Plan. Participants were asked questions including whether they generally agreed or disagreed with the recommended improvements at a specific location (or were unsure), what improvements they would recommend based on familiarity with the location and whether vehicle or pedestrian safety education or enforcement were needed.



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Best Caps
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The Art of Hair
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Madina Gyro & Pizza
ATM

IMPLEMENTATION

With the goal of increasing safety for vulnerable users by improving roadway and intersection geometry as well as implementing traffic calming measures along corridors, the Pedestrian and Bicycle Safety Action Plan:

- Recommends the adoption of a Vision Zero policy
- Prioritizes locations where investments will be made on safety improvements for pedestrians and bicyclists
- Identifies locations in need of further evaluation and improvements
- Creates methods for identifying additional locations in the future that may be in need of safety improvements
- Proposes a bicycle master plan - **Bike Newark**
- Recommends education and enforcements strategies
- Identified potential funding opportunities

The first priority will be to address safety issues at the 10 highest, most severe crash intersections and corridors. This will be accomplished through various funding avenues and processes, which are detailed in this chapter.

The second priority will be to investigate additional intersections and corridors identified by the stakeholders and community through outreach.

The city will continue to screen for other high crash locations. The master plan includes a screening method to identify additional locations in the future.

The plan proposes an expansion of bike facilities in certain neighborhoods within in the city incorporating stakeholder and community input.

VISION ZERO

The concept of Vision Zero began in Sweden in 1994. The Swedes call it "an approach to road safety thinking" and they have a clear and simple message: "Any loss of life in traffic is unacceptable". Their data shows that while traffic volumes have steadily increased, traffic fatalities have significantly decreased. It is an approach and law where emphasis is placed on system design.

Several big cities in the U.S. have since adopted their own Vision Zero policies including New York City, San Francisco, Portland and Seattle. In 2014, New York City created a Vision Zero Action Plan outlining initiatives the city is taking to reduce traffic deaths and serious injuries including street design, outreach, enforcement, legislation and campaigns. In 2014, San Francisco adopted Vision Zero SF. Their policy commits to "build better and safer streets, educate the public on traffic safety, enforce traffic laws, and adopt policy changes that save lives." As part of Portland's Vision Zero safety strategy, the city is aiming for zero traffic-related fatalities and serious injuries in 10 years.

No single agency or department in Newark can implement these strategies alone. If the city is going to succeed in achieving a goal of zero traffic-related fatalities, Vision Zero will require partnerships. The city will create a Transportation Safety Committee that includes representatives from city government, community groups, the business community, colleges, Essex County, NJDOT and the NJTPA. The transportation safety committee will advocate, guide and recommend.

IMPLEMENTATION

RECOMMENDED ENGINEERING SAFETY IMPROVEMENTS FOR THE 10 HIGH CRASH INTERSECTIONS AND CORRIDORS

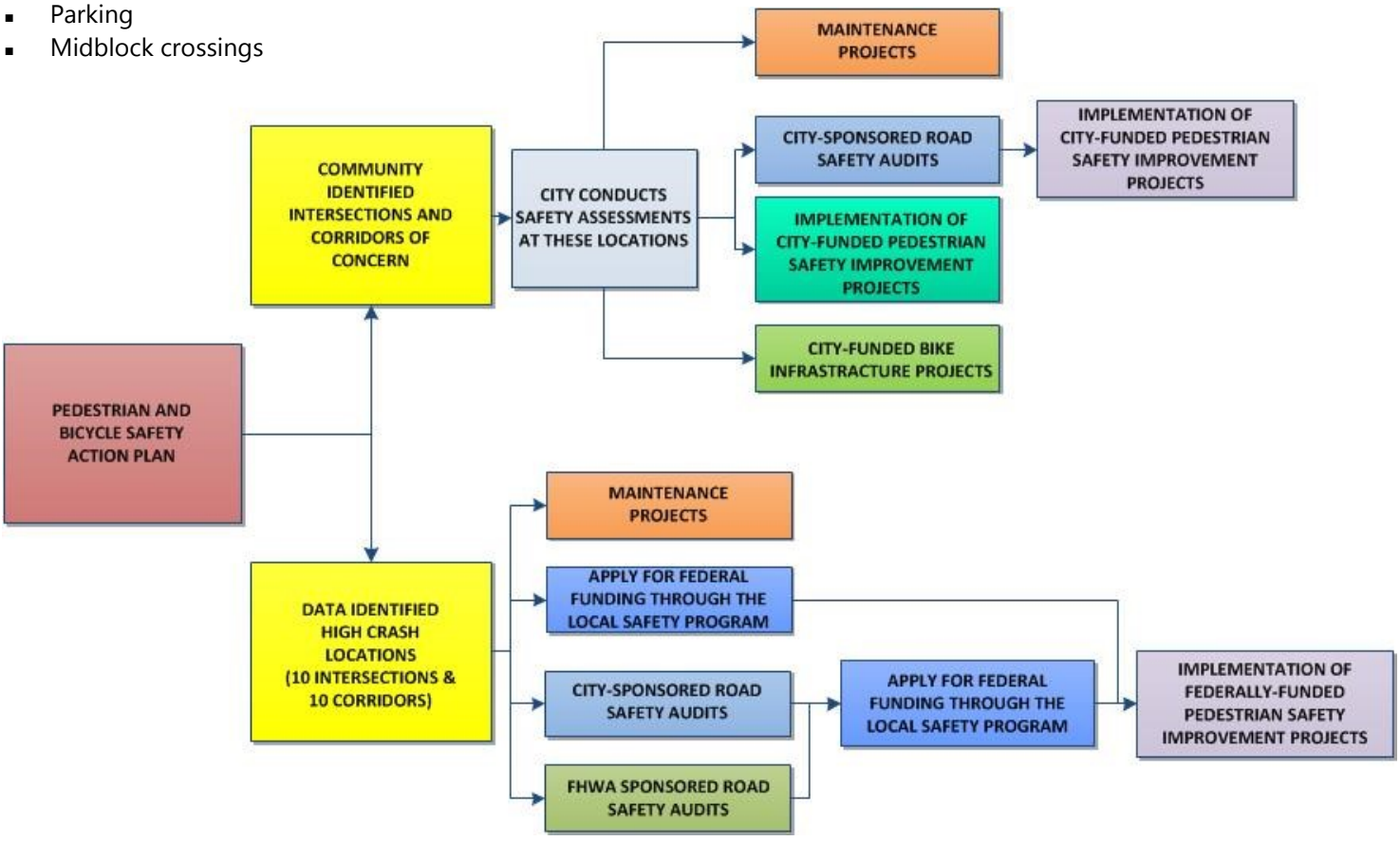
Using crash summary statistics, a.m./p.m. peak pedestrian and bicycle counts and field investigation of high-risk road attributes, engineering improvements from the toolbox have been recommended for each of the 10 high crash intersections and corridors. Field observations were made to confirm the presence the following:

- Pedestrian signals
- Pedestrian school flashers
- Pedestrian signage
- Median or pedestrian refuge island
- Curb extensions
- Sidewalks
- Crosswalks
- ADA compliant curb ramps
- Pedestrian scale street lighting
- Number of travel lanes
- Parking
- Midblock crossings

PATHWAY FOR IMPROVEMENTS

Recommended improvements from the action plan can be implemented through a number of paths as outlined below. Locations of concern identified during community outreach will be evaluated by the city's Division of Traffic and Signals in order to determine what improvements can be made or if further assessment is needed through city-sponsored Road Safety Audits. The appropriate track for funding such improvements will then be determined. Maintenance issues can be addressed promptly, while city-funded safety improvement projects will take more time to implement.

Improvements recommended for the 10 high crash intersections and corridors may be addressed as maintenance or city-funded safety improvement projects, but they are also eligible for federal funding through the Highway Safety Improvement Program or can be further evaluated through a federally-sponsored Road Safety Audit. This is a more lengthy process that can take several years for a project to be constructed.



IMPLEMENTATION

UPCOMING SAFETY PROJECTS

The following is a list of projects that are currently in conceptual planning, design or under construction:

Pedestrian Safety Improvements
Broad Street (South St. and Tichenor St./Lincoln Park)
Dr. MLK Jr. Blvd (7th Ave. and Crane St.)
Dr. MLK Jr. Blvd (7th Ave. from Clinton Ave. to State St.)
Bergen Street (near University Hospital)
Broad Street (between Emmet St. and Thomas St.)
Ferry Street (between Merchant St. and Lexington St.)
Safe Routes to School (eight schools)
Bike Lanes
Ironbound Bike Lanes (McWhorter St. and Ferry St.)

PEDESTRIAN SAFETY DURING CONSTRUCTION

Planning for pedestrian as well as vehicle travel within construction zones is an integral component of any construction project. During construction, access for pedestrians must be maintained to building entrances, bus or transit stops and crosswalks. Newark's dense urban land use pattern often presents constrained spaces and necessitates closing a sidewalk for the duration or a portion of a project. When closing a sidewalk, alternate safe and convenient routes are a requirement of any construction plan. Walkways must be clearly identified, ADA accessible and protected from vehicles and the roadway. A pedestrian detour should never begin mid-block as this can encourage unsafe pedestrian crossings. Clearly readable signage is necessary to direct pedestrians throughout the entirety of the detour. Depending on the type of construction work or the presence of active construction driveways, flaggers or security guards may be needed to guide both vehicle and pedestrian traffic into and past the site.

RECOMMENDING SAFETY IMPROVEMENTS THROUGH ROAD SAFETY AUDITS

A Road Safety Audit (RSA) is a formal safety performance examination of a roadway segment or intersection conducted by a multidisciplinary team of professionals including engineers, planners and law-enforcement. The goal of the RSA is to identify potential safety issues and opportunities for cost-effective safety improvements for all road users. According to FHWA, the RSA aims to answer the following questions:

- What elements of the road may present a safety concern: to what extent, to which road users and under what circumstances?
- What opportunities exist to eliminate or mitigate identified safety concerns?

RSAs are facilitated by Rutgers Transportation Safety Resource Center in partnership with the NJTPA with funding provided by FHWA and NJDOT. Locations are selected based on a network screening that identifies high crash locations. As part of the RSA, the following elements are analyzed:

- Crash diagrams
- Traffic volumes
- Transit service
- Area characteristics
- Corridor and intersection characteristics

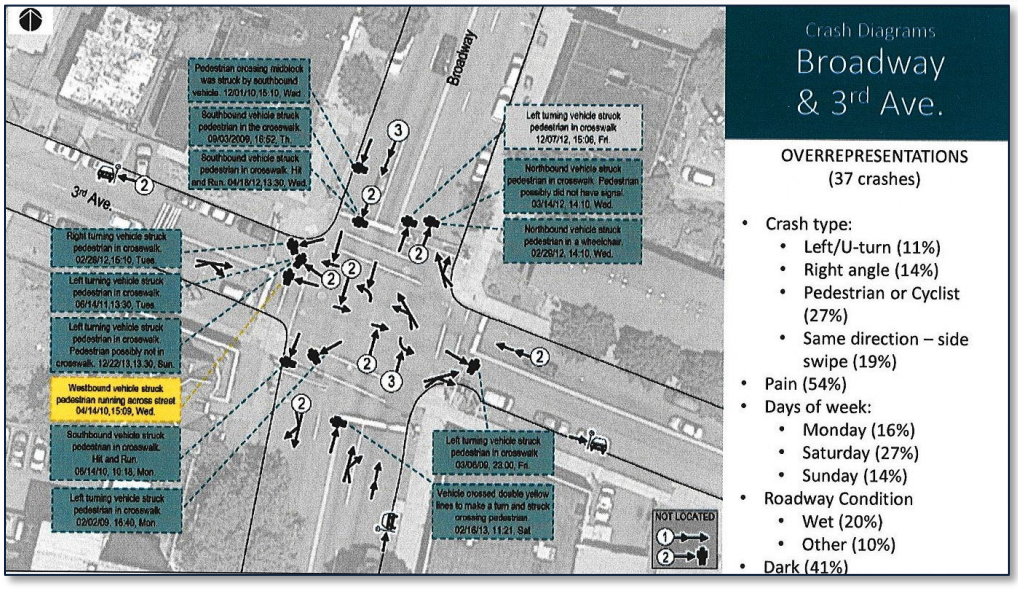
During the site visit, issues are documented and recommendations are made for the following:

- Maintenance
- Visibility & Navigability
- Operations
- Pedestrians
- Bicycles

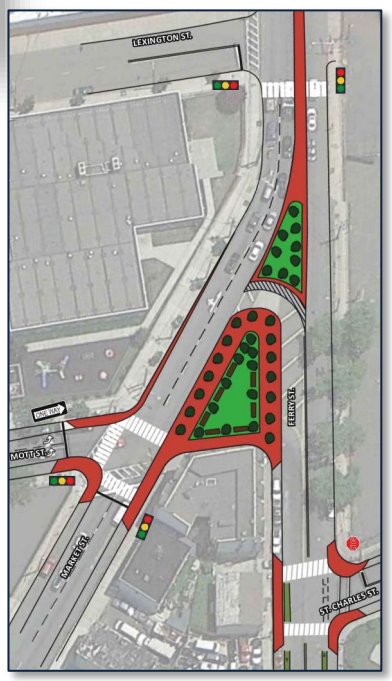
Crash Type—Emmet St. and Broad St.	Count in RSA Area	% in Intersec-tion*	% Essex County*
Same-Direction—Rear-End	3	27%	23%
Same-Direction—Sideswipe	4	36%	15%
Right-Angle	3	27%	13%
Opposite-Direction—Head-On/Angular	1	9%	1%
Opposite-Direction—Sideswipe	—	—	1%
Struck Parked Vehicle	—	—	18%
Left-Turn/U-Turn	—	—	4%
Backing	—	—	8%
Fixed Object	—	—	10%
Animal	—	—	1%
Pedestrian	—	—	4%
Other	—	—	2%
TOTAL	11	100%	100%

*Percentages are rounded

Sample collision-type analysis



Sample crash diagram

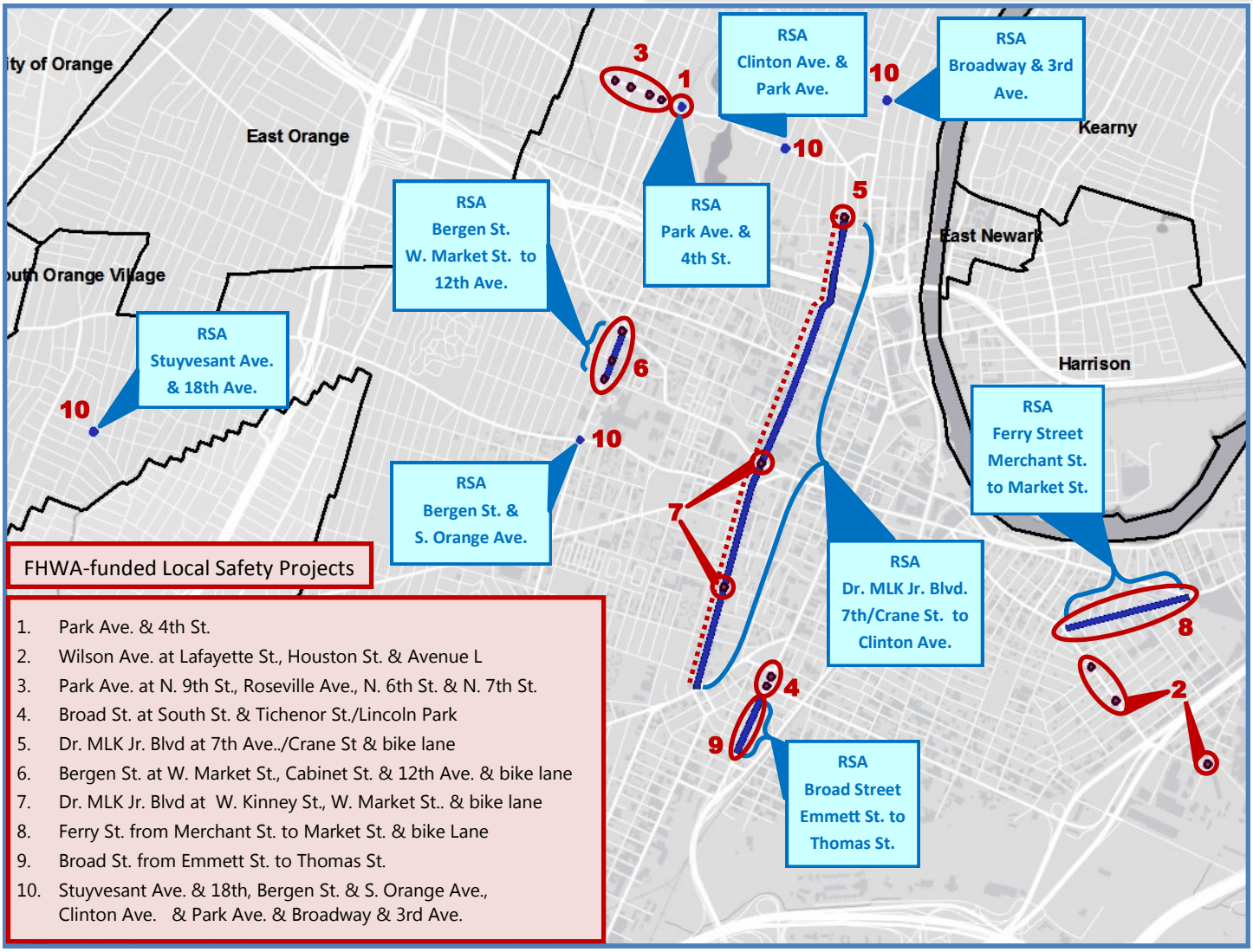


Sample recommendation

IMPLEMENTATION

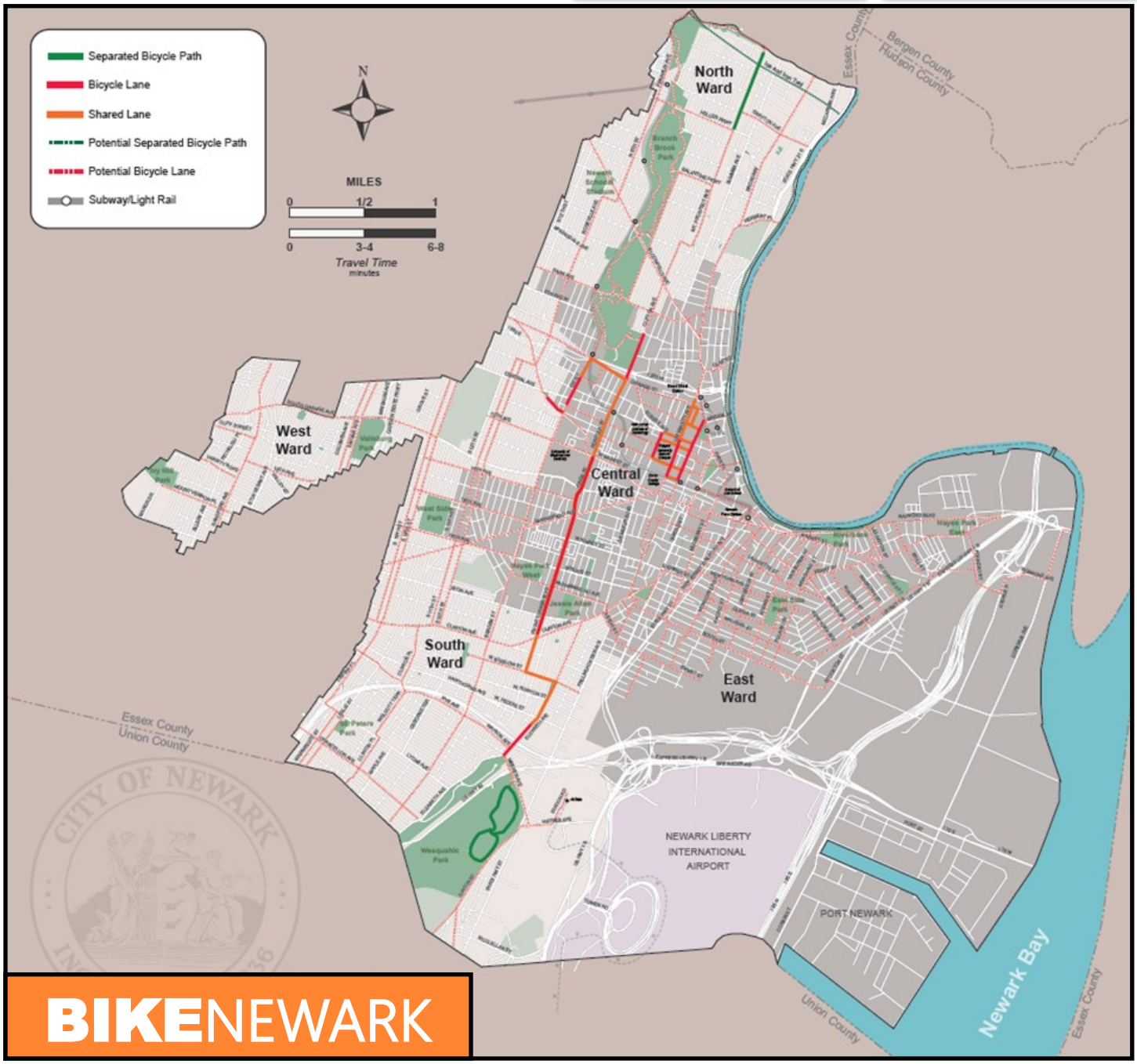
Since 2011, six RSAs have been conducted in the city. The map below depicts the locations. Recommendations from these RSAs are often used as the basis for federally -funded Local Safety Program projects through the NJTPA's annual program solicitation. The following RSAs have resulted in Local Safety Program projects:

- Park & 4th St. and Wilson Avenue projects were completed in 2014.
- Dr. MLK Jr. Blvd. at 7th Ave./Crane Street will begin construction in Spring 2016.
- Broad Street at South St. and Tichenor St./Lincoln Park will begin construction in Summer/Fall 2016.
- Bergen St. at W. Market St., Cabinet St. and 12th Ave. and Dr. MLK Jr. Blvd. at W. Kinney and W. Market St. began engineering design in the fall of 2015 and will begin construction in Summer 2017.
- Stuyvesant & 18th Ave., Bergen St. & S. Orange Ave., Clinton Ave. & Park Ave., Broadway & 3rd Ave. will begin construction in Spring 2017.
- Ferry Street from Merchant St. to Market St. and Broad Street from Emmett St. to Thomas St. will begin engineering design in the fall of 2016 and construction in Spring 2018.



BICYCLE MASTER PLAN

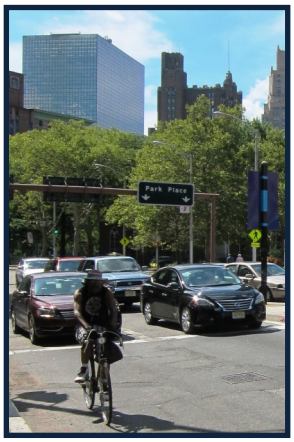
The map below shows the existing, planned and potential bike routes as part of the Bike Newark Initiative. The Central Ward and East Ward have been shaded because initial efforts will focus on bicycle facility improvements in this area based on presence of high crash locations.



RECOMMENDATIONS FOR BIKE FACILITIES

As shown in the Bike Newark Plan, bike routes are planned throughout the city. However, implementation will initially focus on:

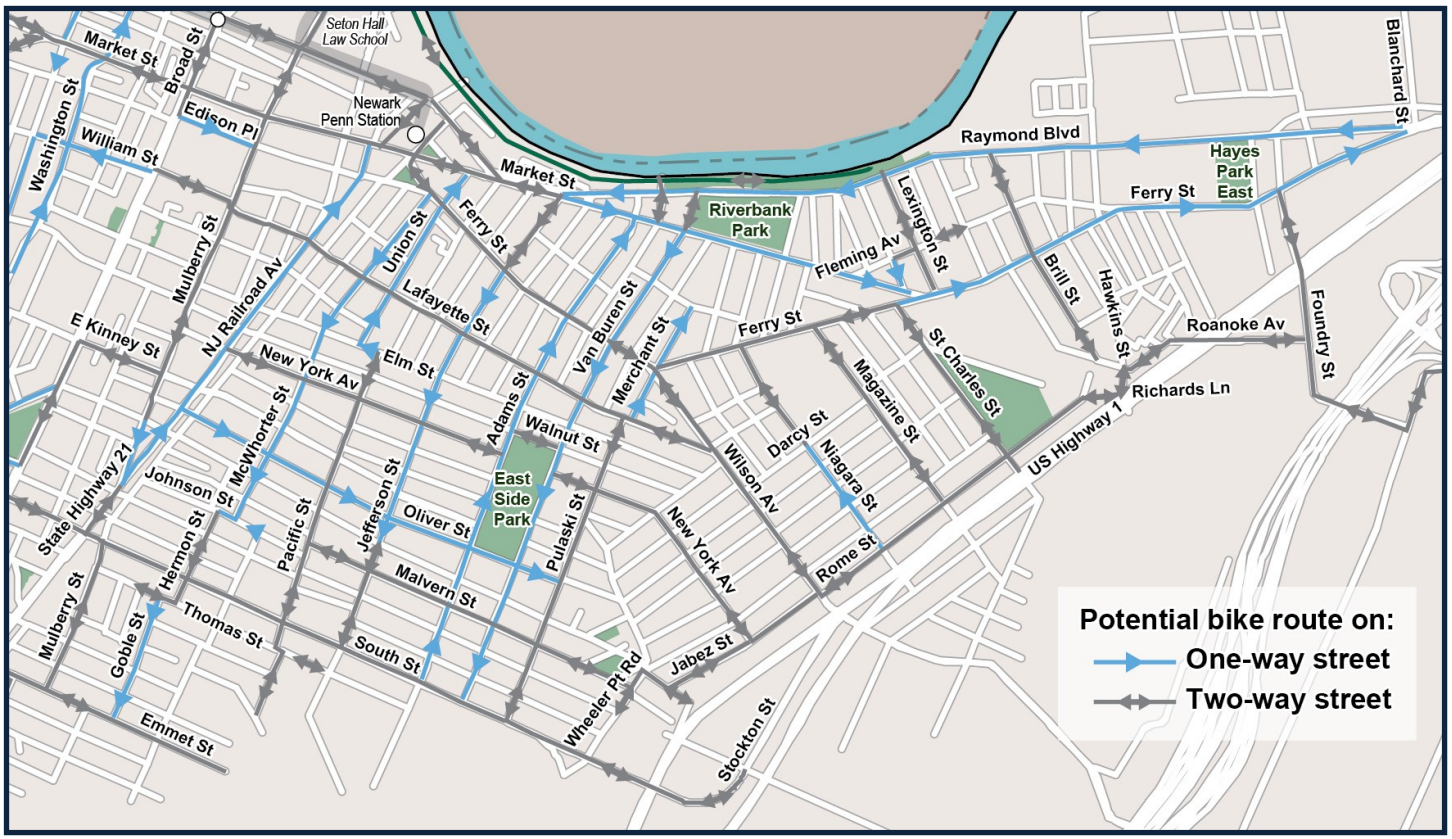
- Central Business District (CBD)/Downtown
- Ironbound neighborhood
- Connectivity to train stations
- High density locations
- High residential growth areas

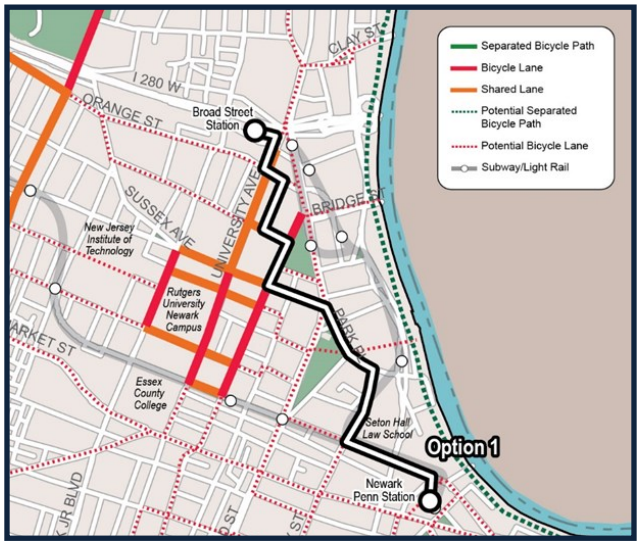


Ironbound

There are several proposed bike routes in the Ironbound neighborhood. The street directions and widths are the main determining factors in whether bike facilities should be striped as shared routes or with dedicated bike lanes. The potential bike routes for implementation in the Ironbound can be determined using the map shown below, as well as field measurements of street widths and the presence or absence of on-street parking.

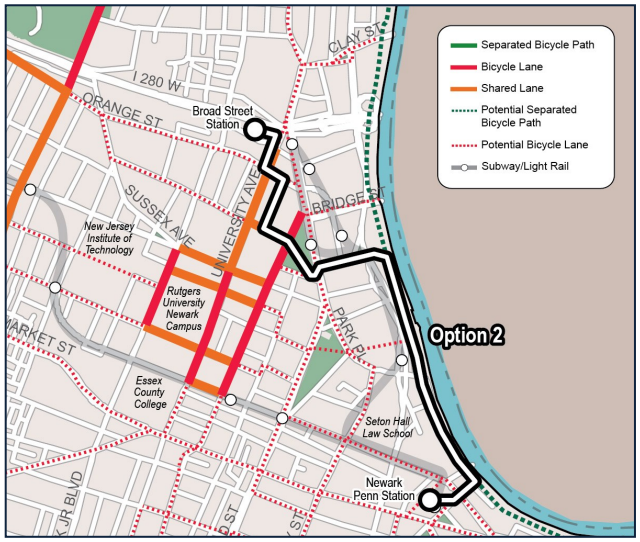
Ironbound Neighborhood Potential Bike Routes

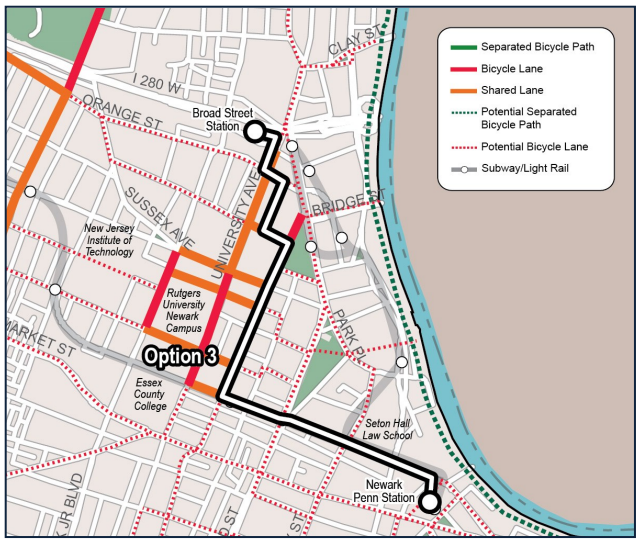




CBD/Downtown Area

A crucial bicycle network link is the connection between Newark's Penn and Broad Street stations. In partnership with NJ Transit and NJ DOT, with funding from 2015 bikeways program, the city is currently in the planning and design stages of making this connection a reality. The route will not only serve as an important connect between two major train stations but will also connect to Rutgers University, the Central Business District and the Four Corners Shopping District. This connection will serve as the backbone of Newark's greater bicycle network facilitating safe bicycle travel to all areas of the city. There are three options for the bike route that will connect the two stations which also include connections to the existing/proposed bike facilities along the way using separated bike lanes.

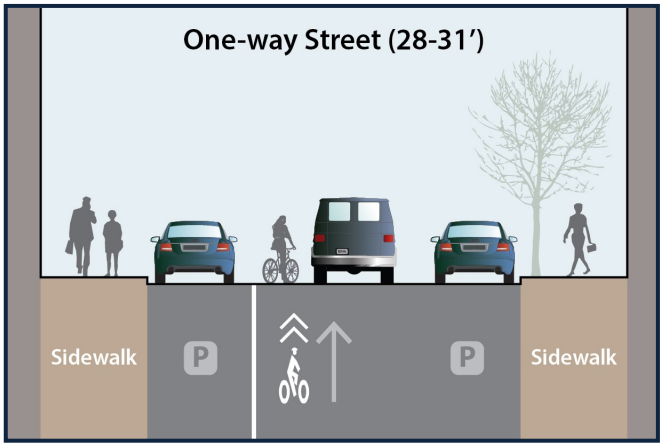




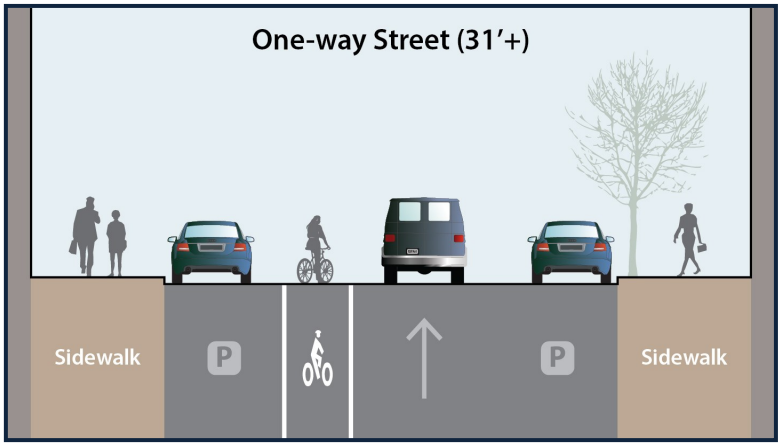
Central Business District Bike Routes

Bike Route Configurations

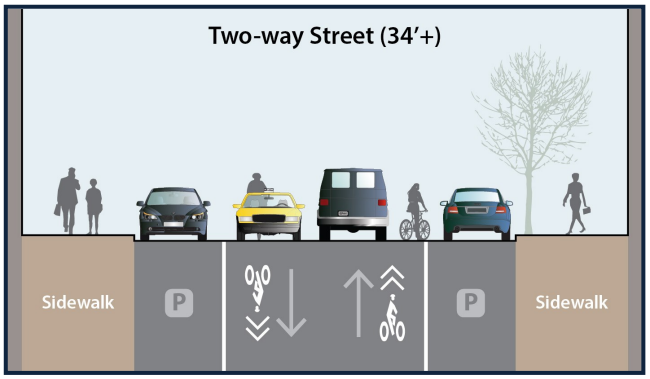
To implement any potential bike route, the roadway cross-section must be considered including roadway width, the travel direction, number of lanes and presence or absence of on-street parking. This will determine if the roadway is best–suited for shared lane markings, bicycle lanes or a separated bike lanes. Potential roadway cross-section configurations are illustrated below and on the next page.



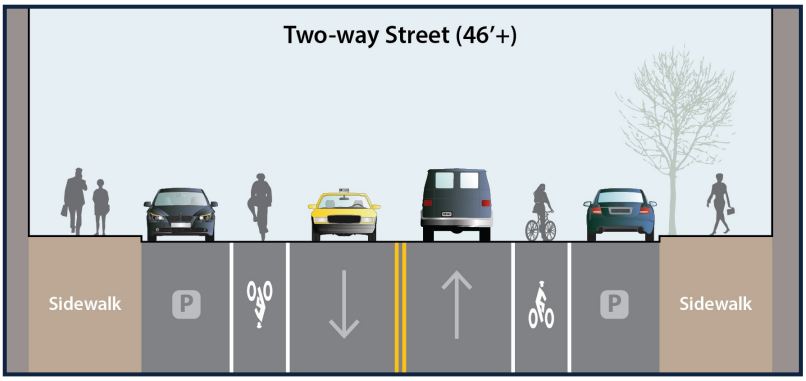
One-way street with shared lane markings (sharrows)



One-way street with bike lane

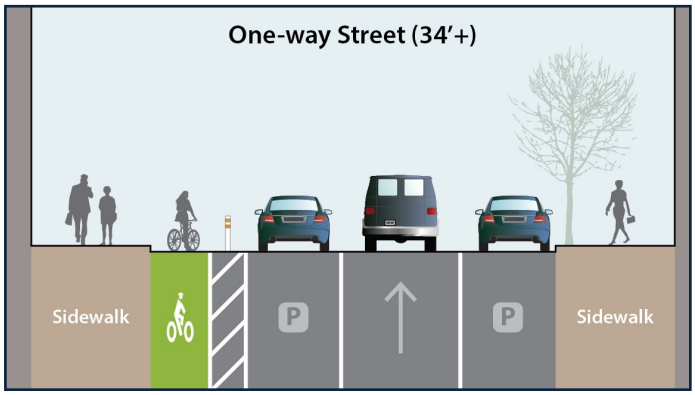


Two-way street with shared lane markings (sharrows)

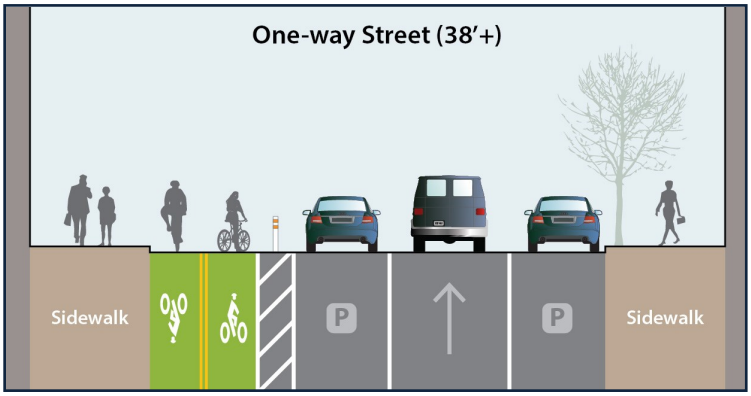


Two-way street with bike lanes

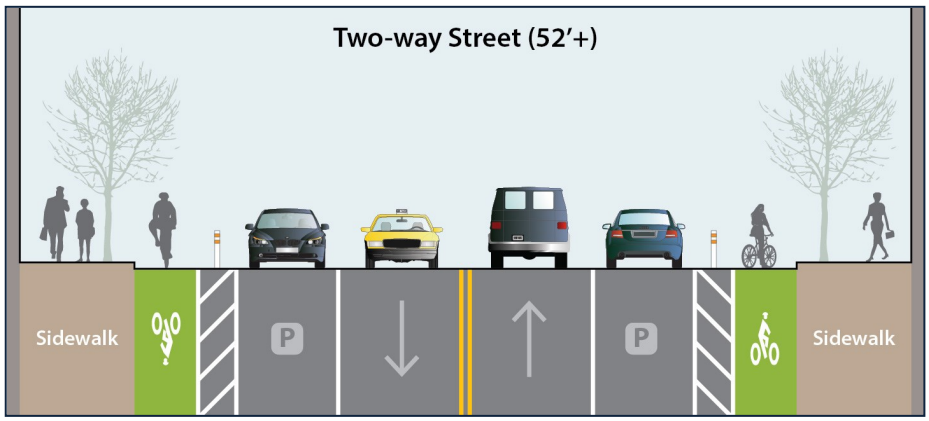
IMPLEMENTATION



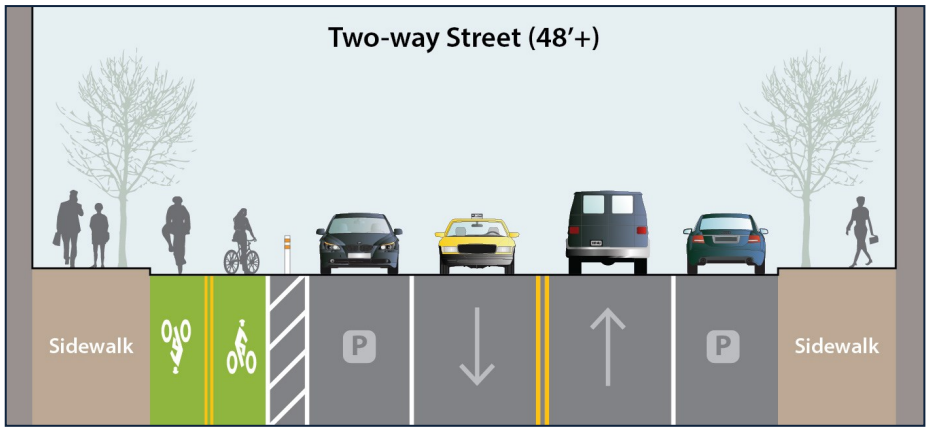
One-way street with separated bike lane



One-way street with separated two-way bike lanes



Two-way street with separated bike lanes



Two-way street with separated two-way bike lanes

SCREENING METHODS FOR IDENTIFYING FUTURE LOCATIONS

Identifying future potential pedestrian and bicycle improvement locations will be accomplished through various screening methods developed as part of this plan. Pedestrian and bike crashes occurring at intersections were queried using Plan4Safety and used to identify and rank the 10 high crash pedestrian and bike intersections that involve two or more streets under the city's jurisdiction. Going forward on an annual basis, The city will re-evaluate top ranked high crash intersections and corridors to monitor progress and identify new locations in need of further investigation.

A comparison was made between the volumes at the 10 high crash intersections and five control no-crash intersections which shows, on average:

- Pedestrian volumes were **six** times higher at high crash intersections than no-crash intersections
- Bike volumes were **two and a half** times higher at high crash intersections than no-crash intersections.

A similar comparison was made between the volumes along 10 high crash corridors pedestrian and five no-crash control corridors which shows, on average:

- Pedestrian volumes were **two and a half** times higher at high crash intersections than no-crash intersections
- Bike volumes were **four** times higher at high crash intersections than no-crash intersections.

Two ways of screening locations have been developed through this Action Plan and will be used in the future to identify new locations.

These results are summarized in a table in Appendix A-3.

In 2015, the city conducted a bike count at four intersections in the Ironbound Neighborhood. The average volume during peak a.m./p.m. hours was 4.6 cyclists per 15 minute intervals.

BASED ON VOLUMES

Intersections

If the pedestrian volumes are below 500 pedestrians per hour for all crossings at the intersection in the a.m. or p.m. peak, screen out. Otherwise, consider for inclusion as a high-crash intersection based on pedestrian volume exposure. If the bike volumes are below four per hour (total of all approaches) in the a.m. or p.m. peak, screen out. Otherwise, consider for inclusion as a high-crash intersection based on bike volume exposure.

Corridors

If pedestrian volumes are below 100 pedestrians per hour (both sides of street) in the a.m. or p.m. peak, screen out. Otherwise, consider for inclusion as a severe crash corridor based on pedestrian volume exposure. If bike volumes are below two per hour (both directions) in the a.m. or p.m. peak, screen out. Otherwise, consider for inclusion as a severe crash corridor based on bike volume exposure.

BASED ON CRASH RATES

Intersections

If the pedestrian crash rate is below 8.0 pedestrian crashes per million pedestrians entering the intersection per year, screen out. Otherwise, consider for inclusion as a high-crash intersection based on the pedestrian crash history combined with the average hourly pedestrian volume. If the bike crash rate is less than 50.0 bike crashes per million bikes entering the intersection per year, screen out. Otherwise, consider for inclusion as a high-crash intersection based on the bicycle crash history combined with the average hourly bicycle volumes.

Corridors

If the pedestrian crash rate is below 14.0 pedestrian crashes per million pedestrians per mile per year, screen out. Otherwise, consider for inclusion as a high-crash corridor based on the pedestrian crash history combined with the average hourly pedestrian volume.

A bike crash rate could not be computed for the high-crash corridors because of the lack of bike crashes involving incapacitating injuries or fatalities. Therefore, there is not a screening method based on the bicycle crash history combined with the average hourly bicycle volumes for the corridors.

STREET SMART NJ PEDESTRIAN SAFETY EDUCATION AND ENFORCEMENT CAMPAIGN

Pilot Phase

Street Smart NJ is a public education, awareness and behavioral change campaign managed by the NJTPA and funded by FHWA. It was developed in response to New Jersey's designation by FHWA as a pedestrian "focus" state and Newark as a pedestrian "focus" city. The campaign has three main goals:

- Change pedestrian and motorist behavior to reduce the incidence of pedestrian injuries and fatalities on New Jersey's roadways.
- Educate motorists and pedestrians about their roles and responsibilities for safely sharing the road.
- Increase enforcement of pedestrian safety laws and roadway users' awareness of that effort.

In November 2013, the campaign was piloted in several New Jersey communities for four weeks, including the City of Newark.

The campaign used a three-pronged approach to educate and engage motorists and pedestrians:

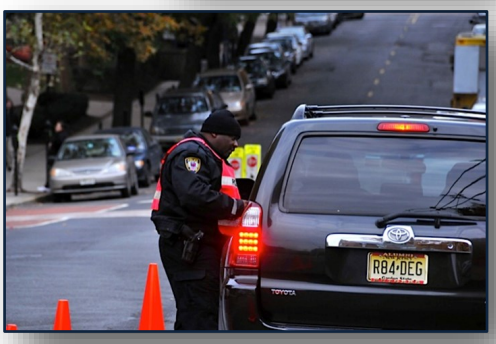
- Media
- Public Outreach
- High visibility enforcement

The campaign also included an evaluation component. A pre– and post–campaign observational analysis was conducted at pedestrian crash hot spots, which showed a statistically significant reduction in non-compliant risky behaviors among the pilot locations (see the table below). Newark also had a 58 percent increase in awareness of the campaign.

Phase II

Phase II will build upon what was learned during the pilot and evaluation of the Phase I Street Smart NJ campaign. Emphasis will be given to combining engineering with education and build upon what was learned in Phase I to educate and engage more pedestrians and motorists. This phase will begin in the spring of 2016.

	Pre-Campaign % of Non-Compliance	Post-Campaign % of Non-Compliance
Pedestrian jaywalking and crossing against the signal	**16%**	**13%**
Failure of turning motorist to yield to pedestrian crossing parallel to their vehicle's approach	**6%**	**2%**
Failure of motorists turning right on red to properly yield to pedestrians	**14%**	**2%**



FUNDING OPPORTUNITIES AND PARTNERSHIPS

To implement any of the improvements recommended in the Pedestrian and Bicycle Safety Action Plan, there must be funding and partners to undertake the studies, permitting, approvals, design and construction of projects. The City of Newark can use its own resources and can apply for additional funding with its partner NJTPA under several programs including the Local Safety, Safe Routes to School, Transportation Alternatives, Municipal Aid, Safe Routes to Transit, Bikeways and Congestion Mitigation and Air Quality Improvement. Where locations shown in the master plan overlap with county and state routes, Essex County and NJDOT can partner with the city to implement improvements. Alternative funding sources may include business improvement districts, large corporations or institutions, or community groups interested in increasing the safety of pedestrians and bicyclists within their neighborhoods. It is recommended that studies showing the economic benefit to businesses along streets where there have been investments in pedestrian, bicycle and complete street improvements be shared with business improvement districts. FHWA offers technical assistance and training to Pedestrian Focus Cities, and the city can request assistance through the FHWA New Jersey Division Office.

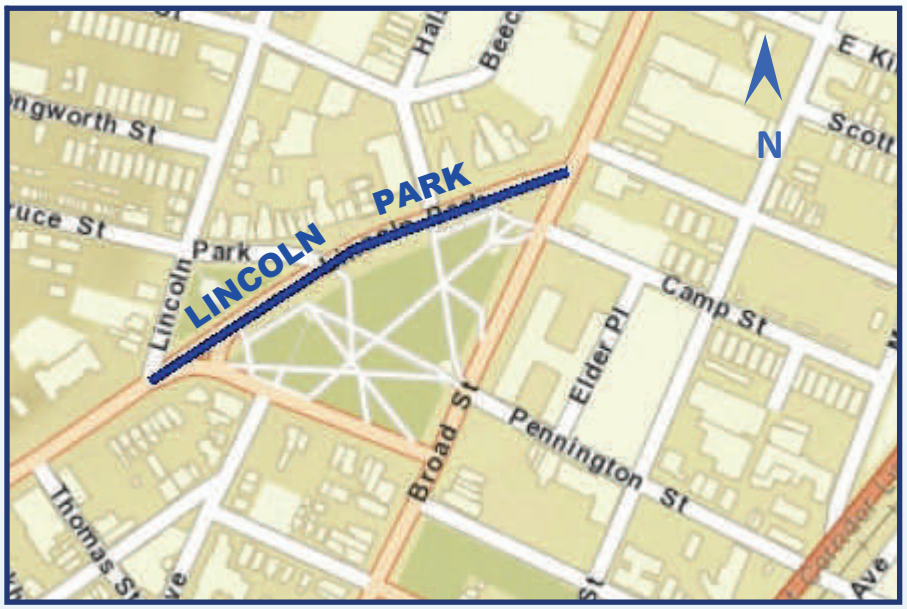
Funding and partners are also needed to implement education outreach and enforcement strategies, beyond the Street Smart NJ Campaign. One potential funding source for enforcement is NJ Division of Highway Traffic Safety grants. Potential partners for public safety education may include universities, hospitals and non-profits, who may already have programs in place to increase the awareness of pedestrian and bicycle safety, such as University Medical Center, who already have pedestrian safety and Safe Kids programs.

Pedestrian Injury Prevention Partnership (PIPP) is a broad-based community coalition of over 40 members that includes public health professionals, law enforcement, school representatives, local government, advocacy and community-based agencies that support each other's applications for grant funding and collaborate on local programming for safety programs. Integral to the PIPP, is the New Jersey Trauma Center's (TJTC) school based pedestrian safety education program. Over the past eight years, NJTC has been partnering with the Newark Public Schools to provide pedestrian safety education programs to Newark students with the goal of reducing the incidence of traumatic injuries due to pedestrian related motor vehicle crashes.

Art installations in public places to beautify neighborhoods and draw attention to walking and biking can be undertaken by local artists. Bike rodeos and bike helmet fittings and giveaways are other methods to reach out to the public and these activities can be funded by Safe Routes to School. Citing the health benefits of pedestrian and bicycle improvements will help form partnerships with education, medical care and department of health stakeholders. For instance, the Institute of Transportation Engineers and the Robert Wood Johnson Foundation have researched transportation's role in reducing childhood obesity.


TRANSIT
Bus Stop
Board Here For
mybus
BANK HAPPY
TRANSIT
The loans you need at the rates you
RETHINK YOUR BANK
Garden Sav
OWNED BY: NEW JERSEY TRANSIT CORPORATION
OPERATED BY: NJ TRANSIT BUS OPERATIONS, INC
US DOT - 074293
NJMVC 58455

IMPLEMENTATION



CORRIDOR 1

LINCOLN PARK

FROM CLINTON AVENUE/ LINCOLN PARK TO BROAD STREET

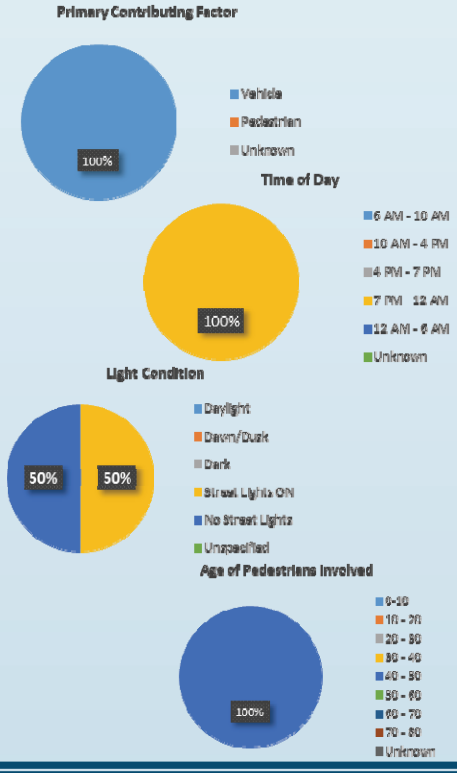
Pedestrians killed or seriously injured between 2009-2013: 1

Vehicular Crashes: 4

KSI/Mile: 8.0

Volumes:

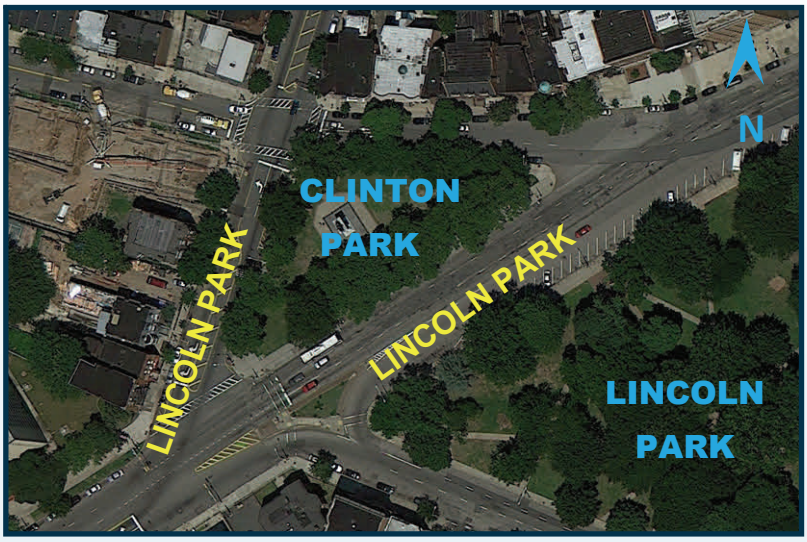
AM Pedestrian	119
AM Bicyclists	-
PM Pedestrian	267
PM Bicyclists	12



Existing Conditions:

- *Residential, Commercial, Park*
- *3 Lanes, One Way*
- *70 ft wide roadway*
- *Parking stripes*
- *Sidewalks*
- *Pedestrian countdown signals present at Clinton Ave/Lincoln Park*
- *NJ Transit bus stop route*

IMPLEMENTATION



CORRIDOR 1

LINCOLN PARK

FROM

CLINTON AVENUE/ LINCOLN PARK TO BROAD STREET

Note 1: Aerial depicts location where pedestrian fatality/injury occurred and where the pedestrian and bicycle volumes where collected

Note 2: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Install a median or pedestrian island***
- ***Install curb extensions to reduce crossing distance***
- ***Add additional crosswalks for a mid-block crossings***
- ***Install a HAWK or RRFB at the proposed mid-block crossing***
- ***Improve the existing pedestrian refuge island ("pork chop" island)***
- ***Road diet study***
- ***Install bike lanes***
- ***Add pedestrian scale lighting***

IMPLEMENTATION

Existing Conditions:

- ***Residential, Cemetery, Golf Course***
- ***2 Lanes***
- ***30 ft wide roadway***
- ***Sidewalk on one side only***
- ***School present***
- ***School signage***
- ***Speed humps***

CORRIDOR 2

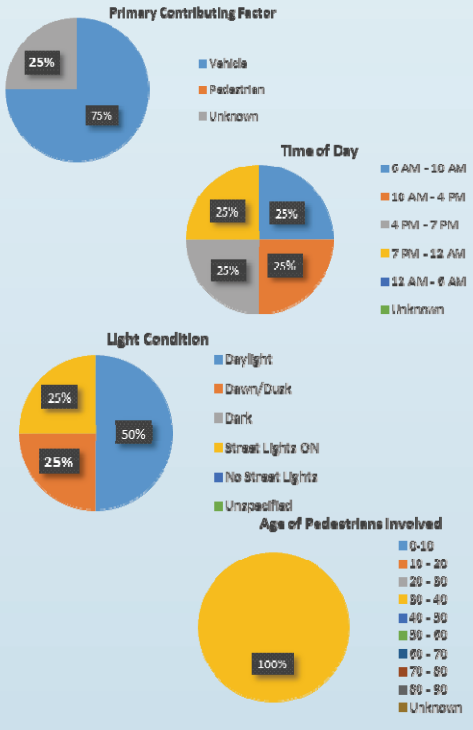
DAYTON STREET

FROM FRELINGHUYSEN AVENUE TO LOWELL PLACE

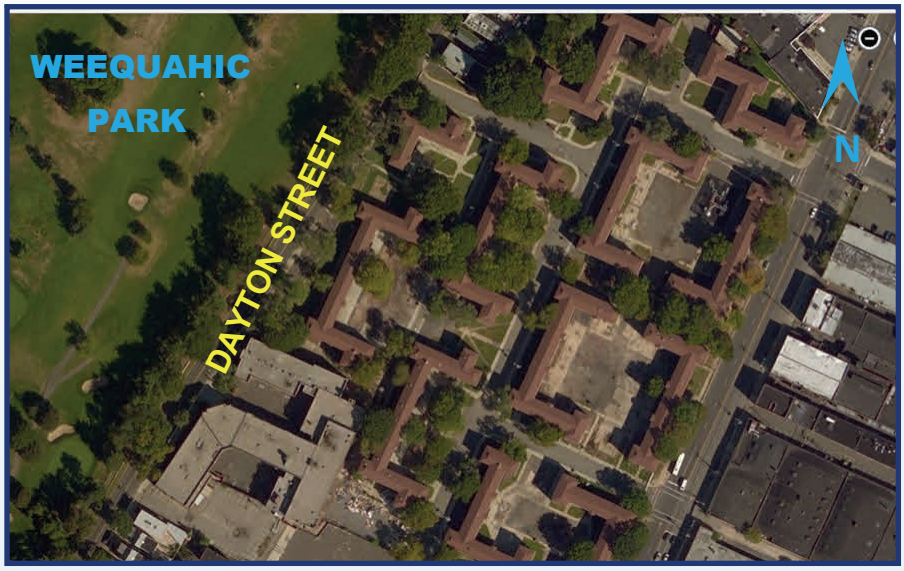
Pedestrians killed or seriously injured between 2009-2013: 1
Vehicular Crashes: 3
KSI/Mile: 5.0

Volumes:

AM Pedestrian	41
AM Bicyclists	-
PM Pedestrian	39
PM Bicyclists	3



IMPLEMENTATION



CORRIDOR 2

DAYTON STREET

FROM FRELINGHUYSEN AVENUE TO LOWELL PLACE

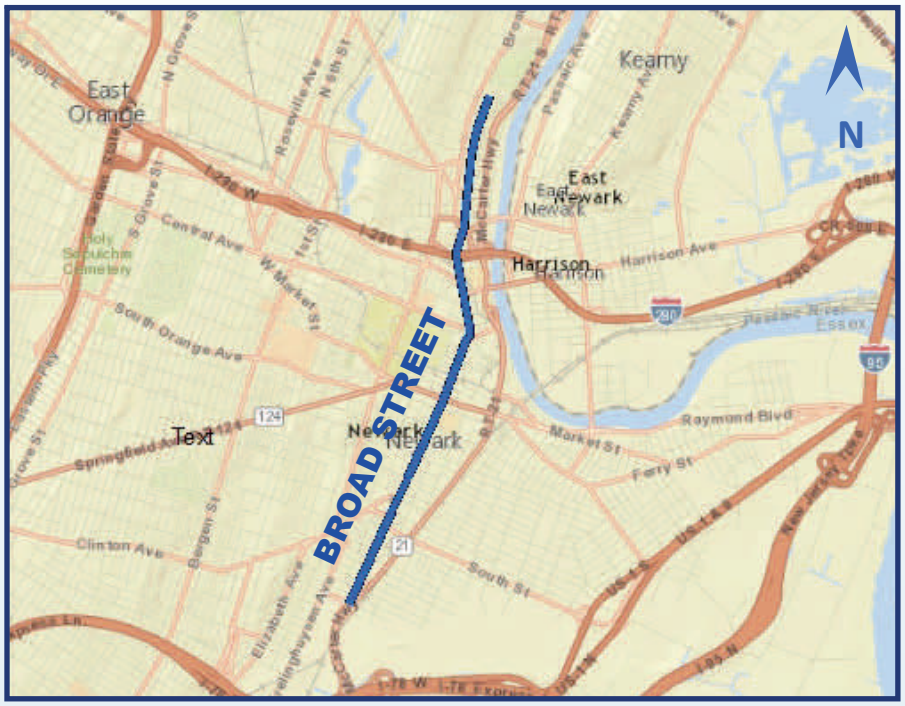
Note 1: Aerial depicts location where pedestrian fatality/injury occurred and where the pedestrian and bicycle volumes where collected

Note 2: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Restripe crosswalks***
- ***Add parking striping***
- ***Install HAWK or RRFB beacon at school (mid-block crossing)***
- ***Install additional speed hump or speed table***
- ***Upgrade curb ramps to meet ADA compliance***
- ***Investigate street lighting***
- ***Create pedestrian plaza at intersection with Evergreen Avenue***
- ***Add sidewalks to west side of Dayton Street***

IMPLEMENTATION



Existing Conditions:

- *Residential, Commercial, Office*
- *Southern end is gateway to downtown*
- *4 Lanes*
- *55 ft wide roadway*
- *Sidewalks*
- *Crosswalks*
- *NJ Transit bus stops route*

CORRIDOR 3

BROAD STREET

FROM
POINIER STREET
TO
NORTH OF ORIENTAL STREET

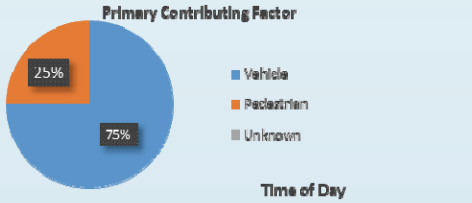
Pedestrians killed or seriously injured between 2009-2013: 6

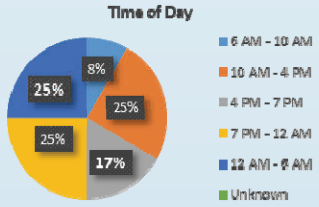
Vehicular Crashes: 6

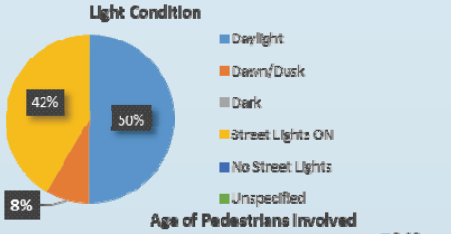
KSI/Mile: 4.5

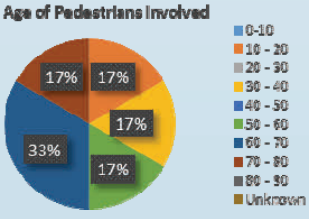
Volumes:

AM Pedestrian	5
AM Bicyclists	1
PM Pedestrian	17
PM Bicyclists	1









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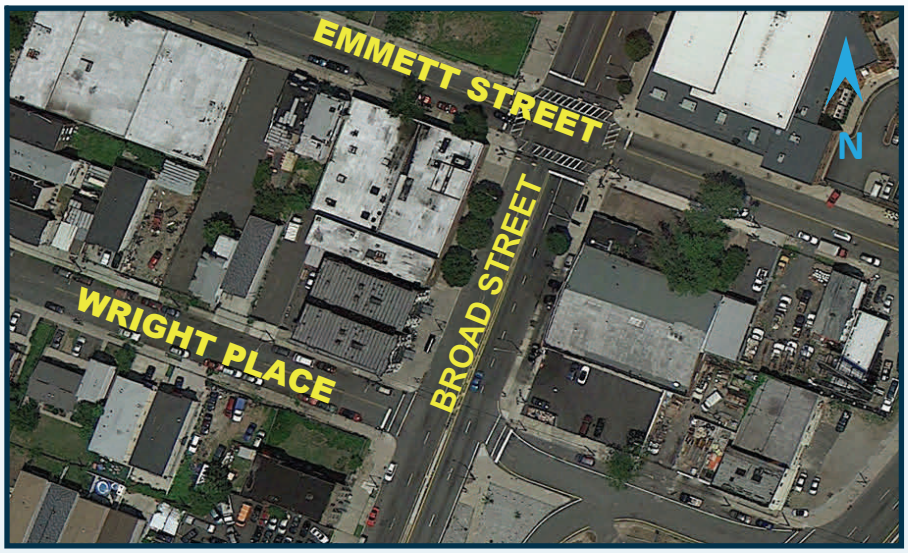


CORRIDOR 3

BROAD STREET

FROM

POINIER STREET

TO

NORTH OF ORIENTAL STREET

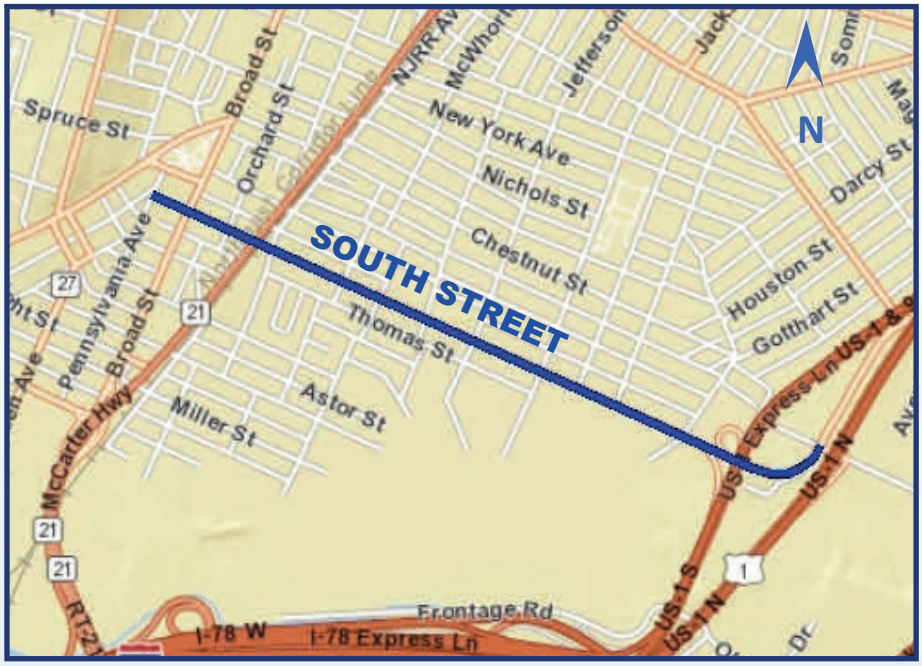
Note 1: Aerial depicts location where pedestrian fatality/injury occurred and where the pedestrian and bicycle volumes where collected

Note 2: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Install a median or pedestrian island***
- ***Create curb extensions to reduce crossing distance***
- ***Install pedestrian signage***
- ***Install a HAWK or RRFB at uncontrolled intersections***
- ***Install pedestrian-scale lighting***
- ***Upgrade curb ramps to meet ADA compliance***
- ***Upgrade traffic signals at intersections near the northern and southern ends of the corridor***

IMPLEMENTATION



Existing Conditions:

- ***Residential, Commercial, Industrial, School***
- ***2 Lanes***
- ***40 ft wide roadway***
- ***Sidewalks***
- ***Pedestrian signage***
- ***Parking stripes***
- ***School flashers present***
- ***NJ Transit bus stop route***
- ***Truck route***

CORRIDOR 4
SOUTH STREET

FROM PENNSYLVANIA AVENUE TO DELANCY STREET

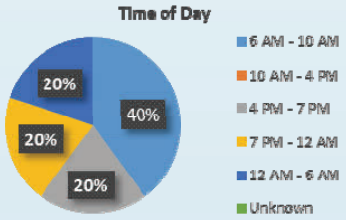
Pedestrians killed or seriously injured between 2009-2013: 0

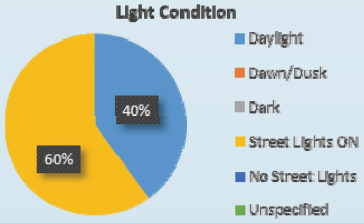
Vehicular Crashes: 5

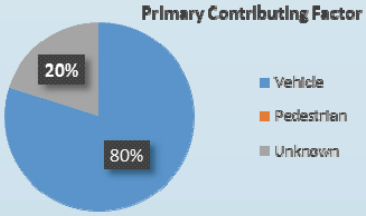
KSI/Mile: 4.4

Volumes:

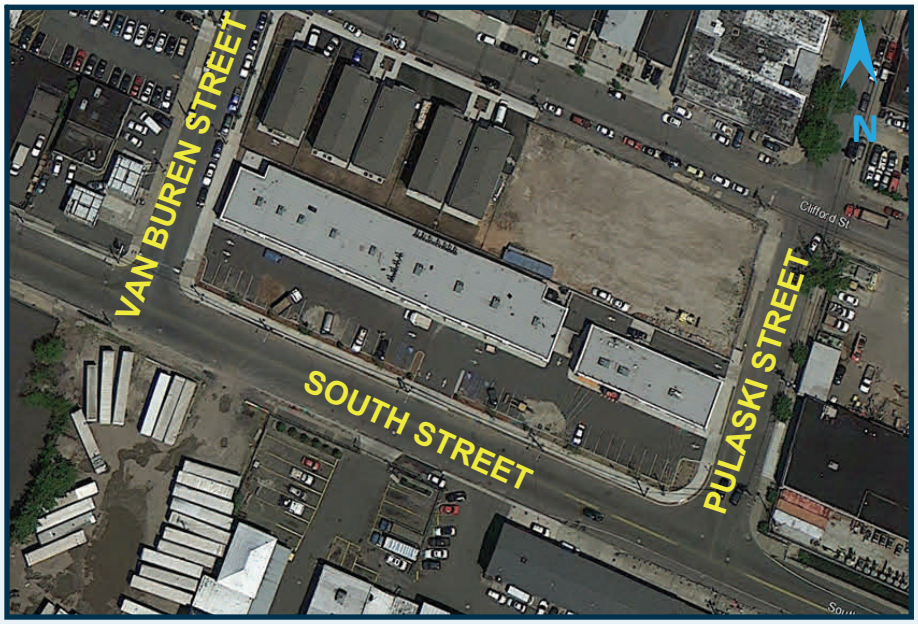
AM Pedestrian	269
AM Bicyclists	6
PM Pedestrian	235
PM Bicyclists	7







IMPLEMENTATION



CORRIDOR 4

SOUTH STREET

FROM PENNSYLVANIA AVENUE TO DELANCY STREET

STREET

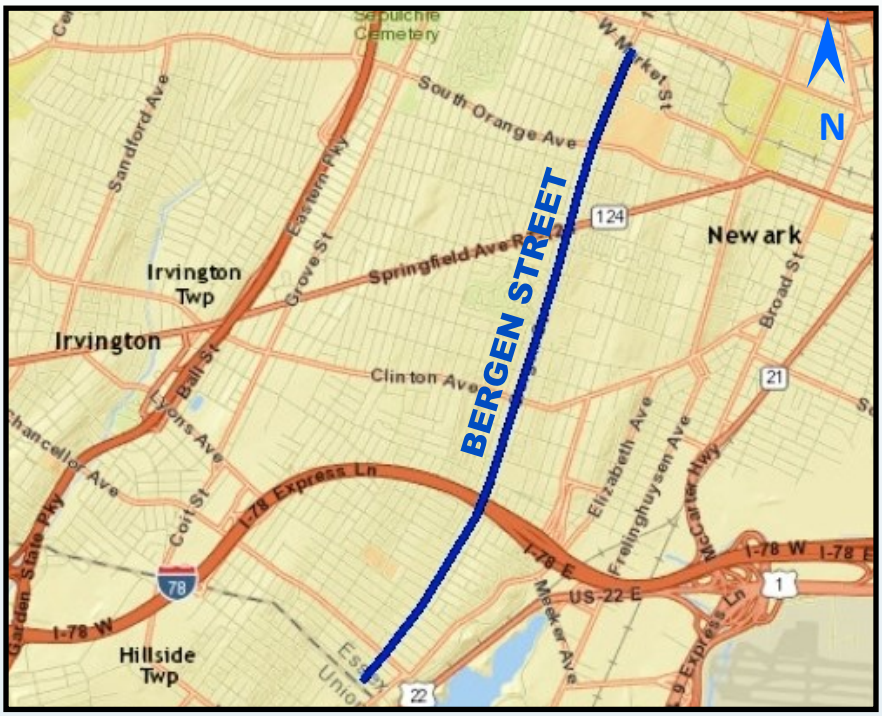
Note 1: Aerial depicts location where pedestrian fatality/injury occurred and where the pedestrian and bicycle volumes where collected

Note 2: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Restripe crosswalks***
- ***Install bus stop striping***
- ***Upgrade curb ramps to meet ADA compliance***
- ***Install curb extensions to reduce crossing distance***
- ***Upgrade traffic signals including pedestrian countdown signals***
- ***Install bike lanes***
- ***Lighting study***

IMPLEMENTATION



CORRIDOR 5 BERGEN STREET

FROM GRUMMAN AVENUE TO WEST MARKET STREET

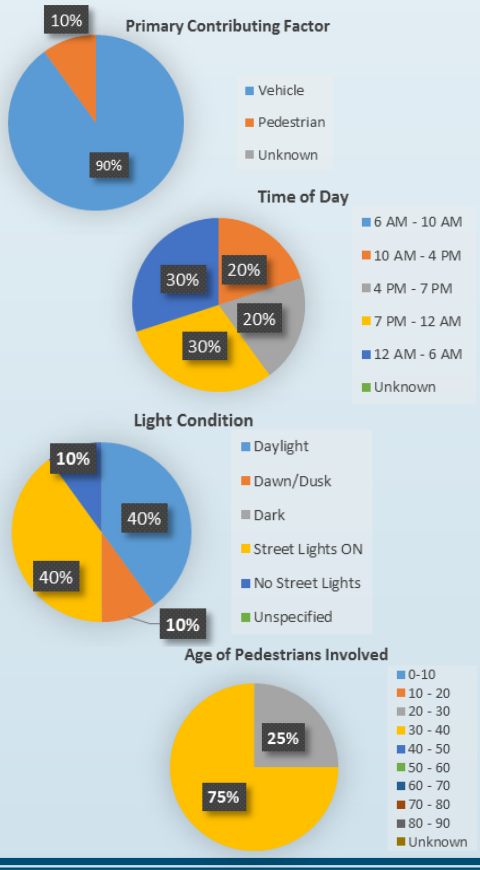
Pedestrians killed or seriously injured between 2009-2013: 4

Vehicular Crashes: 6

KSI/Mile: 4.2

Volumes:

AM Pedestrian	303
AM Bicyclists	1
PM Pedestrian	344
PM Bicyclists	5



Existing Conditions:

- *Residential, Commercial, Industrial, Hospital, Retail, School*
- *4 Lanes, undivided*
- *65 ft wide roadway*
- *Sidewalks*
- *Pedestrian signage*
- *Parking stripes*
- *NJ Transit bus stop route*

IMPLEMENTATION

CORRIDOR 5

BERGEN STREET

FROM

GRUMMAN AVENUE TO WEST MARKET STREET

Note 1: Aerial depicts location where pedestrian fatality/injury occurred and where the pedestrian and bicycle volumes where collected

Note 2: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Install median or pedestrian island***
- ***Install mid-block crossing with HAWK or RRFB beacon at the hospital***
- ***Install curb extensions to reduce crossing distance at appropriate locations***
- ***Upgrade curb ramps to meet ADA compliance***
- ***Restripe existing crosswalks and stripe new crosswalks along the entire corridor***
- ***Create dedicated left turn lanes at 12th Avenue***
- ***Upgrade traffic signal at Bergen Street and 12th Avenue***
- ***Install pedestrian countdown signals at all signalized intersections***
- ***Install pedestrian scale lighting study***
- ***Install bike lanes***
- ***Consider pedestrian plaza at Muhammad Ali Avenue***
- ***Road diet study***

IMPLEMENTATION

Existing Conditions:

- *Residential, Commercial*
- *5 lanes, undivided / 2 lanes undivided*
- *75 ft wide roadway*
- *Sidewalks*
- *Pedestrian signage*
- *Pedestrian countdown signals*
- *NJ Transit bus stop route*

CORRIDOR 6 CLINTON AVENUE

FROM SOUTH 20TH STREET TO LINCOLN PARK

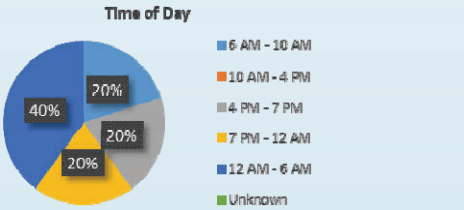
Pedestrians killed or seriously injured between 2009-2013: 3

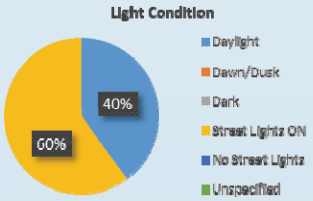
Vehicular Crashes: 2

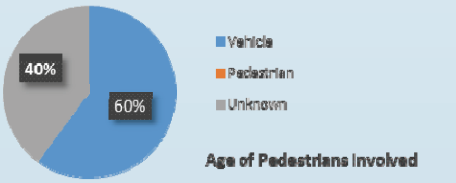
KSI/Mile: 3.5

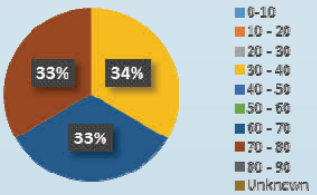
Volumes:

AM Pedestrian	106
AM Bicyclists	-
PM Pedestrian	337
PM Bicyclists	16

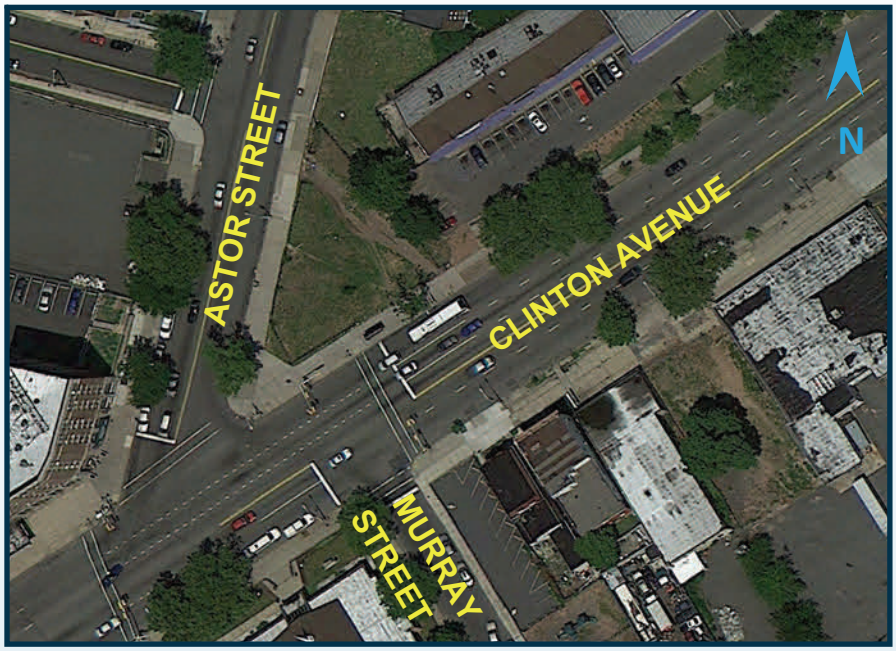








IMPLEMENTATION



CORRIDOR 6
CLINTON AVENUE
FROM SOUTH 20TH STREET TO LINCOLN PARK

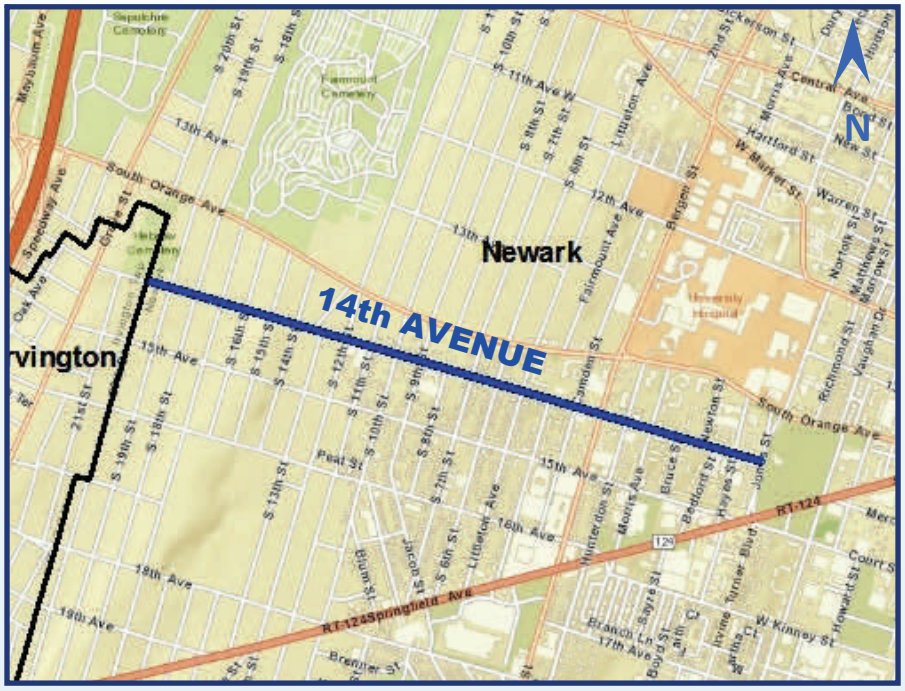
Note 1: Aerial depicts location where pedestrian fatality/injury occurred and where the pedestrian and bicycle volumes where collected

Note 2: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Install rumble strips***
- ***Install bus stop striping***
- ***Install intersection lane guides***
- ***Install mid-block crossing at commercial establishments with a HAWK or RRFB beacon***
- ***Install median, pedestrian islands, and/or curb extensions***
- ***Install bike lanes***
- ***Pedestrian scale lighting study***
- ***Road diet study***

IMPLEMENTATION



Existing Conditions:

- ***Residential, School***
- ***2 Lanes, undivided***
- ***36 ft wide roadway***
- ***Sidewalks***
- ***Pedestrian signage***
- ***School Flashers***
- ***NJ Transit bus stop route***

CORRIDOR 7

14th AVENUE

FROM SOUTH 20TH STREET TO JONES STREET

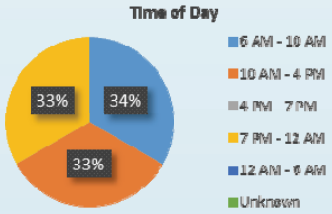
Pedestrians killed or seriously injured between 2009-2013: 2

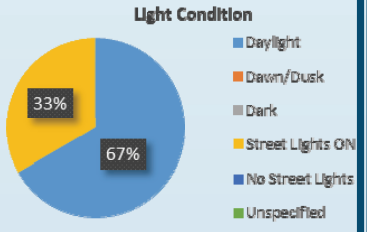
Vehicular Crashes: 1

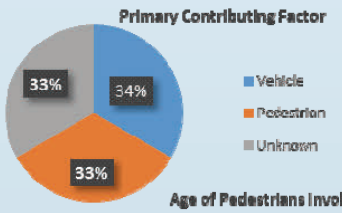
KSI/Mile: 3.1

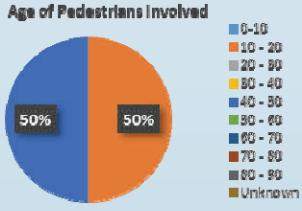
Volumes:

AM Pedestrian	35
AM Bicyclists	2
PM Pedestrian	61
PM Bicyclists	1

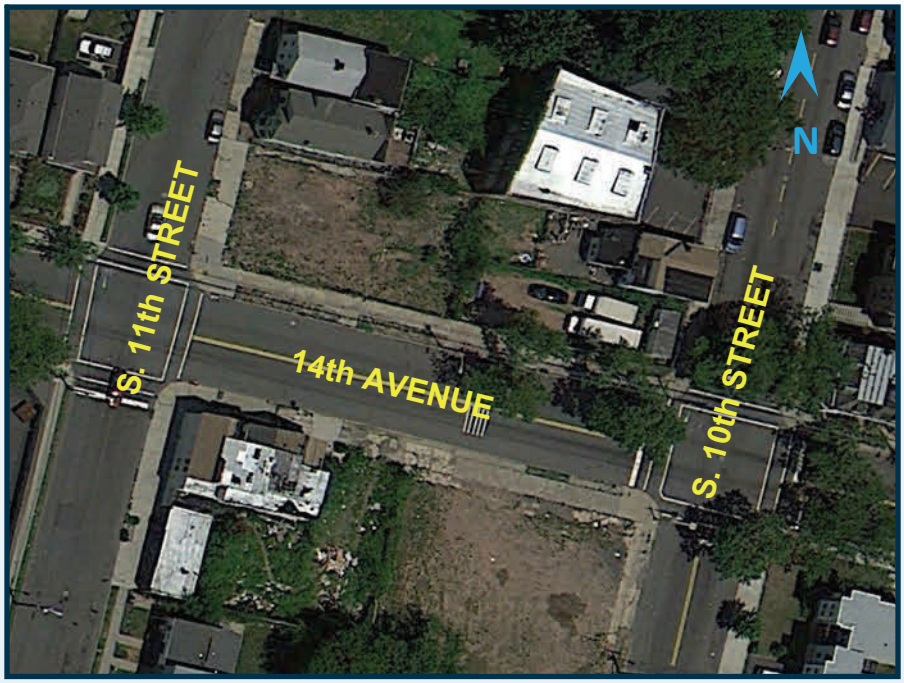








IMPLEMENTATION



Note 1: Aerial depicts location where pedestrian fatality/injury occurred and where the pedestrian and bicycle volumes where collected

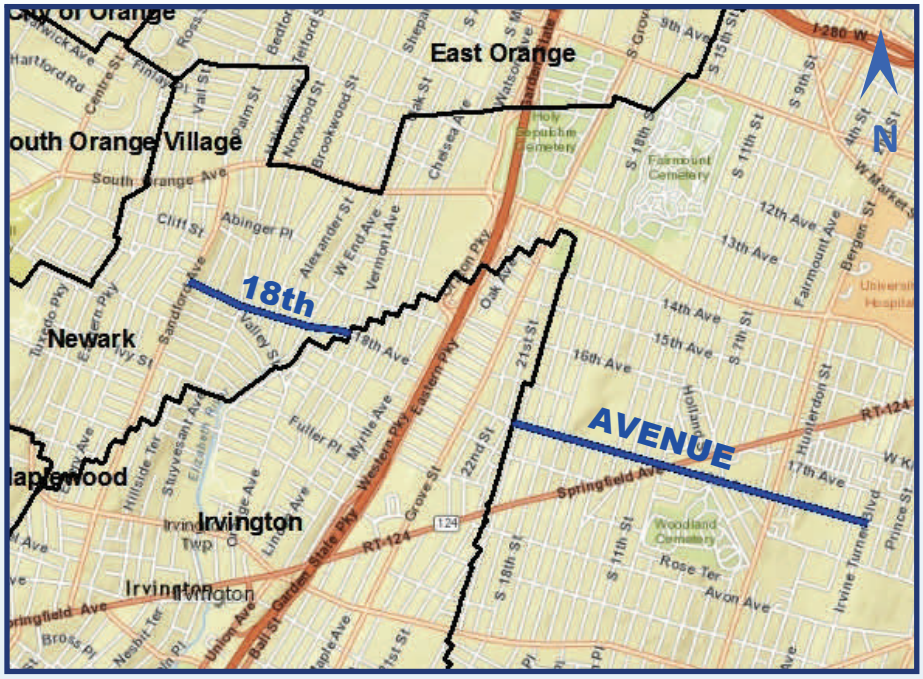
Note 2: Aerial from 2010. May not reflect existing conditions.

CORRIDOR 7
14th AVENUE
FROM
SOUTH 20TH STREET
TO
JONES STREET

Recommendations

- ***Tree & shrub trimming to enhance visibility of signs and/or accessibility of sidewalks***
- ***Eliminate sidewalk trip hazards***
- ***Install parking stripes***
- ***Install pedestrian warning signage***
- ***Install high visibility crosswalks or raised crosswalks***
- ***Install median, pedestrian islands, and/or curb extensions to reduce crossing distance***
- ***Upgrade curb ramps to meet ADA compliance***
- ***Installed raised intersection at S. 11th and S. 10th Streets***
- ***Install pedestrian countdown signals at all signalized intersections***
- ***Pedestrian scale lighting study***

IMPLEMENTATION



CORRIDOR 8

18th AVENUE

FROM IRVINE TURNER BLVD. TO SANDFORD AVENUE

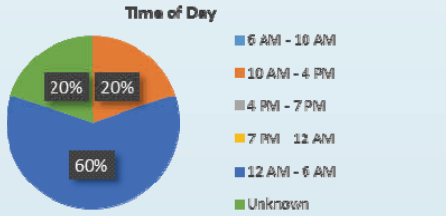
Pedestrians killed or seriously injured between 2009-2013: 1

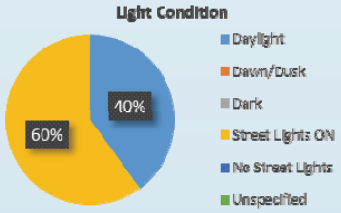
Vehicular Crashes: 4

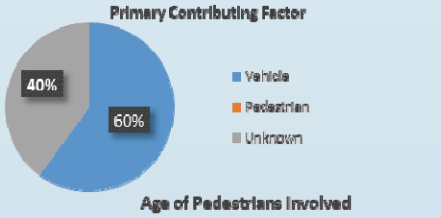
KSI/Mile: 2.0

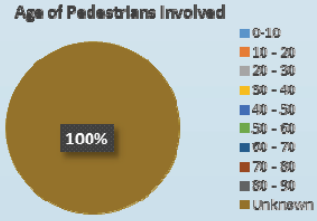
Volumes:

AM Pedestrian	122
AM Bicyclists	4
PM Pedestrian	119
PM Bicyclists	9









Existing Conditions:

- *Residential, Commercial, School*
- *2 Lanes, undivided*
- *38 ft wide roadway*
- *Sidewalks*
- *Pedestrian signage*
- *NJ Transit bus stop route*
- *West Side Park (Essex County)*

IMPLEMENTATION

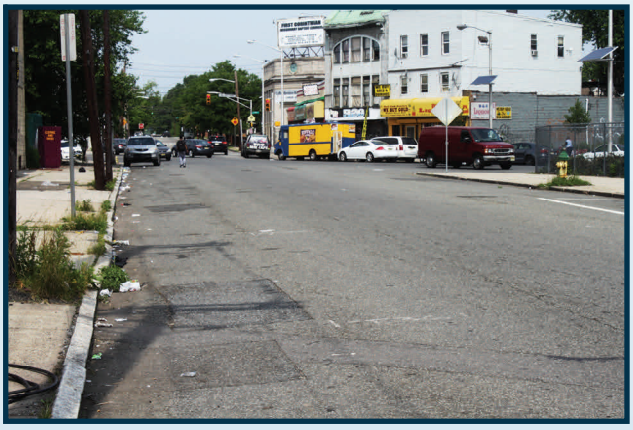
CORRIDOR 8
18th AVENUE
FROM
IRVINE TURNER BLVD.
TO
SANDFORD AVENUE

Note 1: Aerial depicts location where pedestrian fatality/injury occurred and where the pedestrian and bicycle volumes where collected

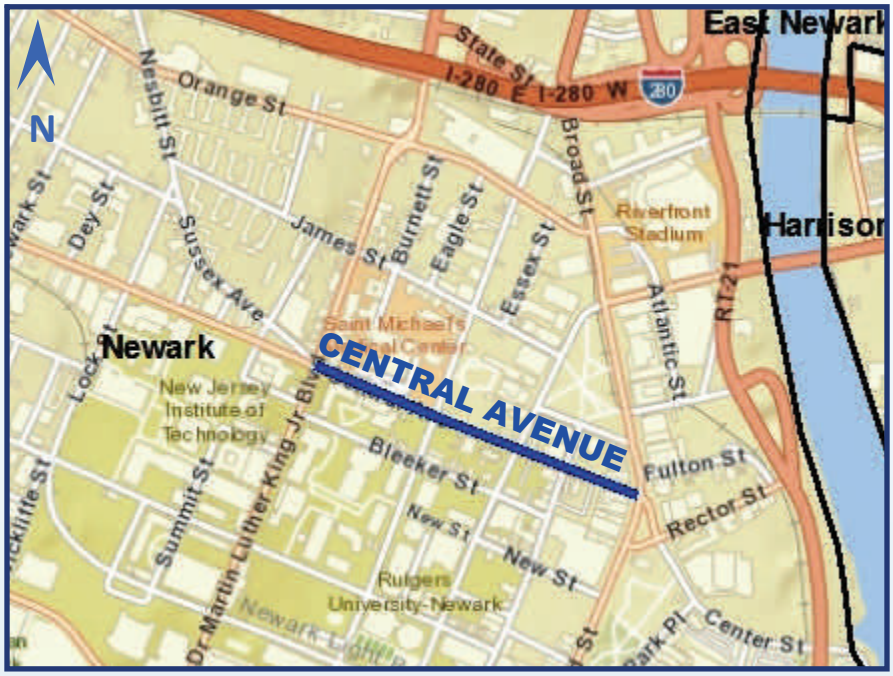
Note 2: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Install parking stripes***
- ***Install pedestrian warning signage***
- ***Install high visibility crosswalks or raised crosswalks***
- ***Upgrade curb ramps to meet ADA compliance***
- ***Install median, pedestrian islands, and/or curb extensions to reducing crossing distance***
- ***Upgrade traffic signals including pedestrian countdown signals***
- ***Install streetscape furniture near West Side Park at S. 17th Street***



IMPLEMENTATION



Existing Conditions:

- ***Residential, Commercial, University, Hospital, School***
- ***4 Lanes, undivided***
- ***37 ft wide roadway***
- ***Sidewalks***
- ***Pedestrian signage***
- ***Shared bike lanes***
- ***NJ Transit bus stop route***
- ***Pedestrian scale lighting***

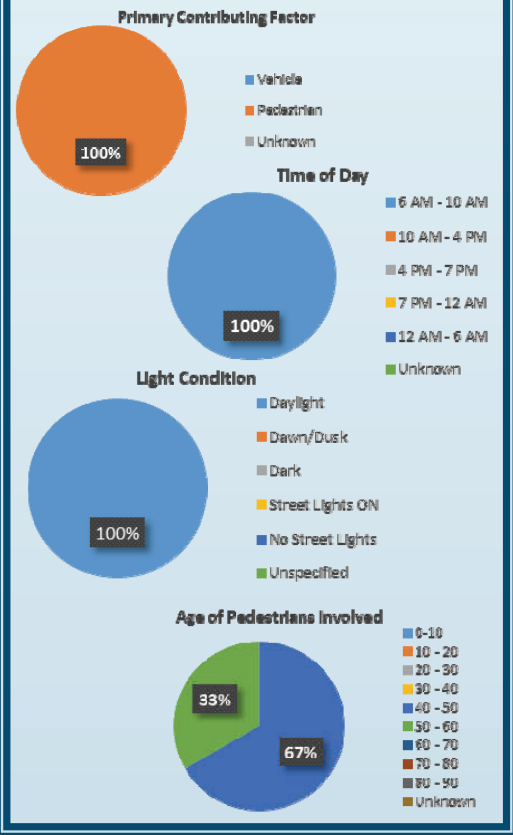
CORRIDOR 9 CENTRAL AVENUE

FROM
Dr. MLK Jr. BLVD.
TO
BROAD STREET

Pedestrians killed or seriously injured between 2009-2013: 1
Vehicular Crashes: 0
KSI/Mile: 2.5

Volumes:

AM Pedestrian	102
AM Bicyclists	5
PM Pedestrian	256
PM Bicyclists	13



IMPLEMENTATION

CORRIDOR 9 CENTRAL AVENUE

FROM
DR. MLK Jr. BLVD.
TO
BROAD STREET

Note: Aerial from 2010. May not reflect existing conditions.
Aerial depicts location were pedestrian crash occurred

Recommendations

- ***Bus stop striping***
- ***Upgrade crosswalks at Broad Street and Dr. MLK Jr. Blvd.***
- ***Upgrade traffic signal at Broad Street***
- ***Road Diet study***

IMPLEMENTATION

Existing Conditions:

- *Commercial, Residential*
- *2 Lanes, undivided*
- *37 ft wide roadway*
- *Sidewalks*
- *Pedestrian signage*
- *NJ Transit bus stop route*

CORRIDOR 10 ORANGE STREET

FROM W. MARKET STREET TO BROAD STREET

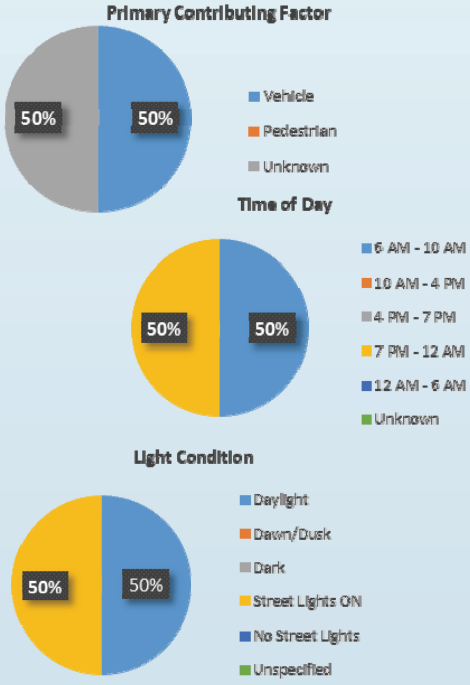
Pedestrians killed or seriously injured between 2009-2013: 0

Vehicular Crashes: 2

KSI/Mile: 1.9

Volumes:

AM Pedestrian	73
AM Bicyclists	3
PM Pedestrian	83
PM Bicyclists	5



IMPLEMENTATION

CORRIDOR 10
ORANGE STREET
FROM
W. MARKET STREET
TO
BROAD STREET

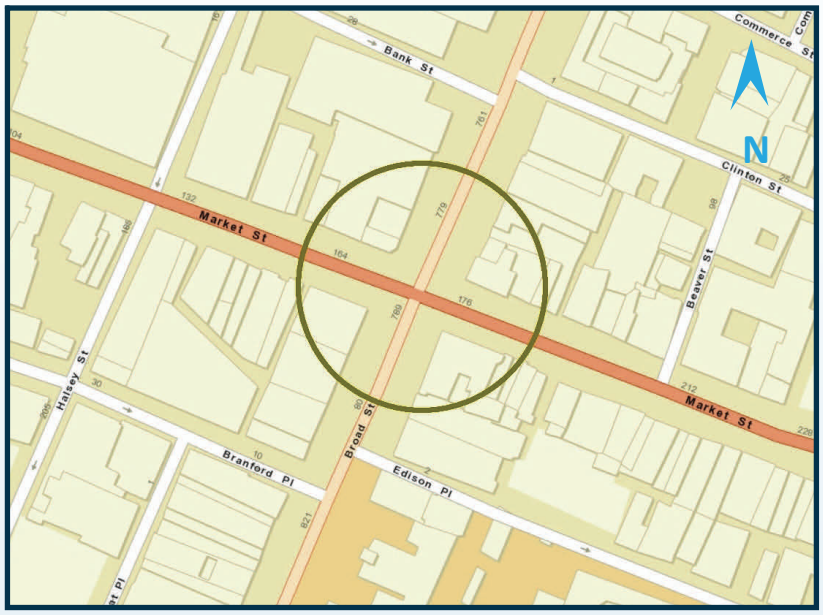
Note 1: Aerial depicts location where pedestrian fatality/injury occurred and where the pedestrian and bicycle volumes where collected

Note 2: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Enforce no parking on sidewalks***
- ***Install parking striping***
- ***Install bus stop striping***
- ***Enhanced pedestrian signage***
- ***Install pedestrian islands and/or curb extensions***
- ***Upgrade crosswalks (including angled crosswalks) and curb ramps to meet ADA compliance***
- ***Upgrade sidewalks in poor condition***
- ***Install pedestrian countdown signals***
- ***Install HAWK or RRFB signal at uncontrolled intersections***
- ***Conduct traffic signal warrant analysis at N. 7th Street***

IMPLEMENTATION



INTERSECTION 1

BROAD STREET AND MARKET STREET

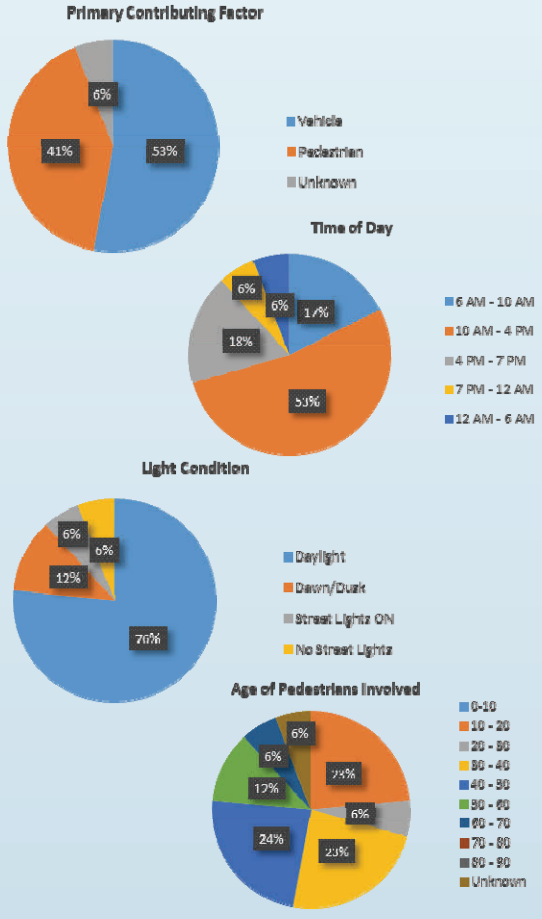
Pedestrians killed or seriously injured between 2009-2013: 17

Volumes:

AM Pedestrian Volumes	2,439
AM Bicycle Volumes	9
PM Pedestrian Volumes	3,556
PM Bicycle Volumes	20

Existing Conditions:

- *Commercial, Office*
- *Signalized with pedestrian countdowns signals*
- *Brick stamped crosswalks*
- *ADA accessible curb ramps*
- *Pedestrian median/refuge island (Broad Street)*
- *Parking stripes*
- *Sidewalks*
- *Major NJ Transit bus routes*
- *Lighting*



IMPLEMENTATION

Note: Aerial from 2010. May not reflect existing conditions.

INTERSECTION 1
BROAD STREET
AND
MARKET STREET

Recommendations

- ***Repair damaged crosswalks***
- ***Add pedestrian warning signs***
- ***Evaluate signal timing and consider adding an all pedestrian phase or lead pedestrian phase***

IMPLEMENTATION

INTERSECTION 2

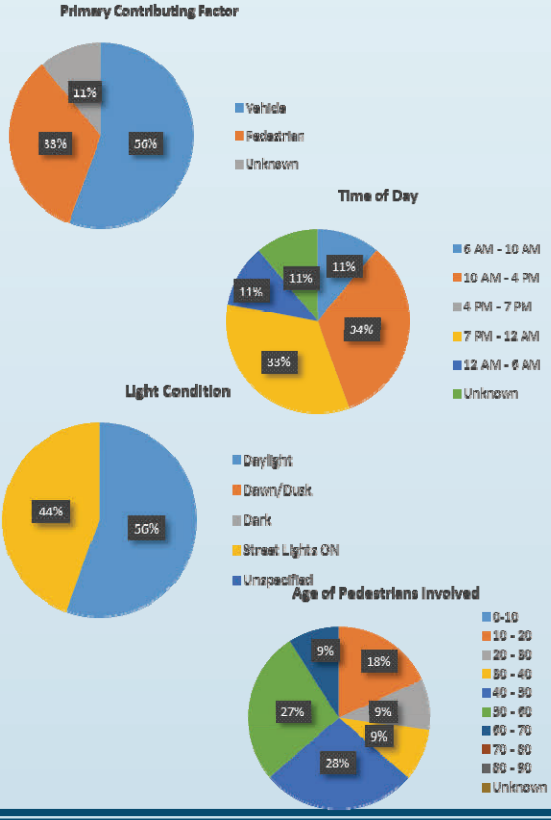
MARKET STREET AND MULBERRY STREET

Pedestrians killed or seriously injured between 2009-2013: 8

Bike crashes during the same period: 1

Volumes:

AM Pedestrian Volumes	116
AM Bicycle Volumes	-
PM Pedestrian Volumes	837
PM Bicycle Volumes	5



Existing Conditions:

- *Commercial, Office*
- *Major NJ Transit bus route (including GoBus)*
- *Signalized with pedestrian countdown signals*
- *Bricked stamped crosswalks*
- *ADA compliant curb ramps*
- *Parking stripes*
- *Sidewalks*

IMPLEMENTATION

INTERSECTION 2
MARKET STREET AND MULBERRY STREET

Note: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Add pedestrian warning signs***
- ***Relocate bus stop on Market Street to far side***
- ***Consider ergonomic crosswalks across Market Street***
- ***Review signal timing and consider adding an all pedestrian phase or lead pedestrian phase***
- ***Bike lanes***

IMPLEMENTATION

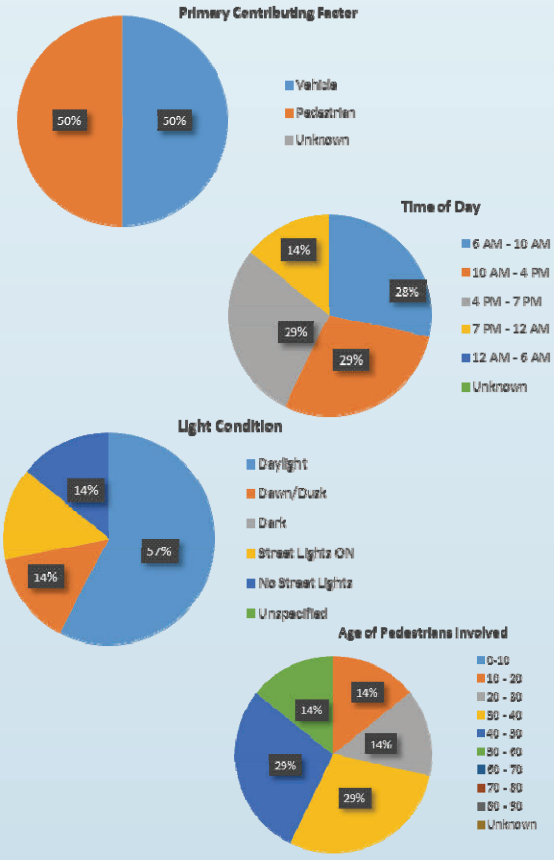
INTERSECTION 3

BERGEN STREET AND 12TH AVENUE

Pedestrians killed or seriously injured between 2009-2013: 7

Volumes:

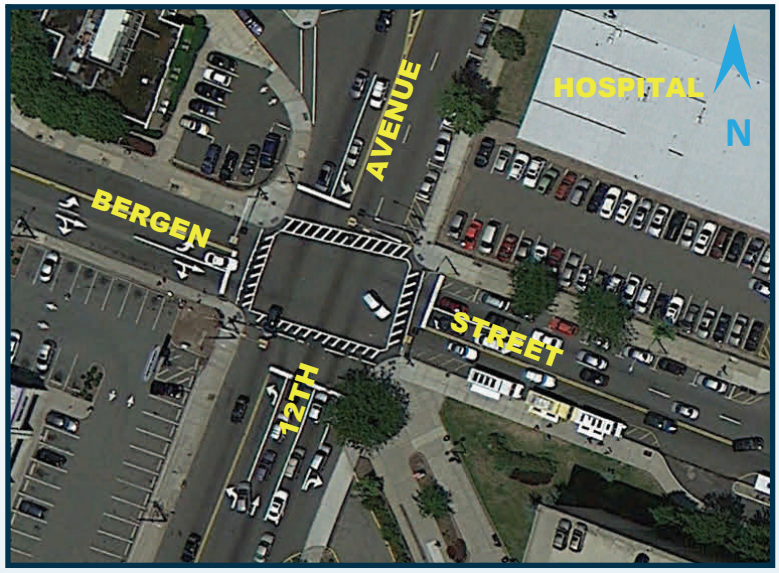
AM Pedestrian Volumes	313
AM Bicycle Volumes	4
PM Pedestrian Volumes	412
PM Bicycle Volumes	5



Existing Conditions:

- *Commercial, Hospital, University, Office*
- *Signalized with pedestrian countdown signals*
- *Marked Crosswalks*
- *Curb ramps*
- *Pedestrian signs*
- *Sidewalks*

IMPLEMENTATION



Note: Aerial from 2010. May not reflect existing conditions.

INTERSECTION 3
BERGEN STREET
AND
12TH AVENUE

Recommendations

- ***Restripe existing crosswalks***
- ***Address trip hazards along sidewalks and crosswalks***
- ***Install pedestrian countdown signals***
- ***Install median, pedestrian island and/or curb extensions to reduce crossing distance***
- ***Install mid-block crossing on Bergen Street at the Hospital with pedestrian-scale lighting***
- ***Implement road diet***
- ***Install bus stop striping***
- ***Install striping to prohibit parking close to crosswalks***

IMPLEMENTATION

Existing Conditions:

- *Commercial, Residential*
- *Unsignalized*
- *Brick stamped crosswalks*
- *ADA compliant curb ramps*
- *Curb extensions*

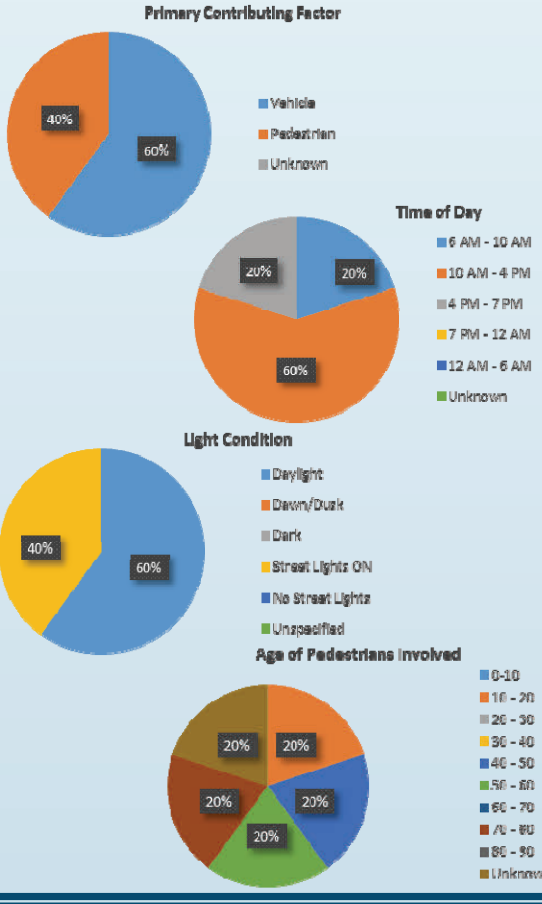
INTERSECTION 4

FERRY STREET AND MONROE STREET

Pedestrians killed or seriously injured between 2009-2013: 5

Volumes:

AM Pedestrian Volumes	333
AM Bicycle Volumes	5
PM Pedestrian Volumes	778
PM Bicycle Volumes	9



IMPLEMENTATION

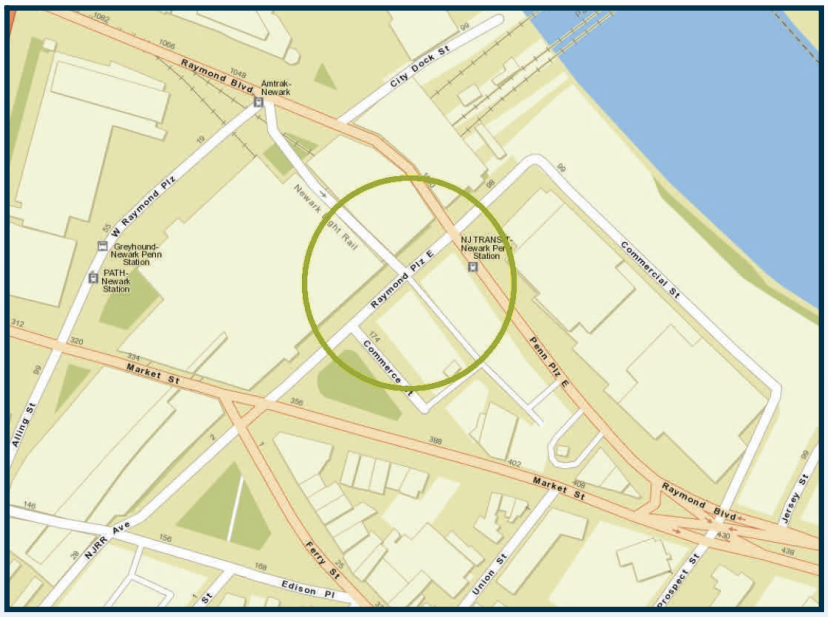
INTERSECTION 4
FERRY STREET
AND
MONROE STREET

Note: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Add pedestrian signs***
- ***Add in-road breakaway stop for pedestrian signs***

IMPLEMENTATION



Existing Conditions:

- *Major Transit Hub (Penn Station), Commercial, Office*
- *Signalized with pedestrian countdown signals*
- *Brick imprinted crosswalks*
- *ADA compliant curb ramps*
- *Pedestrian signs*
- *Audible pedestrian push buttons*
- *Pedestrian-scale lighting*

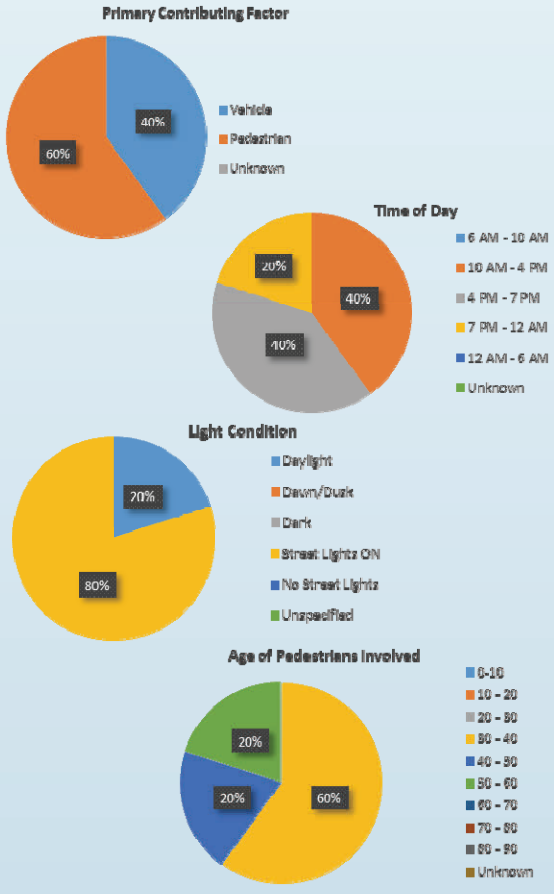
INTERSECTION 5

RAYMOND BLVD AND RAYMOND PLAZA EAST

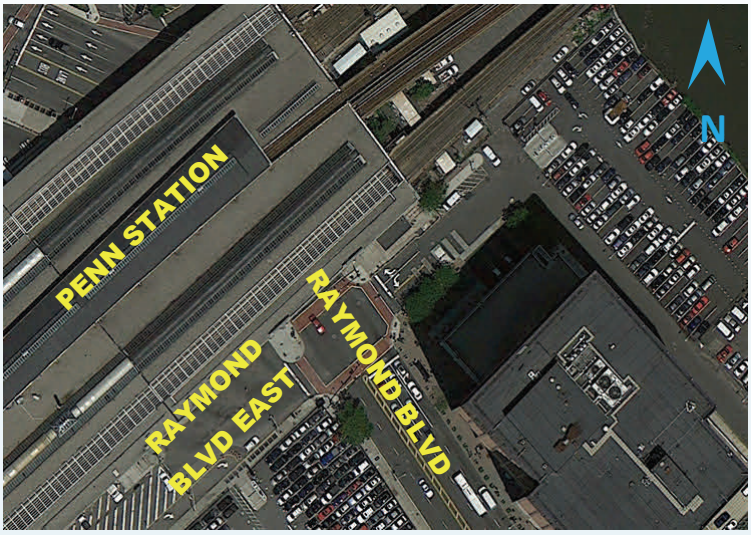
Pedestrians killed or seriously injured between 2009-2013: 5

Volumes:

AM Pedestrian Volumes	234
AM Bicycle Volumes	4
PM Pedestrian Volumes	326
PM Bicycle Volumes	5



IMPLEMENTATION



Note: Aerial from 2010. May not reflect existing conditions.

INTERSECTION 5
RAYMOND BLVD AND RAYMOND PLAZA EAST

Recommendations

- ***Review signal timing and consider adding an all pedestrian phase or lead pedestrian phase***
- ***Traffic signal timing review for pedestrian crossing times***
- ***Add median or pedestrian island on Raymond Blvd***
- ***Add additional lighting under Penn Station***
- ***Add bike facilities***

IMPLEMENTATION

INTERSECTION 6

WALNUT STREET AND McWHORTER STREET

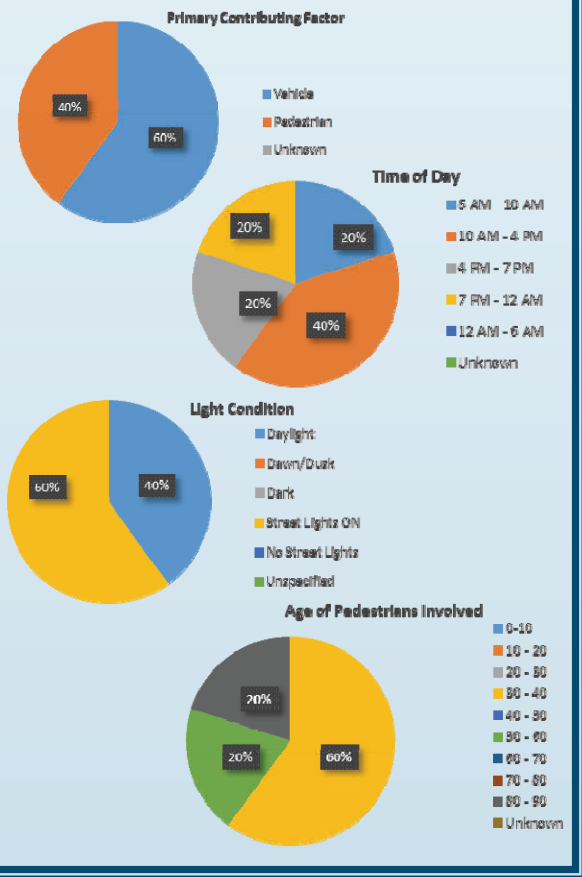
Pedestrians killed or seriously injured between 2009-2013: 5

Volumes:

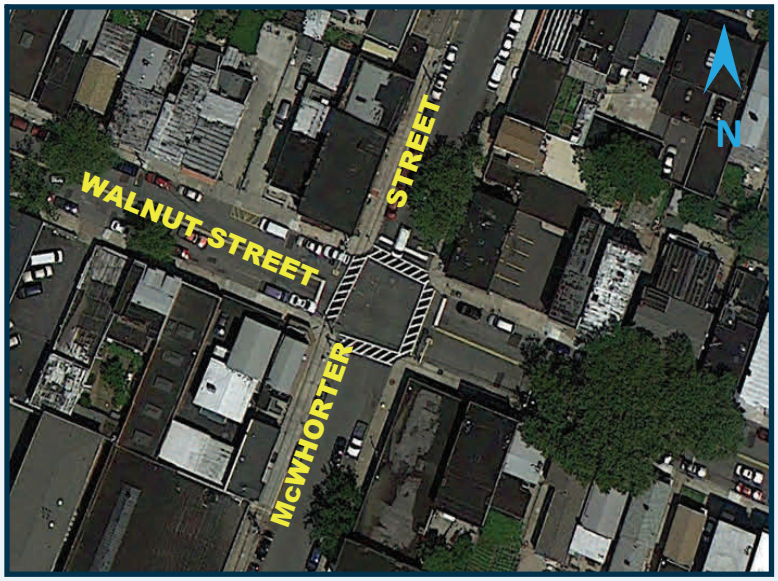
AM Pedestrian Volumes	97
AM Bicycle Volumes	2
PM Pedestrian Volumes	140
PM Bicycle Volumes	8

Existing Conditions:

- *Residential/Commercial*
- *Signalized*
- *Marked Crosswalks*
- *Curb ramps*
- *Pedestrian signs*
- *Bus Stop*



IMPLEMENTATION



Note: Aerial from 2010. May not reflect existing conditions.

INTERSECTION 6
WALNUT STREET AND McWHORTER STREET

Recommendations

- ***Restripe crosswalks***
- ***Upgrade traffic signal including pedestrian countdown signals***
- ***Upgrade curb ramps to meet ADA compliance***
- ***Install parking and bus stop striping***
- ***Install curb extensions to prevent parking close to crosswalks***
- ***Install bike lanes along McWhorter***
- ***Relocate bus stop***
- ***Road diet study***
- ***Investigate street lighting and add pedestrian scale lighting***

IMPLEMENTATION

INTERSECTION 7

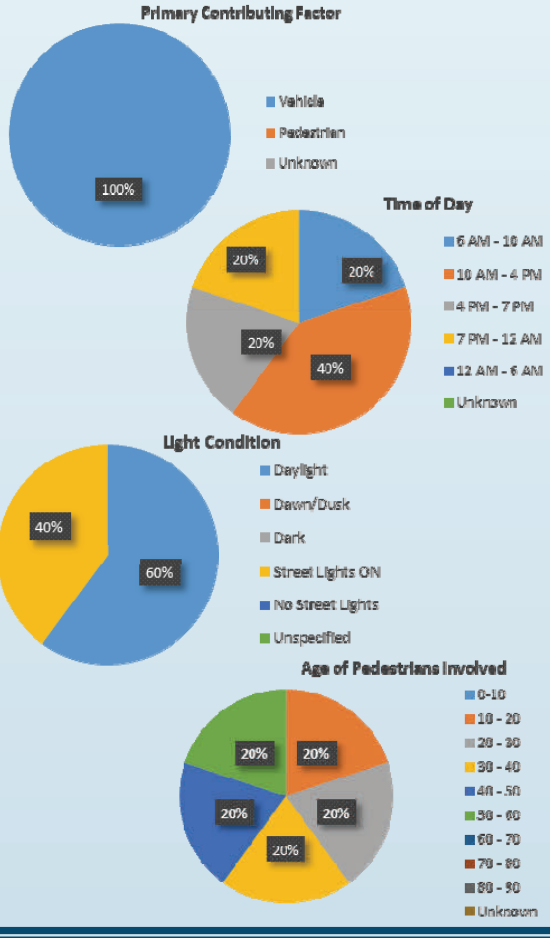
FERRY STREET AND ADAMS STREET

Pedestrians killed or seriously injured between 2009-2013: 4

Bike Crashes during the same period: 1

Volumes:

AM Pedestrian Volumes	376
AM Bicycle Volumes	11
PM Pedestrian Volumes	973
PM Bicycle Volumes	15



Existing Conditions:

- *Residential/Commercial*
- *Signalized*
- *Pedestrian Countdown Signals*
- *Brick stamped crosswalks*
- *ADA compliant curb ramps*
- *Pedestrian signs*
- *Parking Stripes (on Ferry Street)*

Note: Aerial from 2010. May not reflect existing conditions.

INTERSECTION 7
FERRY STREET
AND
ADAMS STREET

Recommendations

- ***Install curb extensions***
- ***Install In-road State Law Stop for Pedestrian signs***
- ***Install No Turn on Red signs***
- ***Consider implementing lead pedestrian phase***
- ***Install bike lanes***

IMPLEMENTATION

INTERSECTION 8

RAYMOND BLVD AND MULBERRY STREET

Pedestrians killed or seriously injured between 2009-2013: 4

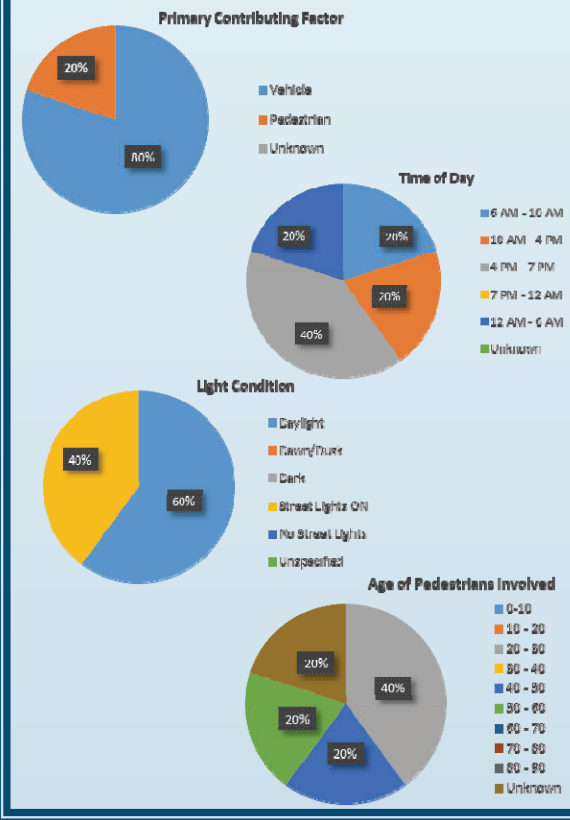
Bike Crashes during the same period: 1

Volumes:

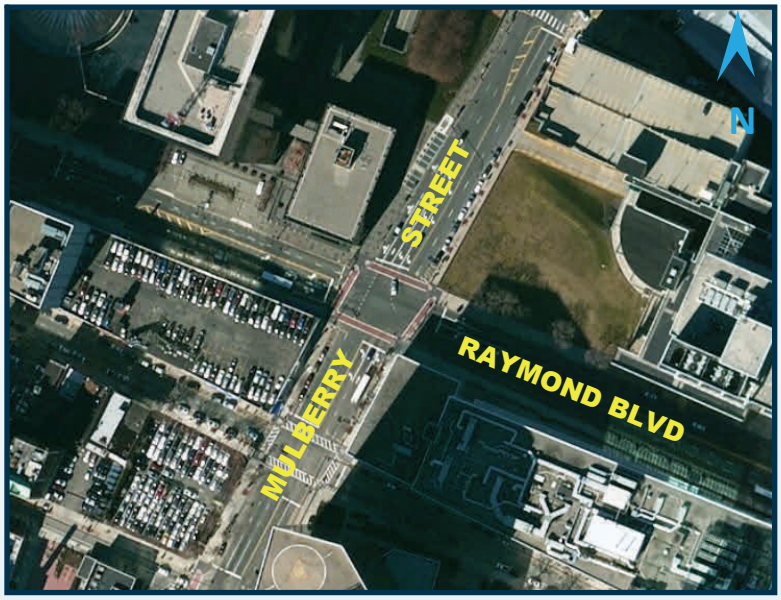
AM Pedestrian Volumes	419
AM Bicycle Volumes	-
PM Pedestrian Volumes	394
PM Bicycle Volumes	9

Existing Conditions:

- *Commercial, Office, University*
- *Signalized*
- *Pedestrian Countdown Signals*
- *Brick stamped crosswalks*
- *ADA compliant curb ramps*
- *Pedestrian signs*
- *Parking Stripes (on Mulberry Street)*
- *NJ Transit bus stops on Raymond*



IMPLEMENTATION

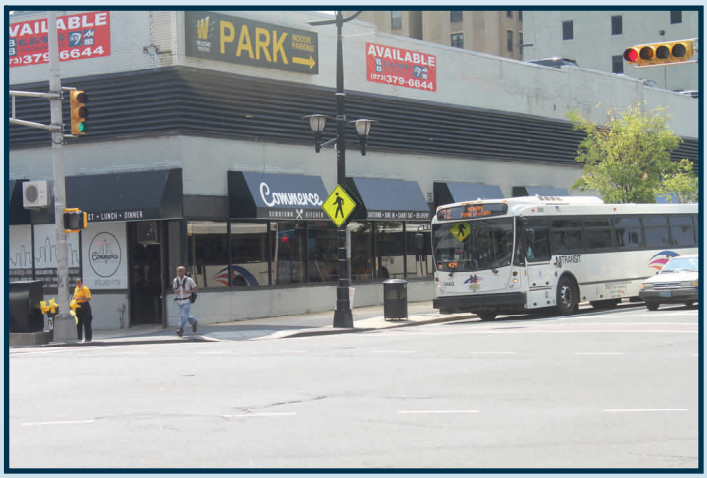


INTERSECTION 8
RAYMOND BLVD AND MULBERRY STREET

Note: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Upgrade traffic signal***
- ***Consider exclusive pedestrian phase or lead pedestrian phase***
- ***Install bike lanes***



IMPLEMENTATION

Existing Conditions:

- *Residential, Commercial*
- *Unsignalized*
- *Marked Crosswalks (only one side across 7th Avenue)*
- *School nearby*
- *NJ Transit bus stop*
- *Longitudinal rumble stripes*

INTERSECTION 9

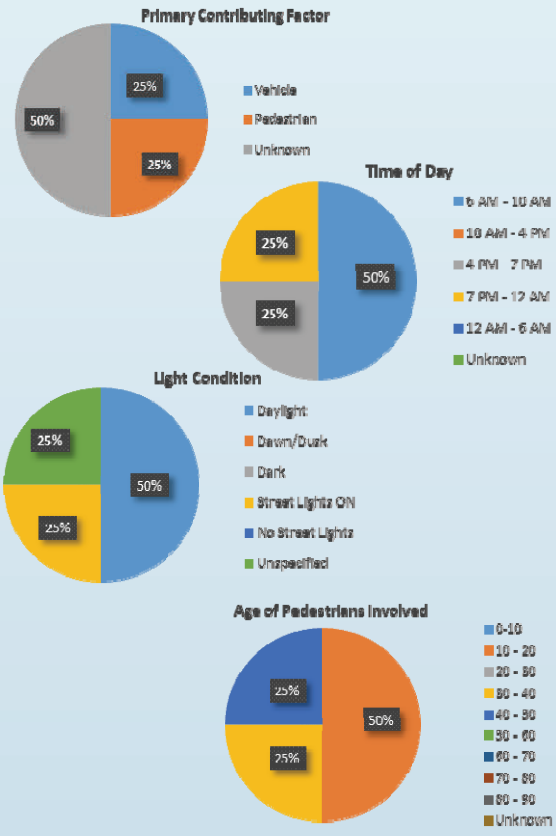
7th AVENUE AND COLONNADE PLACE

Pedestrians killed or seriously injured between 2009-2013: 3

Bike Crashes during the same period: 1

Volumes:

AM Pedestrian Volumes	314
AM Bicycle Volumes	7
PM Pedestrian Volumes	42
PM Bicycle Volumes	1



IMPLEMENTATION

INTERSECTION 9
7th AVENUE
AND
COLONNADE
PLACE

Note: Aerial from 2010. May not reflect existing conditions.

Recommendations

- ***Install In-road Stop for Pedestrian In-road signs***
- ***Install 2nd Crosswalk across 7th Avenue***
- ***Install parking & bus stop striping***
- ***Consider a multi-way stop***
- ***Upgrade curb ramps to meet ADA compliance***
- ***Install curb extensions and/or pedestrian island***
- ***Install speed humps or speed table***
- ***Install bike lanes***

IMPLEMENTATION

Existing Conditions:

- *Major Transit Hub (Penn Station), Commercial, Office*
- *Signalized with pedestrian countdown signals*
- *Brick Stamped crosswalks*
- *ADA compliant curb ramps*
- *Pedestrian signs*
- *Audible pedestrian push buttons*
- *Pedestrian-scale lighting*

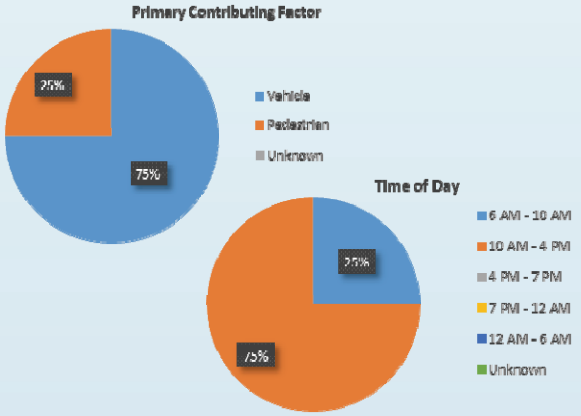
INTERSECTION 10

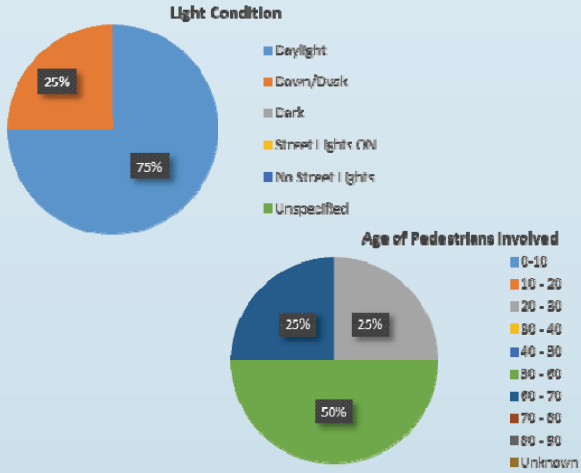
MARKET STREET AND RAYMOND PLAZA EAST

Pedestrians killed or seriously injured between 2009-2013: 4

Volumes:

AM Pedestrian Volumes	445
AM Bicycle Volumes	2
PM Pedestrian Volumes	509
PM Bicycle Volumes	4





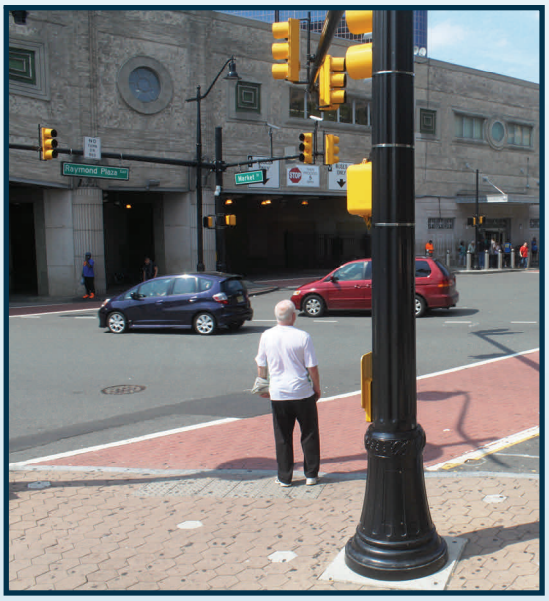
IMPLEMENTATION

INTERSECTION 10 MARKET STREET AND RAYMOND PLAZA EAST

Note: Aerial from 2010. May not reflect existing

Recommendations

- ***Consider exclusive pedestrian signal phase***
- ***Install enhanced lighting under Penn Station***
- ***Install pedestrian island and/or curb extensions***
- ***Consider ergonomic crosswalk***
- ***Install No Turn on Red signs***



Newark Pedestrian & Bicycle Safety Toolbox


SEE
SAY
SCHOOL BUS
COLLINS
Hub

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Introduction

The Newark Pedestrian and Bicycle Safety Toolbox (Toolbox) presents a comprehensive set of measures that can be utilized to improve pedestrian and bicyclist safety citywide. It includes physical strategies (design and engineering) and policy strategies, which are organized into three main categories:

- Pedestrian Tools // Chapters 2, 3, and 4 //
- Bicycling Tools // Chapters 5 and 6 //
- Pedestrian & Bicycle Safety Policies // Chapter 7 //

Each strategy is described and its benefits, usage considerations, implementation approach and time frame, relative cost and representative locations are provided. It is important to note that the Toolbox is focused on pedestrian and bicyclist safety only and is not intended to be a comprehensive "complete street" or "street design" toolbox.

Two key considerations in applying the Toolbox are 1) which tools to apply where, and 2) how a particular tool is designed and implemented in a particular location. The tools may be applied using both the site analysis approach (in which high-crash locations are targeted) and the systemic approach (in which locations with particular risk factors are targeted) in order to identify locations in need of safety improvements. The Newark Pedestrian and Bicycle Safety Action Plan identifies a high-priority set of such locations. Under either approach, locations are identified and then the most appropriate strategy or combination of strategies from this Toolbox can be selected to mitigate the safety challenges.

The Toolbox is not prescriptive in assigning particular strategies to particular situations or locations. Rather, the range of potential strategies are presented side-by-side so the engineer, planner, or designer can choose the most appropriate measures while taking into consideration site-specific factors, available right-of-way space, cost, speed of implementation and other objectives. Chapter 8 lists other leading resources that provide additional research and design guidance related to the tools and policies contained within the Toolbox.

Each tool includes the following elements:

Relative Cost	Description	Example
$	Low cost, generally less than $10,000	In-road stop for pedestrians sign
$$	Moderate cost, between $10,000 and $100,000	Shared roadway, bike lane, buffered bike lane
$$$	Medium cost, between $100,000 and $1,000,000	Curb extension, new sidewalk
$$$$	High cost, generally greater than $1,000,000	Off street bicycle path

Relative Time	Description	Example
Short	Quick to implement, does not require extensive planning, design or construction work.	Street trees, crosswalk, bus stop
Medium	Takes time to plan and design but does not generally require intensive capital construction. Can generally be implemented within six to 18 months.	Pedestrian safety island, separated bike lane
Long	Requires a longer planning, design and construction period, generally over 18 months.	Gateway

Street Design 2

Sidewalks	6.6
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Sidewalks

Sidewalks provide safe and accessible pedestrian circulation throughout the city. Proper sidewalk widths vary depending on the roadway type, usage, location, and land use, among other factors. The Federal Highway Administration recommends at least 5 feet of unobstructed sidewalk width. If there is enough room, a planted buffer between pedestrians and vehicles is suggested. A majority of Newark's roadways are equipped with sidewalks on both sides of the street.

Cost
$$$

Time Frame
medium

Benefits

- Minimize conflicts between pedestrians and cars.
- Reduce pedestrian crashes.
- Encourage safety and mobility through the city for access and recreation.
- Properly designed sidewalks offer a number of social, economic and environmental benefits by promoting walking and public transit as a transportation mode.
- Sidewalks can improve the shopping experience in retail corridors and enhance the sense of community by encouraging social interaction.

Application

- Throughway, buffer zones and frontage widths will vary based on the road typology (arterial, commercial, residential) and usage.
- Compliance with the most current Americans with Disabilities Act Accessibility Guidelines (ADAAG) as well as the Public Rights-of-Way Accessibility Guidelines (RROWAG) is essential.
- Installing or widening sidewalks often requires relocating curbs and drainage as well as re-striping.

Representative Locations

- Raymond Boulevard
- Ferry Street
- Mt. Prospect Avenue

Arterial street: Raymond Boulevard.

Commercial street: Ferry Street.


Residential street: Mt. Prospect Avenue.

Street Trees

Street trees located between the sidewalk and street are a cost-effective way to enhance aesthetics and improve environmental quality while creating a safer and accessible corridor. Street trees buffer pedestrians from the vehicular traffic and calm traffic by visually narrowing the roadway.

Cost
$

Time Frame
short

Benefits

- Buffer and protect the sidewalk from the roadway traffic.
- Calm traffic by visually narrowing the roadway.
- In addition to the safety benefits, street trees offer many economic, social and environmental benefits by offering opportunities for urban wildlife habitats, cooling the urban environment, reducing storm water runoff, improve air quality and increasing pavement life by avoiding extreme heat.

Application

- Proper width between the curb and sidewalk is required for planting street trees or heaving or cracked sidewalks may result.
- Trees should be limbed properly and setback from intersections and crossings to maintain proper sight lines.
- Street tree species, form and aesthetic qualities should be determined based on characteristics of the road including cross section, usage, etc. and must meet all city guidelines
- Planting of street trees requires the removal of portions of sidewalk, the digging and preparation of a tree pit and on-going watering and maintenance until the tree is established (generally 1- 2 years).

Representative Locations

- New Street
- Mt. Prospect Avenue

Flowering trees enclose the roadway on New Street.

Columnar trees buffer pedestrians on Mt. Prospect Avenue.

Lighting

Lighting is a key element of the visual environment that allows pedestrians to move about safely and feel more secure after sundown. Well-lit sidewalks and roadways allow drivers to see pedestrians entering the roadway and allow pedestrians to avoid tripping hazards or other sidewalk elements.

Cost
$$

Time Frame
medium

Benefits

- Offers a safer environment after dark.
- Increases visibility of pedestrians.
- Reduces tripping hazards.
- Reduces conflicts between bicycles/cars and pedestrians.

Application

- There are two types of lighting that may be used to illuminate the roadways: Pedestrian-Scale Lighting (12 foot - 16 foot height); and Roadway Lighting (20 foot - 26 foot height).
- Proper light levels vary depending on road typology and usage. For example, areas with high pedestrian traffic, such as commercial corridors, may require pedestrian-scale lighting in addition to standard roadway lighting.
- Light levels of adjacent properties are a contributing factor, as light from these properties may supplement the sidewalk lighting.
- Installation of lighting requires coordination with PSE&G.
- The means, methods, and level of difficulty involved with installing existing lighting varies greatly depending on existing site conditions, such as availability of electricity, existing poles and footings, light level requirements, etc.

Double teardrop style roadway fixture on Broad Street.

Pedestrian-scale double-head fixture on Mulberry Street.

Pedestrian-scale post top fixture on Clinton Street.

Representative Locations

- Broad Street
- Mulberry Street
- Clinton Street

Bus Stop

Bus stops work in combination with other tools to enhance pedestrian safety and accessibility. Bus stops should be located at the far side of intersections, when possible, to maximize pedestrian safety. For additional information on creating a new bus stop or improving a bus stop, refer to the NJTPA's Bus Stop Safety Toolbox.

Cost
$

Time Frame
short

Benefits

When bus stops are properly located at the far end of the block, they can:

- Reduce traffic at pedestrian crossing intersections.
- Minimize sight distance problems on approaches to intersection.
- Encourage pedestrians to cross behind the bus.
- Create longer deceleration distances for buses.

Application

- The location for a transit stop should be site specific and in relationship to traffic volumes at intersections.
- Placement of transit stops that support pedestrian safety should take into consideration crosswalks and connections opportunities.
- Mid-block stops should be avoided when possible due to reduced visibility.

Representative Locations

- Mt. Prospect Avenue
- Broad Street at Washington Park
- Broad Street at Market Street

Standard near side bus stop on Mt. Prospect Avenue.


Mid-block bus and light rail stop at Washington Park.

Far side bus stop where the curb was extended on Broad Street.

Pedestrian Fence

Pedestrian fences are used as protective barriers where there is an imminent risk to pedestrians due to high traffic volumes, poor sight lines or other factors. Fences should only be used when other, less obtrusive tools have not been effective.

Cost
$$

Time Frame
short

Benefits

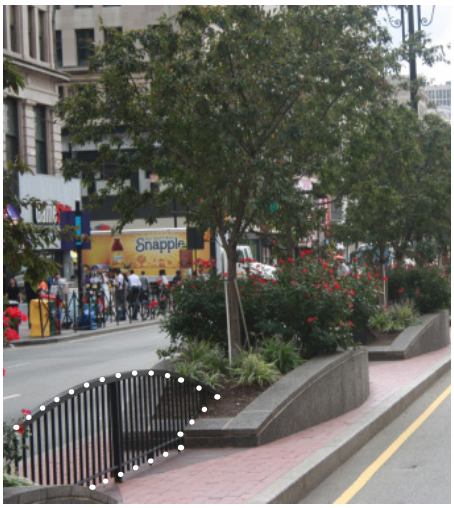
- Minimize conflicts between pedestrians and cars.
- Provide protection from the roadway traffic.
- Encourage pedestrian to use crosswalks or other specific routes.

Application

- Should only be used as a last resort when other, less obtrusive means have not been effective.
- Can have a negative effect on pedestrians that are in the road by preventing them from being able to get on the sidewalk.
- Can cause pedestrians to be trapped in unsafe or overcrowded conditions.
- Need to be high enough to discourage pedestrians from climbing over the fence.

Representative Locations

- Broad Street median
- Broad Street and Raymond Boulevard
- Washington Park Light Rail Stop



Pedestrian fence is used on center median of Broad Street to discourage jaywalking.

Pedestrian fences on the corner of Broad Street and Raymond Boulevard guide pedestrians to the

Pedestrian fences at rail stations to prevent pedestrian from crossing the tracks.

Intersection & Crossing Design

3

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Curb Ramp

Curb ramps are the sloping element of the sidewalk that transitions pedestrians from the sidewalk elevation to the roadway elevation. This transition allows for safe crossing and ADA-compliant accessibility. The design of curb ramps is closely regulated by the city based on New Jersey Department of Transportation guidelines.

Cost
$$

Time Frame
short

Benefits

- Provide accessible crossing for pedestrians of all ages and abilities.
- Minimize the need for pedestrians in wheel chairs or pushing strollers to walk in the street.

Application

- All pedestrian crossing areas (corners and mid-block) should be equipped with curb ramps.
- All curb ramps must be installed in compliance with ADAAG and PROWAG standards.

Representative Locations

- Washington Street and New Street
- Linden Street and Halsey Street
- Broadway Street and Crane Street

Washington Street and New Street concrete curb ramp.

Linden Street and Halsey Street Newark Downtown District granite curb ramp.

Broadway and Crane Street concrete curb ramp with brick edge.

Curb Extension

A curb extension, or bump-out, is an area of sidewalk that is widened into the parking lane to reduce crossing distances, slow turning vehicles and improve pedestrian visibility. The additional sidewalk space can function as gathering space, landscaped area or a waiting zone.

Cost
$$-$$$

Time Frame
medium

Benefits

- Provide safe crossing at wide intersections.
- Increase pedestrian visibility at intersections.
- Decrease pedestrian exposure to vehicles.
- Make crosswalks more apparent to drivers.
- Reduce traffic speed.
- Increase pedestrian waiting space.
- Reduce turning speed, giving priority to pedestrian crossings.
- Allow for an additional curb ramp, useful at high pedestrian traffic locations.

Application

- The installation may reduce the number of curbside parking spaces.
- The site should be reviewed to determine any interference with fire hydrants, snow plows, street sweepers, deliveries, bus stops, etc.
- Depending on the slope of the sidewalk, roadway and road crown, curb extensions may impact roadway and sidewalk drainage. Particular care should be taken to avoid pooling.
- Curb extensions require the installation of new curbing, sidewalks and, in some cases, drainage infrastructure.
- Temporary curb extensions can be implemented using roadway paint and flexible delineators or cones.

Curb extension at Market Street and Mulberry Street.

Curb extensions on Mt. Prospect Avenue significantly reduce the crossing distance by extending the sidewalk into the angled parking lane.

Representative Locations

- Market Street and Mulberry Street
- Mt. Prospect Avenue

Crosswalk

Crosswalks are used to clearly identify where pedestrians should cross the road. Crosswalks are differentiated from other areas of the roadway by a change in the surface to designate the pedestrian right-of-way. The City of Newark uses white "angled ladder" striped crossings, stamped resin "brick" crosswalks and painted side striping, two parallel lines with no stripes in between.

Cost
$-$$

Time Frame
short

Benefits

- Alert drivers to the presence of pedestrians in the roadway.
- Notify pedestrians of the designated areas to cross the roadway.

Application

- Crosswalks should be located based on the desired walking paths of pedestrians but should be limited to corners and intersections whenever possible.
- Crosswalks should be aligned perpendicular to the roadway to provide the shortest possible crossing distance.
- Crosswalks should be constructed of either white, thermoplastic striping or brick stamped resin with white thermoplastic edging.
- Brick Stamped Crosswalks should be limited to commercial areas with high pedestrian volumes. Ladder or angled ladder crosswalks should be used on neighborhood streets. Continental crosswalks should be used selectively in areas with high pedestrian volumes that require high visibility crosswalks.

Representative Location

- Newark neighborhood street
- Broad Street
- South Park Street, Montclair, NJ

Angled ladder or ladder crosswalks are used on neighborhood streets.

A brick stamped crosswalk on Broad Street at Bank Street.

Example of continental style crosswalks on South Park Street, Montclair, NJ.

Pedestrian Safety Island

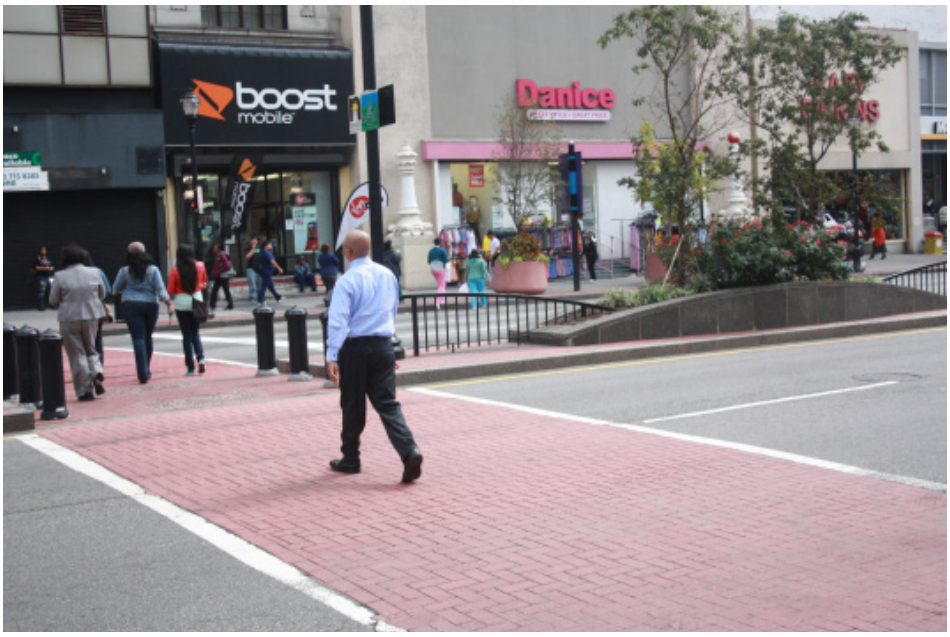
A pedestrian safety island is a segment of roadway median that is used as a refuge for pedestrians that are crossing the road. They are used throughout the city along wide roadways and at multi-modal transit locations.

Cost
$-$$

Time Frame
medium

Benefits

- Reduces pedestrian crossing distance and the exposure time experienced by the pedestrian crossing a wide roadway.
- Reduces the complexity of crossing multiple lanes of traffic by allowing pedestrians to cross one direction of traffic at a time if needed.
- Provides protection to pedestrian from turning cars.
- Reduces speed of on-coming as well as turning vehicles.



Pedestrian refuge integrated into the median on Broad Street.

Application

- Can require a significant amount right-of-way.
- Implementation may require lane reductions or other more significant traffic impacts.
- Emergency vehicle access is often impacted and should be considered.
- Visually-impaired pedestrians may be unaware of pedestrian safety island.
- Pedestrian refuge islands require the installation of a curbed island, flush sidewalk zone, tactile paver and bollards. Size and materials may vary greatly depending on location.


Pedestrian refuge island Bloomfield Avenue at the intersection of Broadway.


Pedestrian refuge island on Mt. Prospect Avenue at intersection of Verone Avenue.

Representative Locations

- Broad Street
- Bloomfield Avenue
- Mt. Prospect Avenue

Pedestrian Signal

Pedestrian signals work in coordination with traffic signals to choreograph the timing allowed for a pedestrian to cross the roadway. Pedestrian signals give clear priority to pedestrians and regulate pedestrian movement during designated times. All signalized intersections should have countdown timers and fixed signals are preferred over actuated ones. Adding accessible pedestrian signals should be an option.

Cost
$-$$

Time Frame
medium

Benefits

- Minimize vehicle-pedestrian conflicts by providing pedestrians crossing time at signalized intersections
- Inform pedestrian when it is safer to cross the roadway.
- Inform drivers when the pedestrian has the right of way.
- Reduces the risk of left-turning vehicle conflicts with the opposite crosswalk.

Application

- Should be timed to allow for safe crossing of pedestrians of all ages and abilities. For example, longer crossing times should be considered in areas with higher populations of elderly residents.
- May not be easily understood by school children with limited counting ability.
- Unless an audible signal is installed, the standard pedestrian signal does not benefit pedestrians with impaired vision.

Representative Location

- Market Street and Mulberry Street
- Market Street and McCarter Highway

Pedestrian crossing signal with countdown timer at Market Street and Mulberry Street.

Pedestrian crossing with push button at Market Street and McCarter Highway.

Rectangular Rapid Flashing Beacon

Rectangular rapid flashing beacons (RRFB) are yield-to-pedestrian-signals that can have sensors or be wirelessly synchronized to alert drivers when a pedestrian is entering the crosswalk. In Newark, RRFBs are usually placed at mid-block crossings or on neighborhood main streets where an additional level of pedestrian safety is required.

Cost
$-$$

Time Frame
short to medium

Benefits

- Visually alerts drivers when pedestrians are entering the crosswalk.
- Can be use at high-speed intersections.
- Extra nighttime and high-fog visibility.
- Ideal for uncontrolled crossings locations like mid-block crossings.

Application

- RRFBs have to be installed in pairs with one on each side of the roadway. If a median or Pedestrian Safety Island is used, then three RRFBs may be needed.

Representative Locations

- Warren Street (at Greek Village)
- West Market Street and Littleton Avenue

LED light panels located above the arrow will flash when the push-button is activated by a pedestrian, Warren Street.

Rectangular rapid flashing beacon shown at West Market Street and Littleton Avenue.

In-Road Stop for Pedestrian Signs

In New Jersey, it is state law that motorists are required to stop for pedestrians crossing at intersections and within marked crosswalks, unless regulated by a traffic control device. A movable, flexible sign can be placed on the center line of the roadway immediately before a crosswalk to remind drivers of this requirement. There are other signs that can be included, such as "Turning Vehicles Yield to Pedestrians" and advanced crosswalk and school crosswalk warning signage.

Cost
$

Time Frame
short

Benefits

- Reminds drivers that they are required by New Jersey State Law to stop for pedestrians entering the crosswalk.
- Centerline location has a traffic calming effect.
- Location on the approach to crosswalks alert motorists to pedestrians entering the roadway.

Application

- In-road "State Law Stop for Pedestrian" signs should be considered at any crosswalk where pedestrians are having difficulty crossing and/or cars are not stopping for pedestrians.
- The signs should be installed at crosswalk locations on the centerline or median.
- Snow plowing can damage the signs so additional attention is required in the winter season.
- Can be paired with targeted enforcement campaigns.

Representative Location

- Warrent Street mid-block at NJIT
- University Avenue at Rutgers University

An in-road stop sign on Warren Street mid-block at NJIT.

An in-road stop sign at Rutgers University, University Avenue.

Mid-Block Crossings

Mid-block crossings are often installed in areas with heavy pedestrian traffic to provide more frequent crossing opportunities. They may also be added near major pedestrian destinations, such as schools, where people might otherwise cross at unmarked locations.

Cost
$-$$

Time Frame
short to medium

Benefits

- Provide additional opportunities for pedestrians to cross the road.

Application

- Additional pedestrian safety measures such as advanced warning signs, raised crosswalks and curb extensions should be considered at mid-block crossings.
- Stop lines at mid-block crossings should be set back a minimum of 20 feet from the crossing.

Representative Location

- University Avenue
- Warren Street

A mid-block crossing located on the Rutgers Campus on University Avenue.

A mid-block crossing located on the NJIT Campus on Warren Street.

Signal Timing

Signal timing such as leading pedestrian intervals (LPI), lagging left turns and protected turning phases are used to give pedestrians priority at intersections and temporarily separate pedestrian and vehicles at crossings. Crossing speeds of pedestrians should also be considered when retiming traffic signals.

Cost
$-$$

Time Frame
short

Benefits

- Enhance pedestrian visual exposure.
- Reduce overall pedestrian wait times and exposure at intersections.
- LPIs allow pedestrian to begin crossing 3-6 seconds before vehicles traveling in the same direction are given the green light.

A pedestrian signal on Broad Street indicates when pedestrians have the right-of-way and how much time they have left to cross.

Application

- The use of a "No Turn on Red" sign might be necessary to ensure pedestrians gain the full benefit of the LPI.
- Short cycle lengths of 60 - 90 seconds are ideal for urban areas.
- Crossing time should be site specific. Longer crossing times should be considered in areas with higher populations of elderly residents and children.
- The Federal Highway Administration suggest that crossing time should be calculated based on a walking speed no more than 1.065 m/s (3.5 ft/s).

Representative Location

- Broad Street

Signage

Pedestrian warning and wayfinding signage can be used to control speeds, provide information and identify points of interest and destinations throughout the city. All signs should be designed to the Manual on Uniform Traffic Control Devices (MUTCD) standards.

Cost
$

Time Frame
short

Benefits

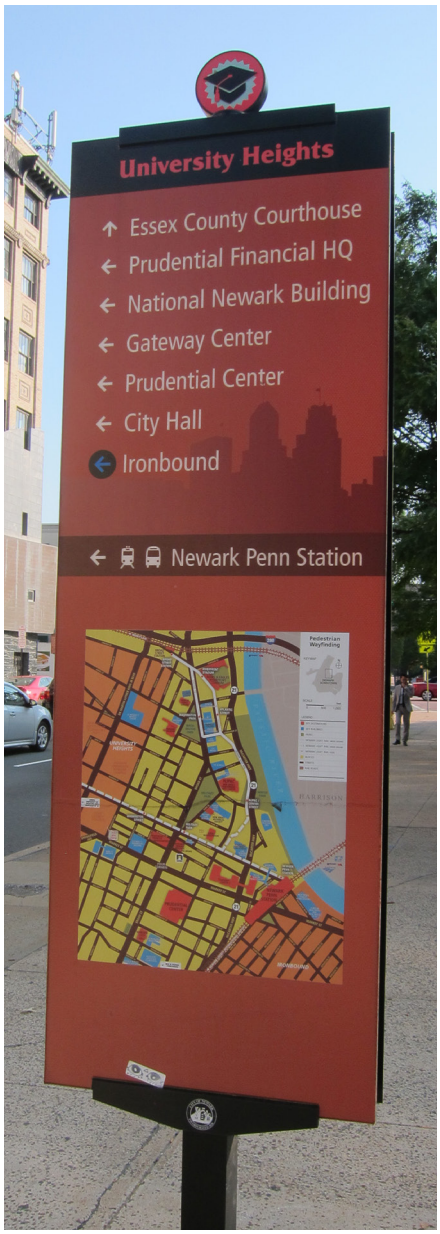
- Provide pedestrians and drivers with information about laws, roadway changes and points of interest.
- Wayfinding signs are used to identify the direction of major destinations and points of interest to both pedestrians and drivers. They facilitate better visitor experiences and can also guide residents unfamiliar with a neighborhood
- Warning signs indicate a hazard ahead in the road that may not be immediately apparent to the driver.

Application

- The use of a "No Turn on Red" sign might be necessary to ensure pedestrians can cross during a Leading Pedestrian Interval.
- Pedestrian wayfind signage should be located in all areas with high pedestrian volumes such as universities, the downtown and commercial corridors.
- Advanced pedestrian warning signage can be used in areas where pedestrian crossings may not be expected by drivers.
- Speed control elements such as a speed hump should be accompanied by the appropiate signage.

Representative Location

- Broad Street
- Warren Street
- Clifton Avenue



Pedestrian wayfinding signage on University Avenue

School crossing ahead warning sign

Warning signage identifying a pedestrian crossing on Crane Street and Broadway


NO TURNS
Market St
NO TURNS
DON'T BLOCK THE BOX
NO TURNS
COSMETIC HOUSE

Speed Control 4

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Rumble Strips

Rumble strips are rows of raised pavement markings that produce a rumbling vibration as the tires of a vehicle roll over them. The rumbling vibration is intended to alert drivers that they are approaching a busy pedestrian crossing area and should exercise due care.

Cost
$

Time Frame
short

Benefits

- Alerts drivers that may be distracted or inattentive.

Application

- Rumble strips should be installed on the approach to key intersections or crossings where inattentive or distracted driving is a concern.
- All pavement marking should be consistent with The Manual of Uniform Traffic Control Devices (MUTCD).

Representative Location

- Broadway
- University Avenue

Rumble strips located on University Avenue.

Rumble strips located on Broadway near Bloomfield Avenue.

Speed Humps & Speed Tables

Speed humps and speed tables are used to slow vehicular traffic and enforce pedestrian-friendly travel speeds. In Newark, these elements are applied along neighborhood streets, school zones and low-speed streets.

Cost
$$

Time Frame
short to medium

Benefits

- Speed limit compliance.
- Deter cut-through traffic.

Application

- Speed humps and tables will only be installed on streets that comply with the city's "Policy on Speed Humps and Tables."
- Drainage may be impacted if the element blocks the flow of runoff along the curb line.
- Bicycle volumes should be considered when planning vertical speed control elements since they may not be bicycle friendly.
- Speed tables may be used in coordination with crosswalks to create "tabled crosswalks."
- Vertical speed control elements are generally constructed using asphalt that may be saw cut into the existing roadbed.

Representative Locations

- Irvine Turner Boulevard
- University Avenue

A raised intersection also acts as speed table at Irvine Turner Boulevard and Muhammad Ali Avenue, providing better visibility of pedestrians and calming traffic.

A speed hump located on University Avenue between Bleeker Street and Warren Street.

Center Median

Center medians are used to separate opposing lanes of traffic along wide roadways. Medians can be used to deter mid-block crossing or jaywalking and may also be used to calm traffic by visually reducing the road width, especially if they contain trees and/or landscaping.

Cost
$$

Time Frame
medium to long

Benefits

- Deter mid-block crossing.
- Calm traffic along excessively wide roadways.

Application

- Medians may interfere with emergency vehicle access.
- Landscaped medians require long-term maintenance.
- Unlike highway medians, medians installed within the city should be designed to visually narrow the roadway and calm traffic. If not properly designed, medians may inadvertently result in increased travel speeds.
- Medians are constructed in the center of the roadway and consist of a curbed edge and either paved or landscaped center area. Additional elements that may be designed into the median include street lighting, landscape materials, raised planters or fencing.

Representative Locations

- Mt. Prospect Avenue
- Broad Street

Center median located on Mt. Prospect Avenue includes granite cobbles and columnar street trees.

Center median located on Broad Street includes raised planters and pedestrian fences to prevent jaywalking.

Gateway Treatments

Gateway treatments are often used to calm traffic when drivers are transitioning from a higher-speed roadway into a more pedestrian-oriented residential neighborhood or center. They typically involve a decorative sign, landscaping and lighting.

Cost
$$

Time Frame
medium to long

Benefits

- Notifies drivers that they are entering a neighborhood and should expect pedestrians to be using the street.
- Calms traffic at neighborhood entry and transitional points.
- Discourages or prohibits through-traffic.
- Defines transitions to low speed, shared streets and pedestrian-friendly areas.

Application

- Gateways should be identified by the community and designed to express the character of the community.
- Gateway designs vary greatly and may incorporate curb extensions, center medians, vertical speed control elements and other tools identified in this manual.

Representative Location

- Bloomfield Avenue at Broadway
- Mt. Prospect Avenue at Verone Avenue

Gateway treatment on Bloomfield Avenue entering the Lower Broadway neighborhood.

Gateway treatment on Mt. Prospect Avenue entering the Forest Hill neighborhood.

Chicanes, Chokers, Diverters & Roundabouts

Chicanes, chokers, diverters and roundabouts are modifications made to the curb line, lanes or traffic flow intended to slow, redirect or block vehicular through-traffic. They are useful tools for deterring speeding and cut-through traffic, particularly on local residential streets.

Cost
$$-$$$

Time Frame
medium to long

Benefits

- Reduce cut-through traffic on neighborhood streets.
- Reinforce speed limit.
- Enhance safety at intersections.

Application

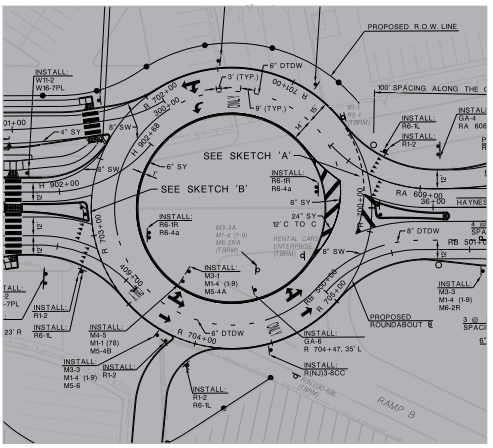
- These improvements have impacts on traffic circulation and therefore traffic volumes and emergency access requirements should be considered.
- Installing these improvements may impact roadway drainage.
- These elements may be installed either permanently or temporarily. Permanent installation requires the construction of concrete curb and a combination of landscape and hardscape materials. Extent of implementation depends on the site specific requirements.

Representative Location

- Burlington County, NJ
- Haynes Avenue, Newark

A roundabout in Burlington County, NJ calms traffic and provides safe crossings for pedestrians.

Picture of Chicane from FHWA Ped Bike Safety Website.



Haynes Avenue, Newark roundabout design

Road Diet

Road diets, also known as a road reconfiguration, refer to a reduction in the amount of space allocated to motor vehicles on a street by eliminating travel lanes or reducing lane widths. This reduction allows the roadway space to be reallocated for other uses such as bike lanes, pedestrian crossing islands or sidewalks.

Cost
$-$$

Time Frame
medium

Benefits

- Reduce crossing distance for pedestrians.
- Improves speed limit compliance and calms traffic.
- Increase areas dedicated to pedestrians.

Application

- Road diets often have traffic implications. In many cases, a traffic study is required in order to fully understand the impacts.

Representative Locations

- Irvine Turner Boulevard
- Bloomfield Avenue

Irvine Turner Boulevard was converted from two lanes per direction to one lane per direction with a bike lane, a median and left-turn lanes at intersections.

On Bloomfield Avenue, one dedicated turning lane was eliminated and the corner radius was reduced in order to provide a larger pedestrian area, calm traffic and reduce crossing distances.

Bicycle Lanes, Paths, & Routes

5

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Shared Roadways

A shared roadway is a street that is preferred for bicycle travel as indicated by signs and pavement markings. Shared roadways are used as an interim treatment or to connect to other bicycle facilities but do not provide dedicated roadway space for bicycling.

Cost
$

Time Frame
short

Benefits

- Shared roadways can be used where other limiting factors, such as roadway width, would not otherwise allow for a connection in the bicycle network. They require no additional street space.
- The use of shared lane markings, or "sharrows," reinforces the legitimacy of bicyclists on the street and can recommend safer bicyclist positioning.
- Bicycle routes can reduce the rate of sidewalk riding and wrong-way bicycling.

Application

- Because they do not provide any protection or separation from vehicular traffic, bicycle routes provide a low level of comfort to bicyclists.
- Requires proper signage and pavement markings.

Representative Location

- Raymond Boulevard
- 1st Street
- Essex Street

Typical street marking to signify a shared roadway, Raymond Boulevard.

"Share The Road" bicycle signage

A sharrow indicates a shared roadway on a narrow, two-way street, Essex Street.

Bicycle Lane

Bicycle lanes create a dedicated space for bicyclists to ride adjacent to traffic by designating a portion of the roadway for exclusive use by bicyclists using signs, striping and pavement markings. Bicycle lanes are located in the street between the travel lane and the parking lane or curb. Travel is in the direction of traffic.

Cost
$$

Time Frame
medium

Benefits

- Bicycle lanes provide dedicated space for bicyclists, increasing safety, comfort and mobility, especially on busy streets.
- Bicycle lanes allow bicyclists to ride at their own pace with minimal pressure or interference from automobile traffic.
- Bicycle lanes foster more predictable behavior and movements between bicyclists and motorists.
- Bicycle lanes, in conjunction with other bicycle infrastructure, encourages more bicycling, creating safety in numbers.

A curbside bike lane on 1st Street between Central Avenue and New Street.

Application

- Standard bicycle lanes provide a low to moderate level of comfort. While they provide dedicated space for bicyclists, this space can be violated by motorists (for example through double-parking or swerving). On higher-speed streets or those with frequent curbside parking and loading activity, bicycle lanes do not provide a low-stress experience for the majority of bicyclists.
- Bicycle lanes require a change to the striping on a street. This may necessitate shifting (or eliminating) travel lanes to accommodate the bicycle lane, plus the addition of street signs alerting motorists to the presence of the lane.
- Costs include roadway markings and signage, and will be higher if it is part of a larger street reconfiguration (e.g. a road diet).

Representative Location

- 1st Street
- Clifton Avenue

A curbside bike lane and signage on Clifton Avenue.

Buffered Bicycle Lane

A buffered bicycle lane is a standard bicycle lane coupled with a striped buffer space separating the bicycle lane from the adjacent travel lane and/or parking lane, enhancing bicyclist comfort.

Cost
$$

Time Frame
medium

Benefits

- Buffered bicycle lanes provide greater clearance for bicyclists, allowing them to ride further outside the "door zone" and pass one another without encroaching on the vehicle travel lane.
- Buffered bicycle lanes provide similar benefits as standard bicycle lanes while appealing to a greater number and type of bicyclists.

Application

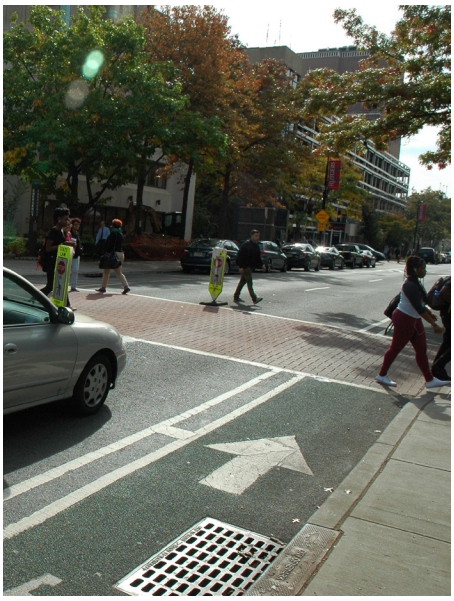
- Buffered bicycle lanes provide a moderate level of comfort to bicyclists. Less experienced riders may find them more attractive on higher-speed streets than standard bike lanes.
- Buffered bicycle lanes require a change to the striping on a street. This may necessitate shifting (or eliminating) travel lanes to accommodate the buffered bicycle lane, plus the addition of street signs alerting motorists to the presence of the lane.
- Costs include roadway markings and signage, and will be higher if it is part of a larger street reconfiguration (e.g. a road diet).

Representative Location

- West Market Street
- Washington Street
- University Avenue

A buffered bicycle lane on West Market Street.

A buffered bicycle lane on Washington Street.



A buffered bicycle lane on University Avenue.

Contra-Flow Bicycle Lane

A contra-flow bicycle lane is a lane that allows bicyclists to ride in the opposite direction of vehicular traffic on what would otherwise be a one-way street. The contra-flow lane allows for shorter connections in the bicycle network that makes bicycling more convenient and, in some cases, safer.

Cost
$$

Time Frame
medium

Benefits

- Contra-flow bicycle lanes decrease trip distance and time by creating more direct links in the bicycle network, significantly enhancing bicyclist mobility and convenience.
- When used where they can help bicyclists avoid the need to use high-volume streets and cross multiple intersections, Contra-flow Lanes may also create a safer bicycle network.
- Decreases the incidence of bicyclists riding the wrong way on a street or on the sidewalk.
- Provides connectivity for bicyclists traveling in both directions.

A contra-flow bicycle lane in Chicago, IL.

Application

- Contra-flow bicycle lanes can provide a moderate to high level of comfort depending on where they are sited (e.g. traffic speeds) and how they are designed (e.g. visibility, separation from motor vehicle traffic, intersection treatments).
- The impact of contra-flow bike lanes is greatest in sections of the street network dominated by one-way streets and large or disconnected blocks where bicyclists would have to go far out of their way to legally ride from one point to another.
- Contra-flow bicycle lanes require a change to the striping on a street. This may necessitate shifting (or eliminating) travel lanes to accommodate the contra-flow bicycle lane, plus the addition of street signs alerting motorists to the presence of the lane.

Contra-flow bike lane schematic from the NACTO Urban Bikeway Design Guide.

- Contra-flow bicycle lanes should be used where alternate routes are unsafe, uncomfortable, or are unduly long; bicyclists are already riding the wrong way; a direct connection is made with a key destination; or a two-way connection between other bicycle facilities is needed.
- Because contra-flow bicyclists will be unexpected to motorists, careful consideration should be given to signage alerting motorists to their presence.
- Contra-flow bicycle lanes are best suited for low speed and low volume streets, unless physically protected from vehicular traffic.
- Costs include roadway markings and signage, and will be higher if it is part of a larger street reconfiguration (e.g. a road diet).

Representative Location

- Union Street, Brooklyn, NY

Separated Bicycle Lane — One-Way

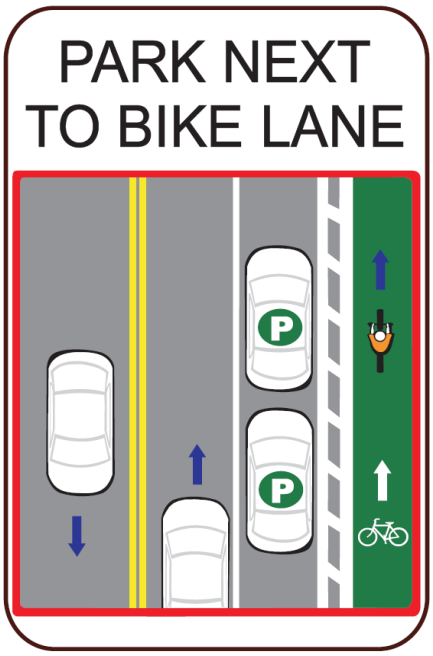
A separated bicycle lane, or cycle track, is an exclusive bicycle facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bicycle lane. A separated bicycle lane is physically separated from motor traffic using a variety of treatments such as on-street parking, raised curbs or medians, bollards, landscaping, planters, concrete barriers and/or distinctive paving.

Cost
$$

Time Frame
medium

Benefits

- The dedicated, separated space for bicyclists increases perceived comfort and safety (and, depending on the particular location and design, actual safety), making the facility more attractive to bicyclists of a wide range of abilities and ages.
- Physical separation all but eliminates the risk and fear of a collision with vehicles mid-block.
- Physical separation reduces the risk of being hit by a door, known as dooring
- Physical separation prevents or reduces parking in the bicycle lane.



The protected bicycle lane on Mt. Prospect Avenue uses a painted buffer with plastic flexi-posts to separate the bicycle lane from the parking and travel lanes.

Application

- Separated bicycle lanes provide a moderate to high level of comfort to a wide range of bicyclists, particularly when the separation is a physical barrier.
- While separated bicycle lanes have the potential to provide a superior facility for bicyclists, there are many more design challenges that must be addressed in their implementation. In particular, special consideration must be given to the design at intersections, driveways and transit stops to manage conflicts, improve visibility and maximize awareness for both bicyclists and motorists.
- The time frame and cost of a separated bicycle lane depends on the type of separation being employed. At its simplest, protection is provided by an off-set parking lane and a striped buffer. This approach can include a painted bicycle lane and/or raised pedestrian islands at crossings. Plastic flexi-posts or bollards can be added to provide more visibility or where there is not enough roadway width to provide for an adequately wide buffer. Concrete (Jersey) barriers or temporary or permanent curbs may be employed where traffic speeds and volumes warrant.
- Costs include, at a minimum, roadway markings and signage and will be higher if part of a larger street reconfiguration (e.g. a road diet). Depending on the design, additional costs might include physical barriers and new signals.

Representative Location

- Mt. Prospect Avenue

Separated Bicycle Lane — Two-Way

A two-way separated bicycle lane is similar to a standard separated bicycle lane but allows for travel in both directions on one side of the road.

Cost
$$

Time Frame
medium

Benefits

- See Benefits of Separated Bicycle Lane – One-Way.
- Can reduce out-of-the-way travel for bicyclists by providing contra-flow movement.
- Typically utilizes less right-of-way than two one-way separated bicycle lanes on either side of the street.

Application

- See Considerations for Separated Bicycle Lane – One-Way.
- Two-way bike lanes introduce more conflicts to intersections and driveways as compared to one-way bike lanes.
- Motorists may not be expecting the presence of contra-flow riders, requiring special attention to planning detail.
- Two-way separated bicycle lanes are well suited for streets that have few conflicts on one side of the street, such as along a park or waterway.

Representative Location

- Kent Avenue, in Brooklyn, NY, runs along the East River waterfront for two miles, providing a key link in the Brooklyn Waterfront Greenway. The two-way separated bicycle lane is on the west side of the street where there are few curb cuts and intersections.

In Brooklyn, NY, the Kent Avenue two-way protected bicycle lane uses a painted buffer and off-set parking to separate the vehicle travel lane from bicyclists.

A mixing zone for vehicles turning left on to S 9th Street from Kent Avenue across the separated bicycle lane. The bicycle lane has its own traffic signal.

Source: flickr user Jacob, https://flic.kr/p/7be7EX, https://flic.kr/p/7dpN9y

Off-Street Bicycle Path

An off-street bicycle path is a bicycle facility that is completely separated from vehicular traffic (aside from intersection crossings). They can take the form of shared use paths used both by bicyclists and pedestrians and often run through parks.

Cost
$$$-$$$$

Time Frame
medium to long

Benefits

- The dedicated space for bicyclists increases comfort and safety, making the facility more attractive to bicyclists of a wide range of levels and ages.
- Isolation from vehicular traffic allows for low stress riding and eliminates the risk and fear of being hit by a door or colliding with a vehicle (apart from any intersections).
- Off-street bicycle paths provide an ideal environment to learn to ride a bike in the city or to teach children how to ride.
- Off-street bicycle paths provide recreational and exercise opportunities.

Off-street bicycle paths in Newark's Weequahic Park.

Application

- Off-street bicycle paths provide the highest level of comfort to the full range of bicyclists.
- The planning, design and construction of off-street bicycle facilities can require capital construction work and consequently take a long time, especially when the facility is not being built on an existing right-of-way.
- If implemented as part of a larger street construction project, then off-street bicycle paths need only add a marginal cost.
- Costs could be significantly higher for a standalone project that requires major site preparation and construction work.

A fully separated side-path on Haven Avenue in Ocean City, NJ.

Representative Location

- Weequahic Park
- Haven Avenue, Ocean City, NJ

Bicycle Boulevard

Bicycle boulevards are low-volume neighborhood streets designated and designed to give bicycle travel priority. Through the use of signs, pavement markings and speed and volume management measures, bicycle boulevards discourage vehicular through trips, creating a safe and comfortable bicycling environment.

Cost
$$-$$$

Time Frame
medium to long

Benefits

- Bicycle boulevards create quiet, low-speed streets that benefit residents as well as bicyclists.
- Calms vehicular traffic creating safe roads for all levels of user.
- Diverting vehicular traffic from the intended bicycle route as part of the bicycle boulevard design approach can create an exceptionally safe and low-stress bicycling environment.

Application

- Bicycle boulevards provide a high level of comfort to all bicyclists because they are located on side streets.
- Because bicycle boulevards avoid main roads, where many destinations are, they are sometimes less convenient for bicyclists making local (versus through) trips.
- The time required to implement bicycle boulevards depends on which design elements are being used. Speed tables, traffic circles, chicanes and other volume management strategies can be capitally-intensive and require partial reconstruction of the roadway.
- Costs range from moderate (i.e. bicycle boulevards implemented primarily through signs, markings and low-cost treatments like speed humps) to high (those involving significant construction work for traffic diverters and landscaping).

This bicycle boulevard on Haven Avenue in Ocean City gives priority to bicyclists with a low speed limit and large road markings.

Representative Location

- Haven Avenue, Ocean City, NJ


Park Place
AHEAD

Bicycle Intersection Tools

6

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Bike Box

Bike boxes are designated spaces for bicyclists between the stop bar and pedestrian crosswalk at signalized intersections. They allow bicyclists to queue in front of motor vehicles at red lights, either to position themselves to make a left turn or to improve their visibility when proceeding on a green light.

Cost
$

Time Frame
short

Benefits

- Provides designated space to increase the visibility of queued bicyclists for motorists waiting at red lights.
- Offers bicyclists the ability to enter the intersection in front of motor vehicles when the signal turns green. Entering the intersection at the beginning of a green phase increases bicyclists' visibility to motorists, both behind them and those making turns through the intersection from the opposite direction. This can reduce bicycle-vehicle conflicts at intersections.
- Provides bicyclists with the opportunity to position for a left turn during red phases. On multilane streets, bike boxes that extend across all lanes up to the left turn lane allow left-turning bicyclists to queue in front of left-turning vehicles behind them. This improves the visibility of left-turning bicyclists to motorists.
- Formalizes bicyclist behavior at intersections and encourage bicyclists to move up and in front of stopped motor vehicle traffic to increase their visibility when navigating the intersection during the next green phase.
- Increases the likelihood that motorists stopping at red lights will stop at the stop bar and not protrude into the pedestrian crosswalk.

This bike box, located on the Rutgers University Campus, creates space for bicyclists to make a left turn to head east on Warren Street.

Application

- Provides a moderate improvement to cyclist comfort by facilitating safer and more convenient maneuvers at intersections.
- While bike boxes will benefit a variety of bicyclists, including novices, by allowing them to leapfrog stopped traffic, some users may be uncomfortable navigating an intersection knowing there is vehicular traffic behind them. In some cases these bicyclists may instead choose to pull off to the curb or corner and wait for traffic flow to lessen, or might prefer to make crossings offset from the intersection next to a pedestrian crosswalk.
- Experienced bicyclists are more likely to take advantage of bike boxes to make left turns in front of other turning vehicles using a "vehicular style" left. Less experienced bicyclists may prefer to make a "pedestrian style," two-stage left-turn at all but the most low-volume intersections.
- Requires changes to street markings, including a potential shift in the location of an intersection's stop bar.

Representative Location

- Dr MLK Jr Boulevard at Warren Street

Bicycle Signal

Bicycle signals provide a dedicated indicator for bicyclists proceeding through an intersection. They are used in conjunction with separated bicycle lanes to separate through bicycle phases from the motor vehicle turning phase. For example, for a separated bike lane on the right side of a street, a bike signal would be used to separate the bicycle through phase from the motor vehicle right turn phase.

Cost
$-$$

Time Frame
medium

Benefits

- Decrease intersection conflicts between bicyclists proceeding straight through an intersection and vehicles making turns across the bike lane.
- Through the use of leading bicycle intervals, bike signals can be timed to provide a green signal for cyclists before motor vehicles receive a green light. This allows bicyclists to enter the intersection earlier and increase their visibility to motorists navigating the intersection.
- Can be used to facilitate complex bicycle movements or help bicyclists navigate complex intersections (i.e. five or six-legged intersections) more safely.
- Provide more clarity for all road users and provide motorists with a better understanding of bicycle movements to anticipate at intersections.

A bicycle signal gives the bicyclist the right of way in Manhattan.

Application

- When used at appropriate locations, bike signals can provide a high level of comfort to bicyclists by providing clarity at intersections for riders of all skill levels. Novice bicyclists will see the most benefit from bike signals.
- By introducing an additional signal phase, bike signals may reduce bicyclist convenience by reducing the amount of green time available to them, potentially increasing signal non-compliance (red light running) by bicyclists when used at inappropriate locations.
- Signal installation can be capital-intensive and may require the city to evaluate the effects of a new signal phase(s) on existing traffic volumes and flows.
- Depending on whether a new signal pole is necessary, as well as the overall budget for traffic signals, bike signal heads can represent a significant capital and operating and maintenance cost. Most intersections will require two bike signals per direction, one on the near side and one on the far side of the intersection.

Representative Location

- In Manhattan, bike signals are used along 8th Avenue's left-side running protected bike lane. Bicyclists are provided a green light during a portion of the motor vehicle through (and right-turn) phase. When the bike signal turns red, left-turning motorists are provided with a green left arrow while bicyclists are held to prevent conflicts.

Two-Stage Turn Queue Box

Two-stage turn queue boxes allow bicyclists to make left turns across high-volume or multilane intersections from a right-side aligned bike lane (or right turns from a left-side aligned bike lane). A bicyclist uses the queue box as a staging area to divide a difficult turn into two distinct phases with fewer vehicle conflicts.

Cost
$

Time Frame
short

Benefits

- Formalizes a "pedestrian style" bicyclist turning movement, in which the bicyclist typically crosses a street with through traffic and then waits in the queue box for a signal change to proceed across the intersection with cross street traffic. The refuge area provides bicyclists with a safe location to wait to make the second portion of the maneuver out of the way of other through bicycle and vehicle traffic.
- Bicyclists performing a two-stage turn avoid higher-speed conflicts with vehicles using the intersection.
- Positions bicyclists in front of stopped vehicles at red lights on the second leg of the turning movement, providing the safety benefits associated with bike boxes.
- Provides clear visual cues for bicyclists and reduces uncertainty when navigating an intersection.

Application

- Provides a high level of comfort to less experienced or more risk-averse bicyclists because "pedestrian style" two-stage turns generally require less skill than merging into moving traffic to perform "vehicle style" turns. Painting two-stage queue boxes to formalize the maneuver and to provide a clear refuge location is most useful for bicyclists seeking a low-stress experience.

A two-stage turn queue box on Broadway in Seattle gives bicyclists a safe place to wait for a green light to turn across Broadway and onto Pike Street.

- Depending on the intersection configuration, convenience for motorists may be reduced, as a two-stage turn queue box is typically positioned in the path of vehicles seeking to make a right turn on red. As a result, two-stage turn queue boxes may need to be accompanied by new "No Right Turn on Red" restrictions if such turns are currently allowed.

Representative Location

- In Seattle, two-stage turn queue boxes along the Broadway bicycle facility provide bicyclists with an intermediate refuge when making two-stage turns across a busy arterial street.

Mixing Zone

A mixing zone is an area where bicyclists and turning motor vehicles merge into one travel lane approaching an intersection. Mixing zones require a negotiation between bicyclists and motorists: drivers typically have to yield to bicyclists already in the mixing zone, but bicyclists should proceed behind vehicles that enter first and not attempt to squeeze between the vehicle and the curb.

Cost
$

Time Frame
short to medium

Benefits

- Provide a design option in which the potential conflict between turning motor vehicles and through bicyclists occurs before the intersection; this reduces the risk of a "right hook" or "left hook" in which a turning vehicle collides with a through cyclist in the intersection.
- May provide the best option in locations without on-street parking and/or with a constrained right-of-way where the roadway width will not accommodate both a bicycle lane and a dedicated turn lane at the intersection. They can also be more appropriate than signal separation on lower-traffic streets so as to balance safety with greater green time for bicyclists and turning motorists.
- Costs less to install than a new bike signal.
- Has a lower impact on multi-modal intersection delay.

A mixing zone on 8th Avenue in New York City.

Application

- Mixing zones provide low to moderate comfort for bicyclists. Although they simplify vehicle/bicycle conflicts by pushing them in advance of the intersection, most bicyclists (aside from the most experienced) prefer to navigate intersections with dedicated bicycle signals.
- Some novice bicyclists may try to pass between a turning vehicle and the curb rather than proceeding single-file, reducing the mixing zone's safety benefits. Motorists, too, may not be comfortable with the mixing zone concept until they understand the negotiation process.
- Mixing zones are often used at intersections with turning vehicle volumes that are high enough to result in frequent conflicts, but not high enough to justify the cost of installing separate bicycle signals.

Representative Location

- Eighth Avenue, Manhattan, NY

Striping Through the Intersection

Striping through an intersection guides bicyclists through an intended path. White dashed markings are typically used but can be supplemented by green paint to increase visibility and draw attention to potential conflicts. Similar striping can be applied at driveways and other curb cuts.

Cost
$

Time Frame
short

Benefits

- Provides a direct path for bicyclists and reduces their uncertainty about how to navigate the intersection. Predictable cycling behavior through an intersection reduces the risks of conflicts with motorists.
- Markings such as dotted lines and green paint are also intended to give motorists an increased awareness of where bicyclists may be positioned. They provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in adjacent lanes, and in doing so alert motorists to the potential presence of bicyclists in the intersection or other traffic conflict areas.
- Striping, especially with colored paint, may increase the likelihood of turning motorists yielding to through bicyclists.
- Creates a more predictable and lower-stress cycling experience.

Application

- Intersections with striping provide a moderate level of comfort to bicyclists, contributing to a more comfortable experience than intersections with no markings at all. However, since the markings offer no physical protection, less experienced cyclists who are uncomfortable riding in mixed traffic may still choose to avoid certain busy intersections, regardless of markings.

Striping through the intersection on Dr. MLK Jr. Boulevard.

Representative Location

- Dr. MLK Jr. Boulevard

Safety Policies

7

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Vision Zero Policy

A Vision Zero policy is a multi-faceted approach to traffic safety that combines roadway engineering, traffic enforcement and education, bringing together government, advocates, and private sector stakeholders, as well as engaging the public to become part of the solution. The policy aims for zero traffic fatalities based on the idea that no level of traffic deaths is acceptable or inevitable. The Federal Highway Administration is committed to eliminating fatalities nationally and local jurisdictions are adopting their own policies. Learn more about the national efforts at http://safety.fhwa.dot.gov/tzd/.

Goal

Reduce pedestrian and bicycle injuries and fatalities to zero.

Objectives

1. Assure motorist, pedestrian and bicycle safety by providing high-quality walking environments and increasing mobility.
2. Code enforcement, education and create awareness.
3. Improve streets and dangerous intersections through street design enhancement.

Strategies

- Target high-crash locations
- Reduce vehicle speeds
- Adding crosswalks where people want to cross
- Shorter crossing distances
- Clear pavement markings
- Signalization
- Designated space for all street users
- Reduce the number of traffic lanes to serve all street users while supporting capacity
- Visible crosswalks markings
- Enforcing, expanding and creating stronger laws
- Community involvement

Representative Location

New York City Vision Zero Policy: Making safer streets through street design improvement, legislation such as speed reduction, law enforcement, and outreach, education and awareness.

San Francisco Vision Zero Policy: Making a walkable, sustainable street environment by creating a pedestrian strategy that convenes policies like Great Streets, Complete Streets and Better Street Plan.

Neighborhood Slow Zone

Neighborhood Slow Zones are self-contained areas where the speed limit is reduced to 20 mph and other safety measures are applied to prioritize pedestrian, bicycle and vehicular safety on local streets.

Goal

Reduce the frequency and severity of traffic incidents in residential neighborhoods.

Objectives

1. Enforce speed limit regulation.
2. Reduce cut-through traffic on residential streets.
3. Enhance social quality of the streets.

Strategies

- Gateway treatments
- Pavement markings
- Speed humps
- Signalization
- Traffic calming devices
- Visible crosswalks markings
- Community involvement

Representative Location

New York City Neighborhood Slow Zones Policy: Neighborhood Slow Zones are a community-based program that reduces the speed limit from 25 mph to 20 mph and adds safety measures within a select area in order to change driver behavior. The ultimate goal of the program is to lower the incidence and severity of crashes. Slow Zones also seek to enhance quality of life by reducing cut-through traffic and traffic noise in residential neighborhoods. Neighborhoods that want to participate in the program have to apply. If selected, DOT works with the community to devise a plan to install the Slow Zone.

Arterial Slow Zone

Arterial Slow Zones are major streets where the speed limit is reduced to 20 mph, typically in combination with other safety measures to reduce automobile speeds and improve pedestrian and bicycle safety.

Goal

Reduce the frequency and severity of traffic incidents at intersections.

Objectives

1. Enforce speed limit regulation.

Strategies

- Traffic lights
- Gateway treatments
- Pavement markings
- Signalization
- Traffic calming devices
- Visible crosswalks markings
- Bike-share program
- Awareness

Representative Location

New York City Neighborhood Slow Zones Policy: This policy is part of the Vision Zero Policy, helping to achieve the goal of zero fatalities on roadways. The selection process is based on fatality rates and other criteria.

School Slow Zone

School Slow Zones are encouraged where school crossings have been established in the vicinity of a school with heavy student foot traffic. In the State of New Jersey, the NJ Safe Routes to School Center recommends that school zones cover a half-mile walking distance to school. Generally, the speed limit in school slow zones is posted at 20 mph with a flashing beacon sign.

Goal

Reduce pedestrian and bicycle injuries and fatalities especially at school and surrounding crosswalks.

Objectives

1. Assure motorist, pedestrian and bicycle safety by providing high-quality walking environments and increasing mobility.
2. Promote shared use of the street by supporting children's ability to walk and bike to school.
3. Improve streets and dangerous intersections through street design enhancements.

Strategies

- Complete sidewalks
- Pavement marking
- Signs
- High visibility crosswalks
- Designated space for all street users
- Flashing signals
- Pedestrian activated signals
- Curb extensions
- Pedestrian safety island

Representative Location

Newark School Zone Safety Program: Making safer routes to school through physical improvements.

School Slow Zone on Clifton Avenue.

Right-Turn-on-Red Prohibition

Right-turn-on-red (RTOR) or No-turn-on-red (NTOR) prohibitions are often applied in central business districts and school zones at all times to reduce vehicular conflicts with pedestrians. They can also be applied during certain periods of the day at selected locations throughout the city. RTOR prohibitions are usually implemented where a turning movement is considered to be high-risk and other treatments are insufficient or not possible to implement.

Goal

Reduce the severity and frequency of vehicle-pedestrian and vehicle-bicycle incidents and improve the perception of safety of turning vehicles at intersections by giving priority to pedestrian and bicyclists.

Objectives

1. Encourage placement in school zones and areas with high foot traffic.
2. Encourage placement at reduced visibility intersections.
3. Reduce the speed of turning vehicles.

Strategies

- Signalize intersections
- Channelized island with a turning traffic light

Representative Location

Minneapolis, MN Pedestrian Master Plan: Reduce pedestrian crashes involving turning vehicles at a red light when the pedestrian is crossing with a WALK signal by adopting an NTOR policy.

NO TURN ON RED at Warren Street and Lock Street

Reduced Speed Limit on County & State Roads

Newark has a city-wide speed limit of 25 mph, however some county and state roads have higher speed limits. Reducing the speed limits on these roads will help reduce the severity of injuries in vehicle-pedestrian and vehicle-bicycle crashes.

Goal

Safer city for pedestrians, cyclists and drivers.

Objectives

1. Reduce the severity of incidents.

Strategies

- Signage
- Code enforcement

Representative Location

New York City Vision Zero Policy: Making safer streets through street design improvement, legislation — such as speed reduction — law enforcement, and outreach, education and awareness campaigns.

Automated Photo Enforcement

Automated photo enforcement can be a cost-effective way to reduce speeds, red light and stop sign running, and crashes. It is particularly effective where roadway geometry or traffic volumes make it difficult to use more traditional methods. Automated photo enforcement employs a detector that, when triggered, takes a photo of the vehicle that is breaking the law. A ticket is then issued to the owner of the vehicle based on the license plate number. New Jersey had a five-year red-light camera pilot program that ended in 2014. The state is studying the results of the pilot and will release a study in 2016, however, in the meantime red-light automatic enforcement is not allowed.

Goal

Safer roads for pedestrians, bicyclists and drivers.

Objectives

1. Reduce the incidence of speeding.
2. Reduce the incidence of running red lights.
3. Reduce the number and rate of speed-related crashes.

Strategies

- Red light automated photo enforcement
- Stop sign automated photo enforcement
- Speed automated photo enforcement
- Advance warning signs
- Code enforcement

Representative Location

Missouri Automated Traffic Enforcement Policy: The Missouri Department of Transportation aims to mitigate speed related incidents by automating the enforcement of red-light and speeding violations on the state highway system.

Maryland Speed Safety Programs: The Maryland State Highway Administration, through an automated speed enforcement program involving public education and visible enforcement, seeks to change driving behavior and urge motorists to drive responsibly, stay alert, and follow the posted speed limit.

Newark, NJ Red Light Running Photo Enforcement Program

Automated Pedestrian Signals

All signals throughout the city should have fixed pedestrian signals. The city is in the process of removing actuated buttons on existing poles, with the exception of accessible pedestrian signals. Where appropriate, there should be the provision for automatic pedestrian signals, in which a pedestrian crossing phase is triggered when a sensor detects a pedestrian waiting at the crosswalk. Automated pedestrian signals can help to reduce jaywalking by making crossing with the signal more convenient.

Goal

Reduce pedestrian - and bicyclist - vehicle collision at intersections and mid-block crosswalks.

Objectives

1. Provide controlled pedestrian crossing.
2. Allocate exclusive pedestrian phasing.
3. Provide supplemental non-visual guidance for pedestrians with sensory restrictions.

Strategies

- Pedestrian signals
- Visible crosswalks markings
- Advance warning signs
- Code enforcement

Representative Location

Portland, OR Pedestrian Policy: Adopted to install safe crossing measures for visually impaired pedestrians and people with limited mobility.

Lateral Clearance for Motor Vehicles When Passing Bicyclists

Laws that dictate a minimum safe passing distance for motor vehicles require that motorists leave the required space when passing a bicyclist. Most states with such a law require a minimum passing distance of three feet, though Pennsylvania requires four feet. Several states, including New York, only require a general "safe distance" passing requirement. New Jersey has no specific law for passing a bicyclist.

Goal

Create a safer street environment for both bicyclists and drivers.

Objectives

1. Create a legal framework to protect bicyclists who are hit by a passing motorist.
2. Create a less arbitrary standard.
3. Raise awareness for the importance of safe passing.

Strategies

- Police enforcement
- Public awareness
- Driving safety education

Representative Location

Connecticut, CT Bill No. 5746: Adopted to require that motorists give bicyclists at least three feet of clearance when passing.

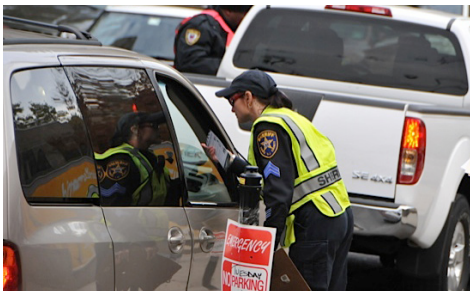
Pennsylvania, PA House Bill: 170: Adopted to require that motorists pass bicyclists within no less than four feet at a careful and prudent speed.

Police Enforcement

The success of any safety tool or policy is in many cases dependent on its enforcement by the police. Educating police officers on new street designs and safety laws and new enforcement priorities are critical to making streets safe and welcoming to all users. Politicians, transportation officials and police leadership should coordinate their efforts as part of a holistic approach to street safety.

Goal

Enhance traffic safety through law enforcement, police education and increased partnerships with stakeholders.



Police in action during Newark's Street Smart campaign

Objectives

1. Promote and enforce traffic safety measures

Strategies

- Increase police education
- Traffic law enforcement
- Collaboration with relevant stakeholders

Representative Location

New York City Vision Zero Policy: Making safer streets through street design improvement, legislation, law enforcement, and outreach, education and awareness campaigns.

City of Newark Street Smart NJ Campaign

Education & Outreach

Like enforcement, education and outreach are critical to supporting safety for all street users. The Street Smart NJ pedestrian safety education campaign is a statewide public education, awareness and behavioral change campaign developed by the North Jersey Transportation Planning Authority (NJTPA). Street Smart NJ has included Newark as a pilot community since 2013. Street Smart NJ in Newark used paid advertising with grassroots public awareness efforts and law enforcement to address pedestrian safety and will continue this approach moving forward. The campaign is a collaborative effort between public, private and non-profit organizations.

Goal

Enhance traffic safety through education and public outreach

Education and outreach during Newark's Street Smart NJ campaign

Objectives

1. Promote and provide education on traffic safety

Strategies

- Increase public awareness
- Educational programs
- Encourage community involvement

Representative Location

Street Smart NJ Safety Campaign: Promotes safe travel behavior by both motorists and pedestrians through a combination of education and enforcement. Provides information to help communities create a pedestrian safety campaign to target specific local issues.


973-344-6060
RESTAURANT

Tool Box Resources 8

Resources

National Resources

AASHTO Policy on Geometric Design of Highways and Streets ("Green Book"), 6th Edition

Contains current research and practices for highway and street geometric design, provides guidance to engineers and designers and serves as a comprehensive reference manual. Design guidelines are included for freeways, arterials, collectors and local roads, in both urban and rural locations.

Published by the American Association of State Highway and Transportation Officials

AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities, 1st Edition

Provides guidance on the planning, design, and operation of pedestrian facilities along streets and highways, specifically identifying measures for accommodating pedestrian on public rights-of-way.

Published by the American Association of State Highway and Transportation Officials

AASHTO Guide for the Development of Bicycle Facilities, 4th Edition

Provides information on how to accommodate bicycle travel and operations in most bicycle riding environments. Intended to present guidelines that result in facilities that meet the needs of bicyclists and other highway users.

Published by the American Association of State Highway and Transportation Officials

AASHTO Highway Safety Manual

Provides tools for considering safety in the project development process to help reduce the frequency and severity of crashes. Assists practitioners in selecting countermeasures and prioritizing projects, comparing alternatives and quantifying and predicting the safety performance of roadway elements.

http://www.highwaysafetymanual.org/Pages/default.aspx

Published by the American Association of State Highway and Transportation Officials

Manual on Uniform Traffic Control Devices (MUTCD)

Specifies the standards by which traffic signs, road surface markings and signals are designed, installed and used. These specifications include the shapes, colors and fonts used in road markings and signs.

http://mutcd.fhwa.dot.gov/

Published by the Federal Highway Administration of the U.S. Department of Transportation

NACTO Urban Street Design Guide

Provides a toolbox and tactics cities can use to make streets safer, more livable and more economically vibrant. Outlines both a vision for complete streets and a basic road map for how to implement them.

http://nacto.org/usdg/

Published by the National Association of City Transportation Officials

NACTO Urban Bikeway Design Guide

Provides cities with state-of-the-practice solutions to help create streets that are safe and enjoyable for bicyclists. Designs are based on real-world experience in bicycle-friendly cities and were selected based on their utility in helping cities meet their bicycle transportation goals.

http://nacto.org/cities-for-cycling/design-guide/

Published by the National Association of City Transportation Officials

FHWA Separated Bike Lane Planning & Design Guide

Provides a full overview of separated bike lanes ("SBLs"), with best practices for all phases of planning their installation, making design choices on context-sensitive issues like intersection treatment and buffer type selection and subsequent evaluation of their impact from a safety, mobility, economic and quality of life perspective. The guide also includes a contemporary assessment of crash data for before- and after- SBL implementation, best practices for data collection and holistic SBL evaluation and a comprehensive analysis of lessons learned in SBL planning, design and implementation to date in over 30 American cities.

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm

Published by the Federal Highway Administration

PEDSAFE

The Pedestrian Safety Guide and Countermeasure Selection System is intended to provide practitioners with the latest information available for improving the safety and mobility of those who walk. The online tools provide the user with a list of possible engineering, education, or enforcement treatments to improve pedestrian safety and/or mobility based on user input about a specific location.

http://www.pedbikesafe.org/PEDSAFE/

Published by the Federal Highway Administration Office of Safety

BIKESAFE

The Bicycle Safety Guide and Countermeasure Selection System is intended to provide practitioners with the latest information available for improving the safety and mobility of those who bike. The online tools provide the user with a list of possible engineering, education, or enforcement treatments to improve bicycle safety and/or mobility based on user input about a specific location.

http://www.pedbikesafe.org/BIKESAFE/

Published by the Federal Highway Administration Office of Safety

Desktop Reference for Crash Reduction Factors

Provides the estimates of the crash reduction that might be expected if a specific countermeasure or group of countermeasures is implemented with respect to intersections, roadway departure and other non-intersection crashes and pedestrian crashes.

http://safety.fhwa.dot.gov/tools/crf/resources/fhwasa08011/

Published by the U.S. Department of Transportation

Active Design Guidelines

Provides architects and urban designers with a manual of strategies for creating healthier buildings, streets and urban spaces, based on the latest academic research and best practices in the field. Includes urban design strategies for creating neighborhoods, streets and outdoor spaces that encourage walking, bicycling, active transportation and recreation. Addresses building design strategies for promoting active lifestyles through the placement and design of stairs, elevators and indoor and outdoor spaces. Discussion of synergies between active design and sustainable design initiatives.

http://centerforactivedesign.org/guidelines/

Published by the Center for Active Design

New Jersey Resources

Newark Complete Streets Policy

Recognizes the city's commitment to creating streets and intersections that safely accommodate all street users of all abilities through the planning, design, construction, maintenance and operation of new and existing transportation facilities. Newark adopted their policy in 2012 after NJDOT adopted its own policy in 2009, which strongly encourages local jurisdictions who apply for funding through local aid programs to adopt a complete streets policy.

Newark's Complete Streets Policy as well as project updates can be found on the Engineering Department section of the City's website under the Newark Complete Streets heading.

Essex County Complete Streets Policy

To ensure consistency in the design and operation of new bicycle and pedestrian infrastructure and transportation systems that are suitable to the needs and character of the county's rural setting. This county level policy may establish a model and provide useful guidelines for local municipalities.

http://togethernorthjersey.com/?grid-portfolio=essex-county-complete-streets-implementation-plan

Published by the Essex County Department of Public Works and the North Jersey Transportation Planning Authority

New Jersey DOT Complete Streets Policy

To create and implement a Complete Streets Policy in New Jersey through the planning, design, construction, maintenance and operation of new and retrofit transportation facilities within public rights of way that are federally or state funded, including projects processed or administered through the department's Capital Program. A Complete Street is defined as means to provide safe access for all users by designing and operating a comprehensive, integrated, connected multi-modal network of transportation options.

http://www.state.nj.us/transportation/eng/completestreets/policy.shtm

Published by the State of New Jersey Department of Transportation

Bus Stop Safety Toolbox

This toolbox provides guidance for creating a new bus stop or improving an existing bus stop in New Jersey. It includes consideration of bus stop design and location, pedestrian signage/signals, pavement markings and area illumination. It was produced as a follow up to The Pedestrian Safety At and Near Bus Stops Study, which was published by NJTPA in 2011.

http://www.njtpa.org/getmedia/161e37a3-6817-419a-8471-d8c976f87fdd/BusBox_final13.pdf.aspx

Published by North Jersey Transportation Planning Authority

Other Cities' Resources

New York City Street Design Manual

A comprehensive resource for street design guidelines and policies in New York City. Draws from a wide range of resources and experience to present a coherent set of choices for street design, ranging from geometric design to paving materials to lighting and furniture.

http://www.nyc.gov/html/dot/html/pedestrians/streetdesignmanual.shtml

Published by the New York City Department of Transportation

Boston Complete Streets Design Guidelines

Provides a road map for retrofitting Boston's streets and sidewalks and includes new street types, guidance on multi-modal intersection design, the integration of transit and bicycling and sustainable and smart design solutions.

http://bostoncompletestreets.org/

Published by the Boston Transportation Department

Complete Streets Chicago

Incorporates best practices from around the world and reevaluates how Chicago designs, builds and maintains its streets with primary emphasis on walking, bicycling and public transit. The plan codifies CDOT's efforts to implement the cty's 2006 Complete Street Policy.

http://chicagocompletestreets.org/

Published by the Chicago Department of Transportation

Philadelphia Complete Streets Handbook

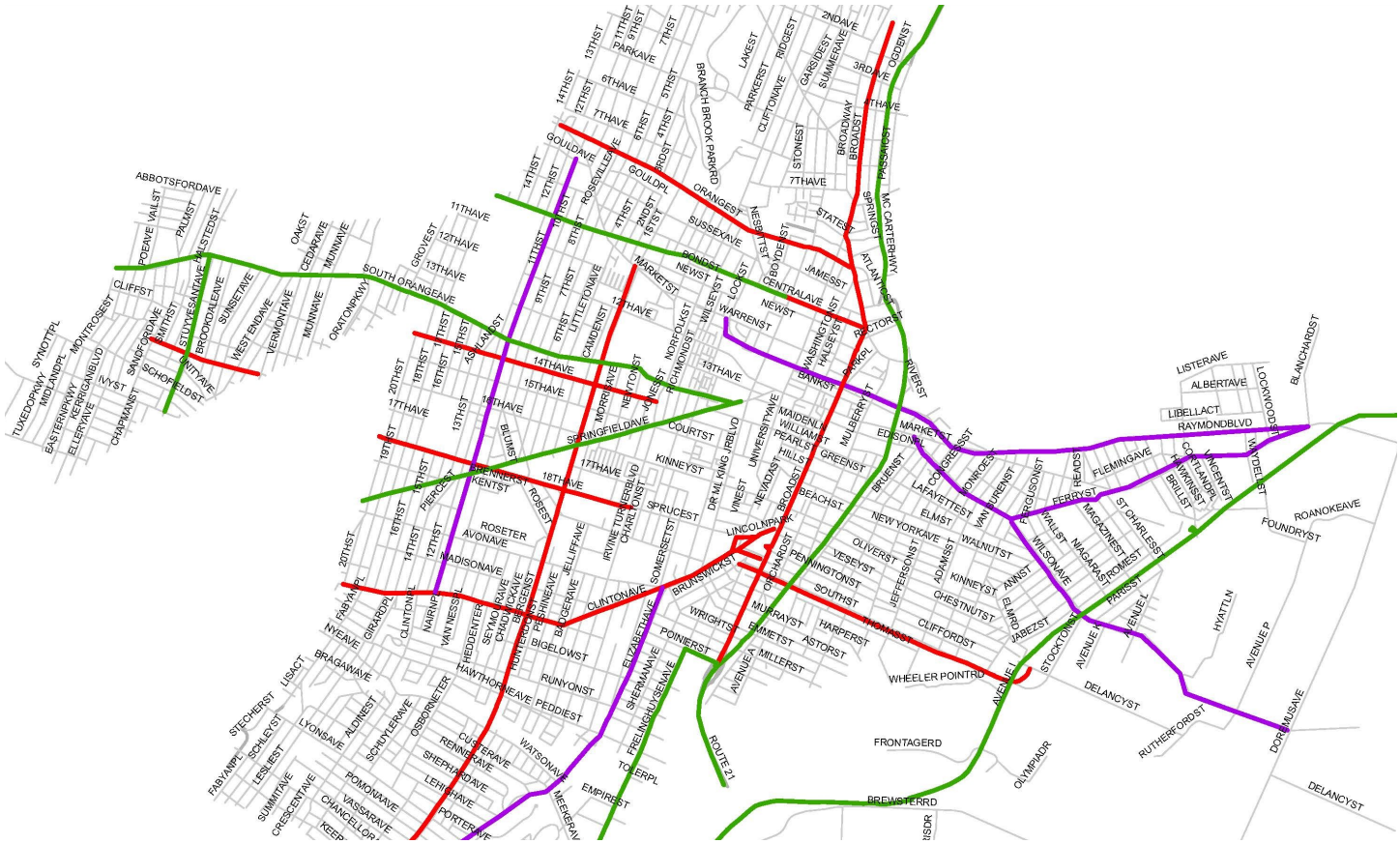
Street design guidance focused on all users and all modes, seeking to achieve balanced street design that accommodates cars while ensuring that pedestrians, cyclists and transit users can travel safely and comfortably.

http://www.philadelphiastreets.com/complete-streets-handbook/

Published by the Philadelphia Mayor's Office of Transportation and Utilities

APPENDIX A-1

HIGH CRASH CORRIDORS



LEGEND

- **TOP 10 HIGH CRASH CORRIDORS (UNDER THE CITY'S JURISDICTION)**
- **OTHER HIGH CRASH CORRIDORS (UNDER THE CITY'S JURISDICTION)**
- **HIGH CRASH COUNTY AND STATE ROADWAYS**

	JURISDICTION	TOP HIGH CRASH CORRIDORS	CORRIDOR	START	END	TOTAL KILLED & SERIOUSLY INJURED	SEGMENT LENGTH (MILES)	KSI/MILE
1	**CITY**	**1**	**LINCOLN PARK**	**CLINTON AVENUE**	**BROAD STREET**	**4**	**0.5**	**8.0**
2	COUNTY		STUYVESANT AVENUE (COUNTY ROUTE 619)	SOUTH ORANGE AVENUE	SOUTH ORANGE AVENUE	5	0.8	6.3
3	STATE		McCARTER HWY (STATE ROUTE 21)	I-78	NEWARK CITY LINE	32	5.5	5.8
4	COUNTY		SPRINGFIELD AVENUE (COUNTY ROUTE 603)	SOUTH 20TH STREET	SOUTH ORANGE AVENUE	10	1.9	5.3
5	STATE		US ROUTE 1	McCLELLAN STREET	NEWARK CITY LINE	29	5.7	5.1
6	**CITY**	**2**	**DAYTON STREET**	**EVERGREEN AVENUE**	**FRELINGHUYSEN AVENUE/STATE ROUTE 27)**	**5**	**1.0**	**5.0**
7	COUNTY		SOUTH ORANGE AVENUE (COUNTY ROUTE 510)	NEWARK CITY LINE	SPRINGFIELD AVENUE (COUNTY ROUTE 603)	19	3.9	4.9
8	**CITY**	**3**	**BROAD STREET**	**POINIER STREET**	**WEST MARKET STREET**	**14**	**3.1**	**4.5**
9	**CITY**	**4**	**SOUTH STREET**	**PENNSYLVANIA AVENUE**	**DELANCY STREET**	**7**	**1.6**	**4.4**
10	**CITY**	**5**	**BERGEN STREET**	**GRUMMAN AVENUE**	**WEST MARKET STREET**	**14**	**3.3**	**4.2**
11	**CITY**	**6**	**CLINTON AVENUE**	**SOUTH 20TH STREET**	**LINCOLN PARK**	**7**	**2.0**	**3.5**
12	**CITY**	**7**	**14TH AVENUE**	**SOUTH 20TH STREET**	**JONES STREET**	**4**	**1.3**	**3.1**
13	STATE		FRELINGHUYSEN AVENUE/STATE ROUTE 27)	VIRGINIA STREET	BROAD STREET	6	2.5	2.4
14	**CITY**	**8**	**18TH AVENUE**	**IRVING TURNER BOULEVARD**	**SANDFORD AVENUE (COUNTY ROUTE 610)**	**5**	**2.5**	**2.0**
15	COUNTY		CENTRAL AVENUE (COUNTY ROUTE 508 PORTION)	SOUTH 17TH STREET	Dr. MLK Jr. BOULEVARD	3	1.5	2.0
15	**CITY**	**9**	**CENTRAL AVENUE (CITY PORTION)**	**Dr. MLK Jr. BOULEVARD**	**BROAD STREET**	**1**	**0.4**	**2.5**
16	**CITY**	**10**	**ORANGE STREET**	**WEST MARKET STREET**	**BROAD STREET**	**3**	**1.6**	**1.9**
17	CITY	11	WILSON AVENUE	MERCHANT STREET	DOREMUS AVENUE	3	2.0	1.5
18	CITY	12	ELIZABETH AVENUE	GRUMMAN AVENUE	CLINTON AVENUE	3	2.1	1.4
19	CITY	13	FERRY STREET	MARKET STREET	BLANCHARD STREET	3	2.1	1.4
20	CITY	14	SOUTH 11TH STREET	CLINTON AVENUE	GOULD AVENUE	3	2.2	1.4
21	CITY	15	RAYMOND BOULEVARD	WARREN STREET	BLANCHARD STREET	4	3.5	1.1

APPENDIX A-2

SUMMARY OF CRASH ATTRIBUTES AT THE 10 HIGH CRASH INTERSECTIONS AND 10 HIGH CRASH CORRIDORS

Crash Attribute	Intersection	Corridor
Time of Day		
6 AM - 10 AM	20%	16%
10 AM - 4 PM	41%	16%
4 PM - 7 PM	20%	14%
7 PM - 12 AM	14%	27%
12 AM - 6 AM	5%	24%
Unknown	2%	2%
Lighting Condition		
Daylight	59%	45%
Dawn/Dusk	6%	6%
Street Lights ON	30%	45%
No Street Lights	3%	4%
Unspecified	2%	0%
Surface Condition		
Dry	76%	88%
Wet	21%	12%
Mud/Slush	0%	0%
Snow/Ice	2%	0%
Unspecified	2%	0%
Road Divided By		
Barrier Median	5%	4%
Curbed Median	3%	2%
Grass Median	0%	0%
Painted Median	27%	29%
None	61%	63%
Unknown	5%	2%
Vehicle Approach Direction		
North-South	31%	48%
East-West	27%	14%
Unspecified	42%	38%
Vehicle Contributing Factors		
Driver Inattention	39%	12%
None (Driver/Pedcycle)	24%	31%
Other Driver/Pedalcyclist Action	6%	6%
Unknown	18%	16%
Unsafe Speed	3%	20%
Other Driver/Environmental Action	9%	14%
Pedestrian Contributing Factors		
Crossing Where Prohibited	3%	5%
Dark Clothing/Low Visibility to Driver	3%	0%
Driver Inattention	3%	0%
Failed to Obey Traffic Control Device	8%	11%
Inattentive	9%	5%
None (Driver/Pedcycle)	11%	11%
None (Ped)	32%	26%
Running/Darting Across Traffic	0%	0%
Unknown/Other Driver/Pedalcyclist/Ped	32%	42%

Crash Attribute	Intersection	Corridor
Contributing Factors Related to		
Vehicle	59%	71%
Pedestrian	35%	12%
Unknown	6%	16%
Alcohol Involvement		
Yes	6%	4%
No	94%	96%
Driver Gender		
Male	50%	65%
Female	24%	22%
Unknown	26%	12%
Ped Gender		
Male	48%	67%
Female	45%	24%
Unknown	7%	10%
Driver Age		
0-10	0%	0%
10 - 20	2%	4%
20 - 30	14%	22%
30 - 40	24%	20%
40 - 50	15%	14%
50 - 60	12%	8%
60 - 70	3%	14%
70 - 80	3%	0%
80 - 90	0%	2%
90 - 100	0%	0%
100 - 110	0%	0%
110 - 120	0%	0%
Unknown/None	27%	14%
Ped Age		
0-10	0%	0%
10 - 20	14%	10%
20 - 30	14%	5%
30 - 40	19%	29%
40 - 50	19%	19%
50 - 60	16%	10%
60 - 70	9%	14%
70 - 80	1%	10%
80 - 90	1%	0%
90 - 100	0%	0%
100 - 110	0%	0%
110 - 120	0%	0%
Unknown/None	6%	5%

APPENDIX A-3

SCREENING METHODS FOR THE 10 HIGH CRASH INTERSECTIONS

		Pedestrians							Bicycles						
		5-Year Period	Adjusted to Annual	Volumes			Adjusted to Annual	Adjusted to Annual	5-Year Period	Adjusted to Annual	Volumes			Adjusted to Annual	Adjusted to Annual
	10 High Crash Intersections	Pedestrian Crashes	Pedestrian Crashes	AM Peak Ped	PM Peak Ped	Average of AM/PM Volumes	Average of AM/PM Peak Volumes	Crash Rates per Million Intersection Crossings	Bicycle Crashes	Bicycle Crashes	AM Peak Bicycles	PM Peak Bicycles	Average of AM/PM Volumes	Average of AM/PM Peak Volumes	Crash Rates per Million Intersection Crossings
1	Broad Street and Market Street	17	3.4	2,439	3,556	2,998	1,094,088	3.1	0	0	9	20	15	5,293	-
2	Market Street and Mulberry Street	8	1.6	116	837	477	173,923	9.2	1	0.2	0	5	3	913	219.2
3	Bergen Street and 12th Avenue	7	1.4	313	412	363	132,313	10.6	0	0	4	5	5	1,643	-
4	Ferry Street and Monroe Street	5	1	333	778	556	202,758	4.9	0	0	5	9	7	2,555	-
5	Raymond Boulevard and Raymond Plaza East	5	1	234	326	280	102,200	9.8	0	0	4	5	5	1,643	-
6	Walnut Street and McWhorter Street	5	1	97	140	119	43,253	23.1	0	0	2	8	5	1,825	-
7	Ferry Street and Adams Street	4	0.8	376	973	675	246,193	3.2	1	0.2	11	15	13	4,745	42.1
8	Raymond Boulevard and Mulberry Street	4	0.8	419	394	407	148,373	5.4	1	0.2	0	9	5	1,643	121.8
9	Market Street and Raymond Plaza East	4	0.8	445	509	477	174,105	4.6	0	0	2	4	3	1,095	-
10	7th Avenue and Colonnade Place	3	0.6	314	42	178	64,970	9.2	1	0.2	7	1	4	1,460	137.0
	Average	6.2	1.2	509	797	653	238,217	8.3	0.4	0.1	4	8	6	2,281	52.0
	Control Intersections														
1	Meeker Avenue and Elizabeth Avenue			96	109						4	1			
2	8th Street and 12th Avenue			334	234						0	4			
3	Irvine Turner Boulevard and Clinton Avenue			54	88						4	3			
4	Crawford Street and Halsey Street			66	127						0	9			
5	Passaic Street and 3rd Avenue			14	10						0	0			
	Average			113	114						2	3			
	Multiplier of High Crash to No-crash Intersection Volumes			4.5	7.0	5.8					2.8	2.4	2.6		

SCREENING METHODS FOR THE 10 HIGH CRASH CORRIDORS

		Pedestrians						
		5-Year Period	Adjusted to Annual	Volumes		Adjusted to Annual		Adjusted to Annual
	10 High Crash Corridors	Pedestrian Crashes	Pedestrian Crashes	AM Peak Ped	PM Peak Ped	Average of AM/PM Peak Volumes	Segment Length	Crash Rates per Million Corridor Crossings
1	Lincoln Park from Clinton Avenue to Broad Street	1	0.2	119	267	70,445	0.5	5.7
2	Dayton Street from Evergreen Avenue to Frelinghuysen Avenue	1	0.2	41	39	14,600	1	13.7
3	Broad Street from Poinier Street to Dead End (near Oriental Street)	6	1.2	5	17	4,015	3.1	96.4
4	South Street from Pennsylvania Avenue to Delancy Street	0	0	269	235	91,980	1.6	-
5	Bergen Street from Grumman Avenue to W. Market Street	4	0.8	303	344	118,078	3.3	2.1
6	Clinton Avenue from S. 20th Street to Lincoln Park	3	0.6	106	337	80,848	2	3.7
7	14th Avenue from S. 20th Street to Jones Street	2	0.4	35	61	17,520	1.3	17.6
8	18th Avenue from Irvine Turner Boulevard to Sanford Avenue	1	0.2	122	119	43,983	2.5	1.8
9	Central Avenue Dr. MLK, Jr. Boulevard to Broad Street	1	0.2	102	256	65,335	0.4	7.7
10	Orange Street from W. Market Street to Broad Street	0	0	73	83	28,470	1.6	-
	Average	1.9	0.4	118	176	53,527		15
	Control Corridors							
1	Custer Avenue			84	31			
2	Wheeler Point Road			28	20			
3	9th Street			37	33			
4	Goble Street			44	126			
5	Warwick Street			55	157			
	Average			50	73			
	Multiplier of High Crash to No-crash Corridor Volumes			2.4	2.4	2.4		

APPENDIX A-4

LOCATIONS OF CONCERN IDENTIFIED AT THE PUBLIC MEETINGS*

East Ward

Intersections	
Doremus Ave.	Wilson Ave.
South St.	Van Buren St.
Ferry St.	Wall St.
Ferry St.	Niagara St.
Ferry St.	Magazine St.
Ferry St.	**Market St.**
Ferry St.	Christie St.
Ferry St.	Lentz Ave.
Market St.	Somme St.
Raymond Blvd.	Riverfront Park Crossing
Raymond Blvd.	Somme St.
Raymond Blvd.	Freeman St.
Raymond Blvd.	Brill St.
Raymond Blvd.	Schalk St.
Raymond Blvd.	**Chapel St.**
Raymond Blvd.	Wadell St.
Raymond Blvd.	Lockwood St.
Raymond Blvd.	Ferry St.
Mulberry St.	South St.
McCarter Highway	South St.
McCarter Highway	Pennington St.
McCarter Highway	Chestnut St.
McCarter Highway	Oliver St.
McCarter Highway	Kinney St.
McCarter Highway	Cottage St.
McCarter Highway	Walnut St.
McCarter Highway	**Elm St.**
McCarter Highway	Green St.
McCarter Highway	Lafayette St.
NJ Rail Road Avenue	Edison Pl.
NJ Rail Road Avenue	**Market St.**
Mulberry St.	Edison Pl.
Mulberry St.	Raymond Blvd.
Park Pl.	Park St.
Broad St.	Center St.
McCarter Highway	Market St.
McCarter Highway	Raymond Blvd.
Bruen St.	**Lafayette St.**
Bruen St.	Edison Pl.
McWhorter St.	Chestnut St.
McWhorter St.	Lafayette St.
McWhorter St.	**Ferry St.**
Pacific St.	Chestnut St.
Pacific St.	**Elm St.**
Prospect St.	Market St.
Congress St.	Ferry St.
Jefferson St.	Lafayette St.
Madison St.	Lafayette St.
Adams St.	New York St.
Ferry St.	Polk St
Raymond Blvd.	Jackson
Clinton Ave.	**Lincoln Pk.**
Broad St.	Wright St.
Broad St.	Walnut St.
Broad St.	Green St.
Broad St.	**Raymond Blvd.**
Broad St.	**New St.**
McCarter Highway	Emmet St.
South St.	Orchard St.
South St.	Herman St.
South St.	Pacific St.
South St.	Jefferson St.
South St.	Adams St.
South St.	Van Buren St.
Van Buren St.	Chestnut St.
Van Buren St.	New York St.
Ferry St.	Chambers St.
Mulberry St.	Elm St.
Mulberry St.	Green St.
Mulberry St.	Market St.
Mulberry St.	**Clinton St.**
Mulberry St.	Raymond Blvd.
McCarter Highway	Market St.
McCarter Highway	Raymond Blvd.
Raymond Blvd.	Market St.
Raymond Blvd.	Jefferson St.
Raymond Blvd.	Van Buren St.
Market St.	Van Buren St.
Ferry St.	Congress St.
Adams St.	Delancy St.
Adams St.	Nichols St.
Adams St.	Elm St.
Adams St.	Downing St.

Corridors
Raymond Plaza W.
Broad St.
Clinton Ave.
South St.
Lincoln Pk.
McCarter Highway
Raymond Blvd.
NJ Rail Road Ave.

Central Ward

Intersections	
Bergen St.	Avon Ave.
Bergen St.	Muhamad Ali Ave.
Bergen St.	18th Ave.
Bergen St.	12th Ave.
Bergen St.	South Orange
W. Market	Central Ave.
Clinton Ave.	**Lincoln Pk.**
Broad St.	Kinney St.
University Ave.	Washington St.
Broad St.	Central Ave.
Broad St.	State St.
Central Ave.	Martin Luther King Jr. Blvd.
Raymond Blvd.	Martin Luther King Jr. Blvd.
Raymond Blvd.	University Ave.
Springfield Ave.	Market St.
Springfield Ave.	South Orange
Park Ave.	11th St.
Park Ave.	4th St.
Park Ave.	Highland St.
Park Ave.	**Clifton St.**
Bloomfield Ave.	Broadway
7th Ave.	Martin Luther King Jr. Blvd.

Corridors
Park Pl.
Bergen
18th
14th
Clinton
Lincoln Pk.
Broad St.
Central Ave.
Orange

West Ward

Intersections	
South Orange Ave.	Hazelwood Ave.
South Orange Ave.	Sandford Ave.
South Orange Ave.	Stuyvesant Ave..
South Orange Ave.	Munn Ave.
18th Ave.	Stuyvesant Ave.
18th Ave.	Westend Ave.
12th St.	14th Ave.
Bergen St.	12th Ave.
Littleton Ave.	W. Market

Corridors
18th Ave.
Orange St.
Bergen St.
14th Ave.

South Ward

Intersections	
Girard Pl.	Hawthorne Ave.
Osborne Ter.	Hawthorne Ave.
Osborne Ter.	Clinton Ave.
13th St.	Clinton Ave.
Jelliff Ave.	Clinton Ave.
Bergen St.	Bigelow St.
Bergen St.	Renner Ave.
Bergen St.	Mapes Ave.
Bergen St.	Lyons Ave.
Aldine St.	Lyons Ave.
Elizabeth Ave.	**I-78**
Frelinghuysen Ave.	McClellan St.
Dayton St.	Dayton Ter.
Meeker Ave.	Meeker Pl.

Corridors
Clinton Ave.
Bergen St.
18th Ave.
Broad St.
Dayton St.

North Ward

Intersections	
Bloomfield Ave.	Summer Ave.
Bloomfield Ave.	Garside St.
Bloomfield Ave.	Mt. Prospect Ave.
Bloomfield Ave.	Ridge St.
Bloomfield Ave.	Highland Ave.
Bloomfield Ave.	Lake St.
Bloomfield Ave.	Branch Brook Park Dr.
Bloomfield Ave.	4th St.
Bloomfield Ave.	6th St.
Bloomfield Ave.	7th St.
Bloomfield Ave.	10th St.
Bloomfield Ave.	12th St.
Broadway	Van Wagenen St.
Broadway	2nd Ave.
Broadway	Arlington Ave.
Broadway	Chester Ave.
Broadway	Elwood Ave.
Broadway	Grafton Ave.
Summer Ave.	Heller Pkwy.
Highland St.	Heller Pkwy.
Grafton Ave.	Ridge St.
Grafton Ave.	Clifton Ave.

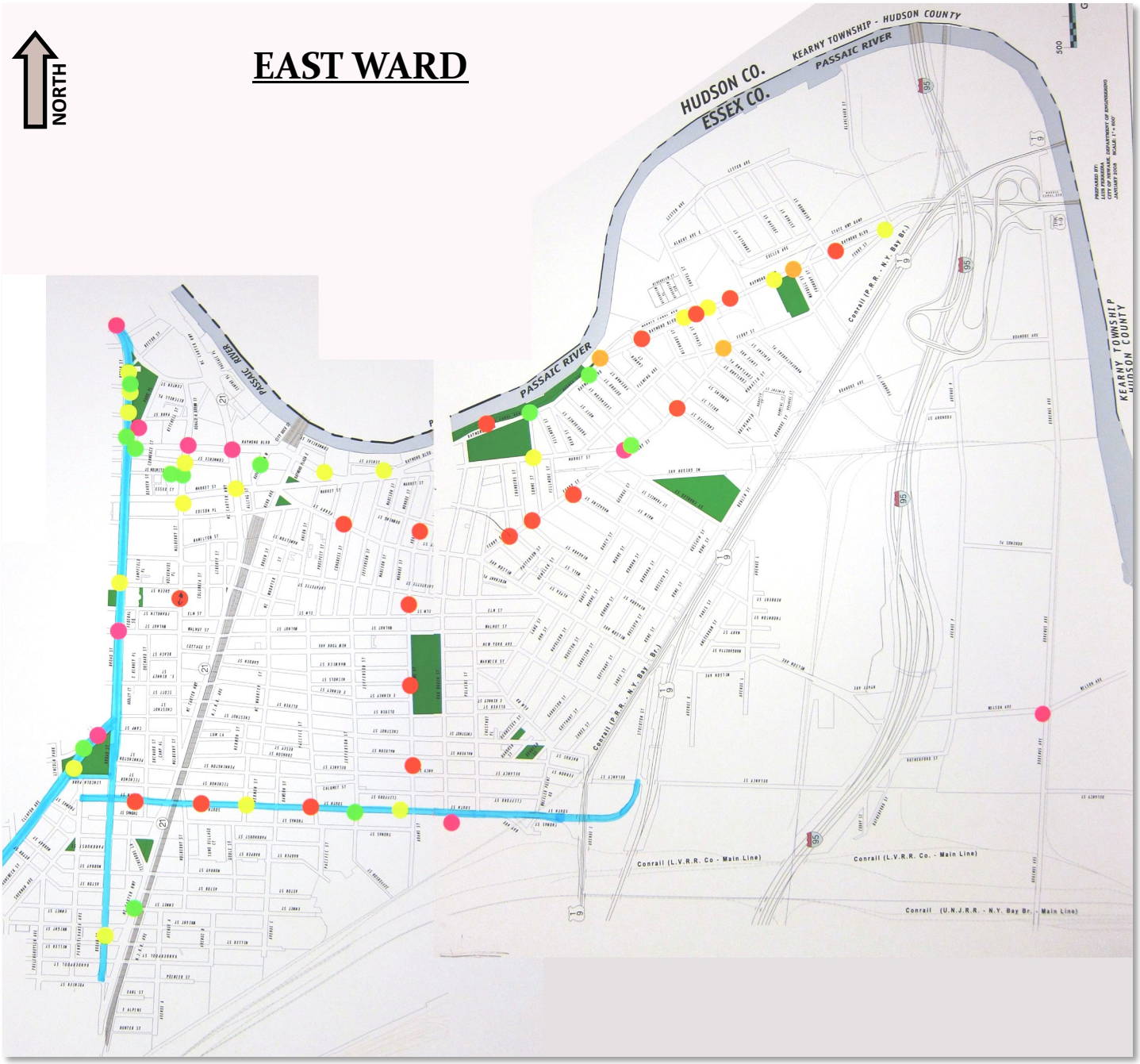
Corridors
Broad St.

*Locations highlighted in yellow received multiple comments from the public as locations of concern.

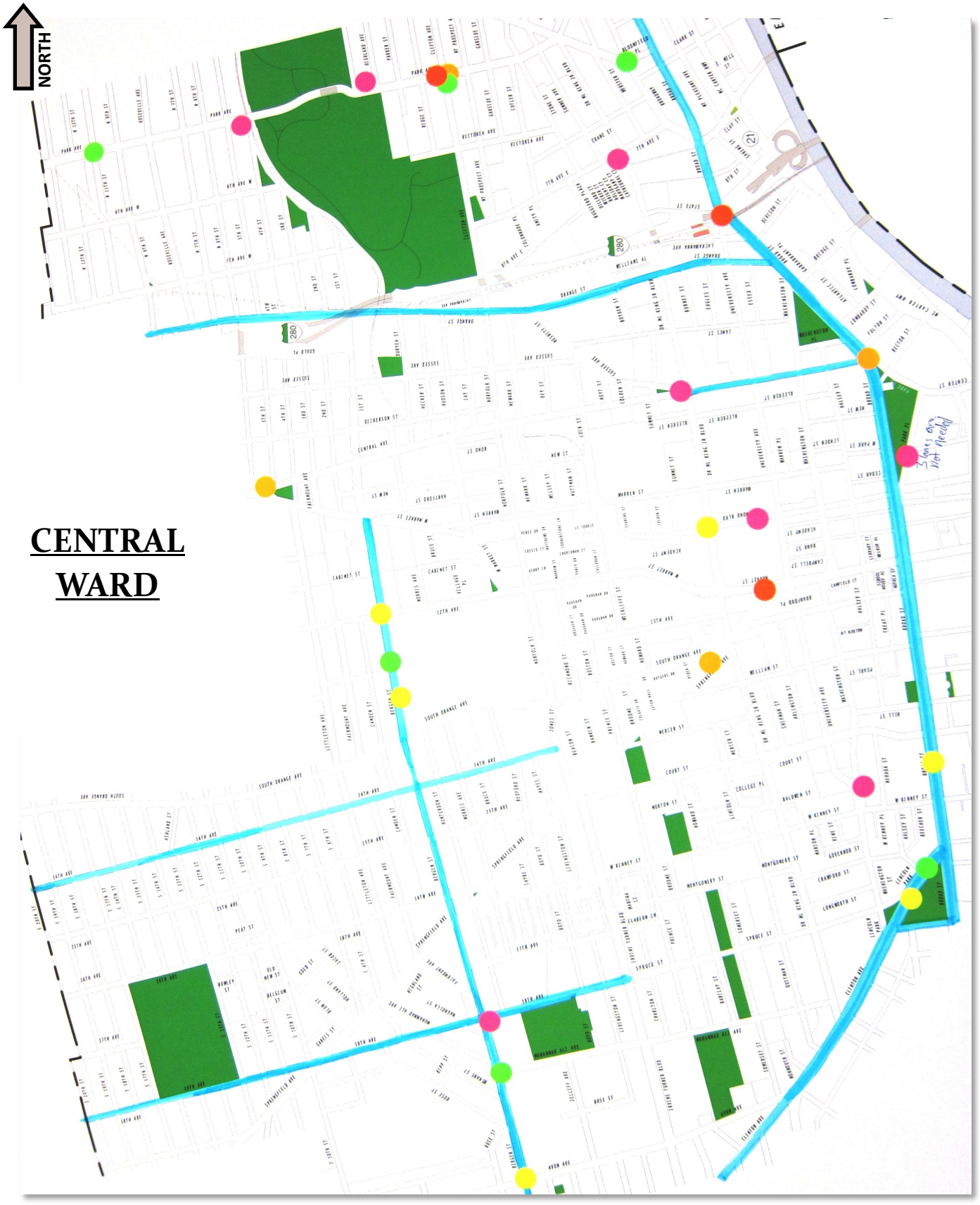
APPENDIX A-4

LOCATIONS OF CONCERN IDENTIFIED AT THE PUBLIC MEETINGS

Through various community outreach efforts, individuals and organizations identified intersections and corridors of concern. Maps were provided for each Ward and participants were asked to identify intersections (marked with dots) and highlight corridors (highlighted in blue) where improvements recommended in the toolbox should be applied. The following pages show the maps beginning with the East Ward below.

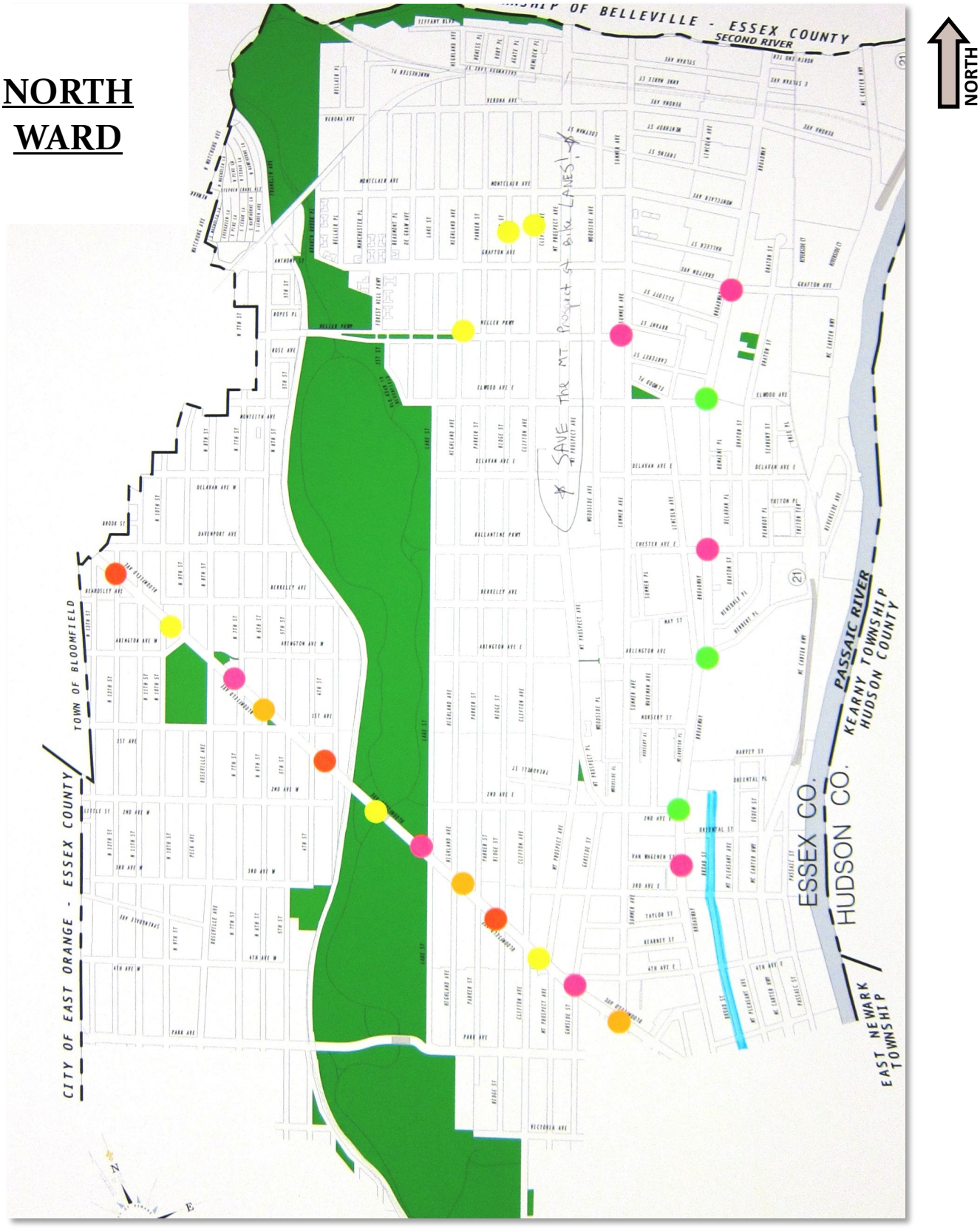


APPENDIX A-4



APPENDIX A-4

NORTH WARD



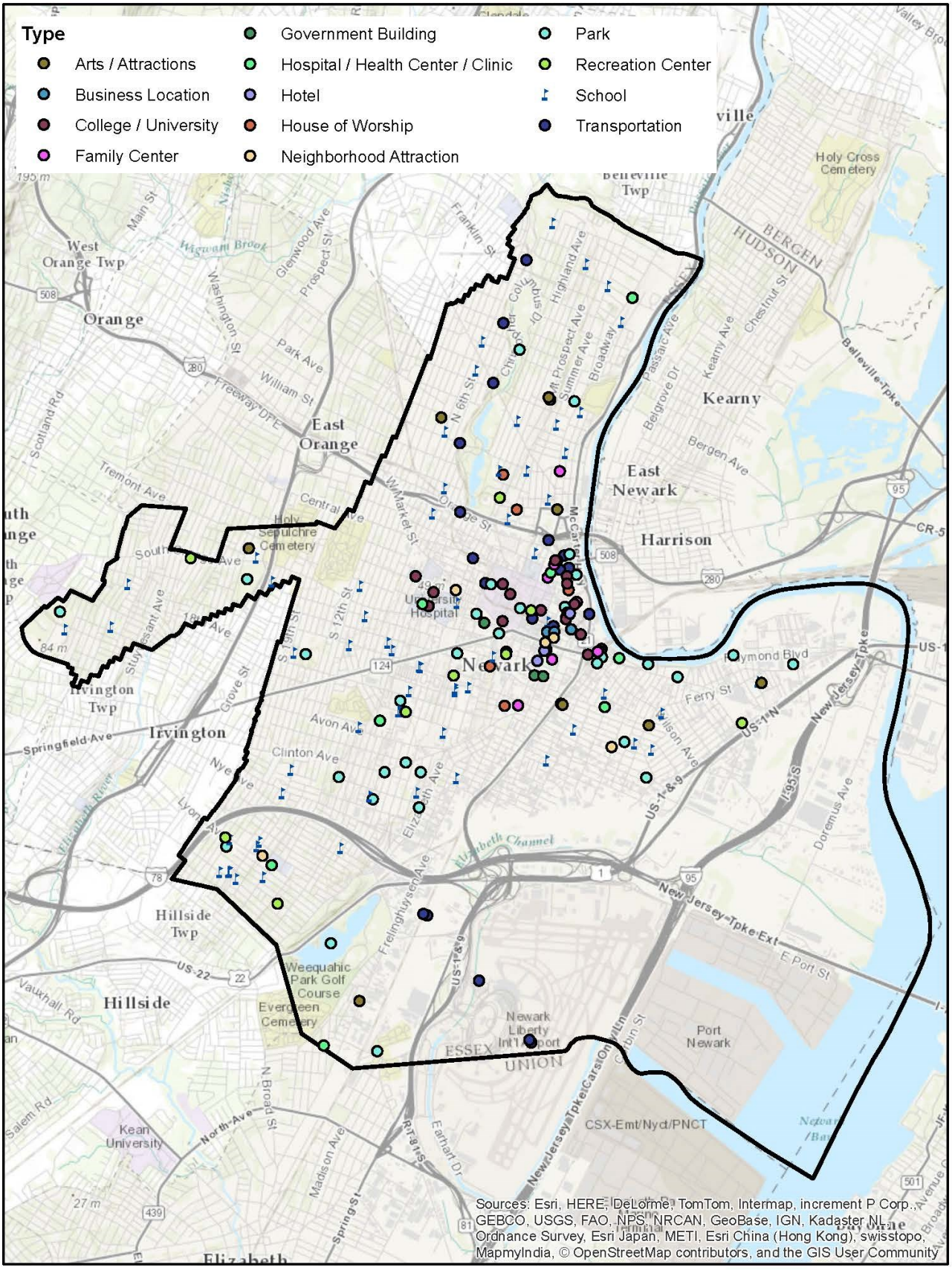
APPENDIX A-4


NORTH
SOUTH WARD
TOWNSHIP OF IRVINGTON
ESSEX COUNTY
TOWNSHIP OF HILLSIDE
UNION COUNTY
Conrail (L.V.R.R. Co. - Main Line)
CLINTON AVE
MADISON AVE
AVON AVE
W BIGELOW ST
W RUNYON ST
W PEDDIE ST
HAWTHORNE AVE
WYE AVE
SPRINGFIELD AVE
WOODLAND AVE
ROSE TER
VERNON AVE
MILLINGTON AVE
TILLINGHAST ST
YATES AVE
SEYMOUR PL
WATSON AVE
BRENNER ST
KENT ST
HOMESTEAD PARK
RUFFINGTON ST
LORETTO ST
SELVAGE ST
SHAW AVE
78
22

APPENDIX A-4


NORTH
WEST WARD
CITY OF EAST ORANGE - ESSEX COUNTY
CITY OF EAST ORANGE -
VILLAGE OF SOUTH ORANGE
TOWNSHIP OF IRVINGTON ESSEX COUNTY
TOWNSHIP OF MAPLEWOOD

APPENDIX A-5


Type
Arts / Attractions
Business Location
College / University
Family Center
Government Building
Hospital / Health Center / Clinic
Hotel
House of Worship
Neighborhood Attraction
Park
Recreation Center
School
Transportation
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

APPENDIX A-5

A SAMPLING OF CITY DESTINATIONS FOR PEDESTRIANS

TRANSPORTATION

Newark Broad Street Station
NJPAC/Centre Street Light Rail Station
Branch Brook Park Light Rail Station
Bloomfield Avenue Light Rail Station
Davenport Avenue Light Rail Station
Park Avenue Newark Light Rail Station
Orange Street Light Rail Station
Norfolk Street Light Rail Station
Warren Street Light Rail Station
Washington Street Light Rail Station
Military Park Light Rail Station
Penn Station Light Rail Arrival
AirTrain Newark Liberty International Airport
Atlantic Street Light Rail Station
Washington Park Light Rail Station
Riverfront Stadium Light Rail Station
Newark Liberty International Airport
Newark Liberty International Airport Amtrak
Newark Penn Station
Newark Airport Railroad Station

NEIGHBORHOOD ATTRACTIONS

Newark Downtown District
Ironbound District
University Heights
Weequahic
Intersection of Broad and Market

ARTS & ATTRACTIONS

Newark Museum
N.J. Historical Society
The Jewish Museum of New Jersey
N.J. Performing Arts Center
Prudential Center
Newark Symphony Hall
Greater Newark Convention and Visitors Bureau-Newark Happening
The Newark Public Library
Gateway Center

PARKS

Branch Brook Park
Ivy Hill Park
Vailsburg Park
West Side Park
Nat Turner Park
Mildred helms Park
Badger Ave Park
Independence Park
Riverbank Park
Riverfront Park
Schleifer Memorial Park
Terrell James Park
Peshine Park
Hiker Park
Weequahic Park
The Beth El Memorial Park
Military Park
Hennesey Street Park
Mother Cabrini Park
Minish Passaic River Waterfront
Peter Francisco Park
Alumni Field
Washington Park
Bears & Eagles Riverfront Stadium
Lombardy Park
Wilburton Place Park
Hank Aaron Field
Justice William J. Brennon Jr. Park
Veterans Memorial Park
Sussex Park
Hayes Park
St. Peters Park

HOTELS

Hotel Indigo Newark Downtown
Courtyard Marriot Newark Downtown
Best Western Plus Robert Treat Hotel

APPENDIX A-5

SCHOOLS

Abington Avenue School
Ann Street School
Arts High School
B.R.I.C.K. Avon Academy
American History High School
Barringer High School
Belmont Runyon Elementary School School
Benjamin Franklin Elementary School
Branch Brook School
Bruce Street School For The Deaf
Camden Street Elementary School
Central High School
Chancellor Avenue School
Quitman Street Renew School
Dr. William H Horton Elementary School
Dr. E. Alma Flagg School
Early Childhood Academy Berliner
East Side High School
Elliott Street Elementary School
Eagle Academy For Young Men Of Newark
Early Childhood Academy - Gladys Hillman Jones
Early Childhood Academy - West
Fast Track Success Academy
First Avenue School
Fourteenth Avenue School
George Washington Carver Elementary School
Girls Academy Of Newark
Harriet Tubman Elementary School
Hawkins Street School
Hawthorne Avenue School
Ivy Hill Elementary School
John F Kennedy School
Lafayette Street School
Lincoln School
Luis Munoz Marin Elementary School
Louise A. Spencer Elementary School
Malcolm X Shabazz High School
McKinley School
Mt Vernon Place School
Miller Street School At Spencer
Newark Innovation Academy
N.J. Regional Day School - Newark
Newark Leadership Academy
Bard High School Early College Newark

SCHOOLS (cont.)

Park Elementary School
Oliver Street School
Quitman Community School
Rafael Hernandez School
Ridge Street School
Sussex Avenue School
B.R.I.C.K. Peshine Academy
Newark Vocational High School
Roberto Clemente Elementary School
South 17th Street Elementary School
Science Park High School
South Street School
Speedway Academies
Burnet Street School
Newark Public Schools
Technology High School
University High School
Weequahic High School
Wilson Avenue School

FAMILY CENTERS

Ironbound Early Learning Center
Ironbound Community Center
The North Ward Center
La Casa De Don Pedro Youth, Family & Health Services
La Casa De Don Pedro
Family Success Centers

RECREATION CENTERS

Ironbound Recreation Center
Rotunda Recreation Center
Golden Dome Athletic Center- Rutgers Athletic Center
John F. Kennedy Recreation Center
Newark Arts Council
First Class Championship
Hayes Park West Recreation Center
Boylan Street Recreation Center
St. Peter's Recreation Center

HOUSE OF WORSHIP

St. James A.M.E. Church
First Baptist Peddie Memorial Church
Cathedral Basilica of the Sacred Heart
St. Lucy's Church
Churches in Cooperation Inc.

APPENDIX A-5

COLLEGES & UNIVERSITIES

Seton Hall University School of Law
New Jersey Institute of Technology-NJIT
Rutgers University-Newark
Essex County College
Rutgers School of Nursing
Berkeley College
Newark School of Theology
Rutgers Business School
Drake College of Business
Pillar College
Rutgers NJ Medical School
College of Architecture and Design-NJIT
Rutgers School of Dental Medicine
Star Career Academy
Kaplan Medical

HOSPITALS, HEALTH CENTERS & CLINICS

Newark Community Health Centers
Newark Community Health Center: Siripurapu Padma MD
Newark Community Health Center: Dr. Sheila Santiago
Children's Hospital of New Jersey
Horizon Blue Cross And Blue Shield Of New Jersey- HQ
Horizon Blue Cross And Blue Shield Of New Jersey-Branch
University Hospital

GOVERNMENT BUILDINGS

Newark City Hall
Newark Municipal Court
Essex County Courthouse (Veterans Courthouse)

BUSINESS LOCATIONS

PSEG HQ
Prudential Financial HQ
National Newark Building

APPENDIX A-6

Resolution of the City of Newark, NJ (No. 7R4-D Complete Streets Policy)

WHEREAS, the City of Newark is committed to creating street corridors and intersections that safely accommodate all users of all abilities; and

WHEREAS, the State Department of Transportation adopted a Complete Streets Policy (Policy No. 703), effective December 3, 2009, for all projects funded through the Department's Capital Program and strongly encouraged the adoption of similar policies by local jurisdictions, such as the City of Newark, that apply for funding through Local Aid Programs; and

WHEREAS, a Complete Street is defined as a means to provide safe access for all users by designing and operating a comprehensive, integrated, connected multimodal network of transportation options; and

WHEREAS, the benefits of Complete Streets include the following:

- *Improve safety for pedestrians, bicyclists, children, older citizens, non-drivers and the mobility challenged as well as those that cannot afford a car or choose to live car free;*
- *Provide connections to bicycling and walking trip generators such as employment, education, residential, recreation, retail centers and public facilities;*
- *Promoting healthy lifestyles;*
- *Create more livable communities;*
- *Reduce traffic congestion and reliance on carbon fuels thereby reducing greenhouse gas emissions;*
- *Improving fiscal economy, by incorporating sidewalks, bike lanes, safe crossings and transit amenities into the initial design of a projects, thus sparing the expense of retrofits later; and*

WHEREAS, the City of Newark wishes to implement the Complete Streets Policy through the planning, design, construction, maintenance and operation of new and retrofit transportation facilities, enabling safe access and mobility of pedestrians, bicyclists, transit users of all ages and abilities; and

WHEREAS, it is the intent of the City of Newark, to the extent practicable and not otherwise exempted, to apply the City of Newark Complete Streets Policy to include all public roadways, bridges and building projects in the City of Newark

NOW, THEREFORE, BE IT RESOLVED BY THE MUNICIPAL COUNCIL OF THE CITY OF NEWARK, NEW JERSEY, THAT:

The Municipal Council of the City of Newark formally adopts the Complete Streets Policy with the following goals and objectives:

1. *All City of Newark public street projects, both new construction and reconstruction, shall be designed and constructed as "Complete Streets." The "Complete Street" accommodates all modes of transportation, including but not limited to, travel by pedestrians, bicyclists, public transit, and other motorized vehicles and their passengers.*
2. *Create a comprehensive, integrated, connected multi-modal network by facilitating connections to bicycling and walking trip generators such as employment, education, residential, recreational and public facilities, as well as retail and transit centers.*
3. *Provide safe and accessible accommodations for existing and future pedestrian, bicycle and transit facilities.*
4. *Establish a checklist of pedestrian, bicycle and transit accommodations such as accessible sidewalks curb ramps, crosswalks, countdown pedestrian signals, signs, curb extensions, pedestrian scale lighting, bike lanes, and shoulders for consideration in each project where City jurisdiction applies.*
5. *Transportation facilities constructed for long-term use shall anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements.*
6. *Designs shall address the need for bicyclists and pedestrians to cross corridors, as well as travel along them, in a safe, accessible and convenient manner; therefore, the design of intersections, interchanges and bridges shall anticipate use by bicyclists and pedestrians.*
7. *Bicycle and pedestrian facilities shall be designed and constructed to the best currently available standards and practices including the New Jersey Roadway Design Manual, the AASHTO Guide for the Development of Bicycle Facilities, AASHTO's Guide for the Planning, Design and Operation of Pedestrian Facilities, NACTO Urban Bikeway Design Guide and the Manual of Uniform Traffic Control Devices.*
8. *Provisions shall be made for pedestrians and bicyclists when closing roads, bridges or sidewalks for construction projects as outlined in NJDOT Policy #705 – Accommodating Pedestrian and Bicycle Traffic During Construction.*
9. *Improvements shall comply with Title VII Environmental Justice, Americans with Disabilities Act (ADA) and complement the context of the surrounding community.*
10. *Exemptions to the Complete Streets Policy shall be presented for final decision to the Director of Engineering in writing and documented with supporting data that indicates the reason for the decision and are limited to the following:*

    a. *Non-motorized users are prohibited on the roadway.*
    b. *Scarcity of population, travel and attractors, both existing and future, indicate and absence of need for such accommodations.*
    c. *Cost of accommodations is excessively disproportionate to cost of project, more than twenty (20%) percent of total costs.*
    d. *The safety or timing of a project is compromised by the inclusion of Complete Streets.*
    e. *Detrimental environmental or social impacts outweigh the need for these accommodations.*

11. *An exemption other than those listed above must be documented with supporting data and must be approved by the Director of the Department of Engineering.*
12. *A fully executed copy of the Complete Streets Policy shall be filed with the Office of the City Clerk by the Director, Department of Engineering or his designee.*

STATEMENT

The City of Newark formally adopts a Complete Streets Policy, which will require that all City of Newark public street projects, both new construction and reconstruction (not including maintenance), shall be designed and constructed as "Complete Streets." The "Complete Street" accommodates travel by pedestrians, bicyclists, public transit and other motorized vehicles and their passengers.

Dated September 6, 2012

APPENDIX A-7

Newark Pedestrian and Bicycle Safety Action Plan
Steering Committee/Stakeholder List

Type	Organization	Contact
NEWARK	Newark Mayors Office	Ras Baraka, Mayor: Keith Hamilton, Legislative/Community Aide; Amiri Barka, Jr. Mayor's Chief of Staff ; Sakina Cole, Director Mayor's Office of Communication
	Newark Municipal Council Representative	Robert Marasco, City Clerk
	Newark Engineering Department	Jack Nata, Manager Division of Traffic Signals
	Newark Planning and Community Development	Damon Rich, Planning Director & Chief Urban Designer
	Newark Police Department	Eugene Venable, Director of Police
	Newark Police Department	Anthony Campos, Chief of Police
	Newark Police Department	Sgt. Pablo Maldonado
	Newark Office of Emergency Management	Keith Isaac, Director
	Newark Urban Enterprise Zone	Ollyn J. Lettman, Director
	Newark Board of Education - Safety Task Force	Cami Anderson, State District Superintendent
	Newark Housing Authority	Keith Kinard, Executive Director
Regional	NJTPA	Mary K. Murphy, Executive Director
	NJTPA	Sascha Frimpong, Manager, Local Programs
	NJTPA	Christine Mittman, Principal Planner, Project Management
	NJTPA	Pam Fischer, Office of Safety Planning
	U.S. Senator Cory A. Booker	Zoe Baldwin, Field Director
	Essex County Department of Public Works	Sanjeev Varghese, Public Works Director & County Engineer
	Essex County Planning	David Antonio, Supervising Transportation Planner
	Essex County Police Sheriffs	Requests must be made to Sherrif Armando B. Fontoura 50 West Main Street, Veteran's Courthouse 2nd Floor Newark, NJ 07102; Officer Michael Kihlberg, Traffic Safety Bureau
	Essex Cty Prosecutor's Office/Admin.	Katherine Carter, Media Relations
	FHWA NJ Division Office	Caroline Trueman
	NJDOT Bureau of Local Government Services	Richard Loveless
	NJDOT Safety	Mark Tozzi designee for Dave Kuhn, Assistant Commissioner
	NJDOT Bicycle Pedestrian	Debra Kingsland; William Riviere
	Division of Highway Traffic Safety	Bob Gaydosh, DHTS Regional Supervisors North Region; John Strachan
	NHTSA, Region 2	Francisco Gomez
	NJ Transit	Elmira Yasin, Manager Bus System Safety
	NJ Transit	Michael J. Viscardi Assistant Director Federal Projects Planning
	Meadowlink	Meeta Patel , Program Coordinator SRTS and Chris Rodriguez in place of Ellie Ferrer, Regional Manager
	Rutgers Transportation Safety Resource Center	Andy Kaplan, Senior Traffic Engineer; Aimee Jefferson
	Alan M. Voorhees Transportation Center Rutgers, The State University of New Jersey	Charles Brown, MPA, Senior Research Specialist
Schools and Hospitals	Rutgers University	Chief Mike Lattimore, PD (Andrea Tejada)
	Rutgers University	Christopher Pye, Associate Vice Chancellor for Facilities
	NJIT	Chief Joe Marswillo; Charles Tighe; Lt. Mark J. Cyr Special Services Commander
	Essex County College	Wayne Yourstone, Senior Newswriter
	Seton Hall Law School	Cara Herrick Foerst, Dean of Students
	The New Jersey Trauma Center at University Hospital	Iesha M. Suber Safe Kids Essex County Coordinator; Tiffany Smith, Media/Communications; Stacie Newton, Director Of Marketing Communications
Community Orgs. & BIDs	Ironbound Community Corporation	Nancy ZAK
	La Casa de Don Pedro	Roberto Frugone, Program Director
	Weequahic Park	
	Frelinghuysen	
	Lincoln Park Coast Cultural District	Susan Austin, Director of Development and Operations
	Unified Vailsburg Service Organization	Mike Farley and Veronica Manning
	My Block, My Family, Our Village Neighborhood Association	Marilyn Y. Gaynor, President
	West Ward Newark	
	Newark Downtown District	Anthony McMillan, Chief Executive Officer; Kimberly Heelan, Executive Assistant/Office Manger
	Ironbound Business Improvement District	Seth A. Grossman, Executive Director
	Mount Prospect Partnership	Frank Petolino, Executive Director
Advocacy & Non Profit	Newark Office on Aging	Philip Orlando, Program Coordinator
	Brick City Bikes	Zoe Baldwin
	New Jersey Bike & Walk Coalition	Cyndi Steiner, Executive Director
	Newark Regional Business Partnership	Barbara Kauffman, Executive Vice President
	AAA New Jersey Automobile Club	Cathleen Lewis, Director, Public Affairs and Government Relations; Shani Jarvis
	Tri-State Transportation Campaign	Janna Chernetz, Esq., New Jersey Advocate
	Regional Plan Association	Robert Freudenberg, Director, New Jersey
	Urban League of Essex County	Vivian Fraser, President & CEO
Downtown Destinations	New Jersey Performing Arts Center	Ross S. Richards VP Operations and Real Estate; Chad Spies Asst VP - Site Operations; John Dante Esposito
	Prudential Center/NJ Devils	Stephen Wolcott
	Prudential Financial Inc.	Lori A. Hennon-Bell, Chief Security Officer Global Security
	Newark Center	Ellie Lawrence
	Panasonic Corporation of North America	

ACKNOWLEDGEMENTS

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ISAAC OJEDA, DIVISION OF TRAFFIC AND SIGNALS, CITY OF NEWARK, PRINCIPAL ENGINEER

STEERING/STAKEHOLDER MEMBERS:

A list of the Steering Committee/Stakeholder Members has been included in the Appendix - A-7.

FINAL REPORT COMPLETED BY:

JACK M. NATA

CHRISTINE MITTMAN

JORDAN KOCAK