

Bergen Street – City of Newark

Road Safety Audit

FINAL REPORT

December 2013

Submitted by

Andy Kaplan

SENIOR TRANSPORTATION SAFETY ENGINEER

Aimee Jefferson

TRANSPORTATION SAFETY PLANNER

Center for Advanced Infrastructure & Transportation (CAIT)

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY



NJDOT Research Project Manager

Robert Desando

In cooperation with

New Jersey Department of Transportation
Bureau of Transportation Data Development

and

U.S. Department of Transportation
Federal Highway Administration

DISCLAIMER STATEMENT

Road Safety Audit reports provided by the Center for Advanced Infrastructure and Transportation staff do not constitute an engineering report. The agency responsible for design and construction should consult a professional engineer licensed in the State of New Jersey in preparing construction documents to implement any of the safety countermeasures in the report.

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the New Jersey Department of Transportation or the Rutgers' Center for Advanced Infrastructure and Transportation. This report does not constitute a standard, specification, or regulation. Such document is disseminated under the sponsorship of the Department of Transportation, University Transportation Centers program, in the interest of information exchange. The U.S. government assumes no liability for the contents or use thereof.

1. Report No.		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Bergen Street – City of Newark Road Safety Audit				5. Report Date December 2013	
				6. Performing Organization Code CAIT/Rutgers	
7. Author(s) Andy Kaplan, Aimee Jefferson				8. Performing Organization Report No.	
9. Performing Organization Name and Address Center for Advanced Infrastructure & Transportation (CAIT) Rutgers, The State University of New Jersey 100 Brett Road Piscataway, NJ 08854-8014				10. Work Unit No.	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address N.J. Department of Transportation 1035 Parkway Avenue P.O. Box 600 Trenton, NJ 08625-0600 U.S. Department of Transportation Research and Special Programs Administration 400 7th Street, SW Washington, DC 20590-0001				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract This report documents findings and recommendation made by the RSA team on July 17, 2013.					
17. Key Words RSA, Road Safety Audit, Newark			18. Distribution Statement No Restrictions.		
19. Security Classification (of this report) Unclassified		20. Security Classification (of this page) Unclassified		21. No of Pages 70	22. Price

Form DOT F 1700.7

CAIT's Transportation Safety Resource Center (TSRC) and New Jersey Local Technical Assistance Program (NJ LTAP) offer a statewide Road Safety Audit (RSA) service at no charge to New Jersey towns and counties. Interested parties can request road surveys conducted by a team of engineers, planners, and law-enforcement officers to help municipalities and counties make cost-effective safety improvements.

A multidisciplinary team of professionals offers assessments on roadway issues such as pedestrian and bicycle safety, intersection analyses, rural roads, human factors, speed management, and sign visibility and retro-reflectivity standards.

RSAs include data-driven considerations and analysis of crashes. To determine the best safety solutions, RSA professionals perform incisive crash data evaluations on the target area using Plan4Safety, TSRC's award-winning crash database and software.

The RSA team provides a final report that includes long- and short-term countermeasure recommendations that fit within the requestor's budget. Furthermore, RSAs pay off. According to the Federal Highway Administration (FHWA), countermeasures applied after RSAs can reduce crashes by about 60 percent.

For more information, contact Senior Engineer Researcher Andy Kaplan at andy.kaplan@rutgers.edu.

Table of Contents

Introduction	1
Background	3
Road Safety Audit Process	4
Information Sources	5
RSA Team	6
Crash Data	7
RSA Team Findings	19
Implementing Recommendations	25
Potential Funding Sources	38
Appendix A – Raw Crash Data	A-1
West Market Street & Bergen Street.....	A-2
Cabinet Street & Bergen Street	A-6
12 th Avenue & Bergen Street	A-7
Appendix B – Crash Diagrams	B-1
West Market Street & Bergen Street.....	B-2
Cabinet Street & Bergen Street	B-3
12 th Avenue & Bergen Street	B-4
Appendix C – Straight Line Diagram	C-1
Appendix D – Bus Routes	D-1

Introduction

The Rutgers' Transportation Safety Resource Center (TSRC) at the Rutgers' Center for Advanced Infrastructure and Transportation (CAIT) and the North Jersey Transportation Planning Authority (NJTPA) have partnered to provide NJTPA's sub-regions with facilitated Road Safety Audits at locations identified by the sub-regions as having safety concerns. To assist the sub-regions in making this determination, NJTPA and TSRC prepared a ranking of roadway segments based on crash data.

In 2012, the city of Newark was identified as a "pedestrian focus city" by the Federal Highway Administration. In consideration of this focus, NJTPA selected the city of Newark as a sub-region to obtain an RSA. NJTPA provided the city of Newark with the following suggested crash locations from a TSRC data run. [Note: blue are county routes, yellow are city routes]

County Rank	County	Road Name	Starting Municipality	SRI	Milepost Start	Milepost End	Segment Length	Total Crashes	EPDO	Property	Complaint of Pain	Moderate Injury	Incapacitating Injury	Fatal Injury	Roadway Departure	Younger Driver	Older Driver	Motorcycle	Truck	Bus	Bike	Pedestrian
1	Essex	Bergen Street	Newark City	7141895	0.00	4.24	4.24	486	907	278	0	204	3	1	5	42	54	4	27	14	4	40
2	Essex	Broad Street	Newark City	7141865	0.00	2.88	2.88	438	754	282	0	154	0	2	1	29	37	5	35	50	2	34
3	Essex	Franklin Avenue	Newark City	7000645	0.00	4.06	4.06	477	723	356	0	119	0	2	3	83	97	4	36	5	4	28
4	Essex	Broadway	Newark City	7000667	0.00	2.55	2.55	287	545	160	0	124	2	1	1	15	31	4	11	8	5	31
5	Essex	18th Avenue	Newark City	7141885	0.00	3.30	3.30	296	497	196	0	99	1	0	3	25	29	2	13	10	1	17
6	Essex	Irvine Turner Boulevard	Newark City	7141900	0.16	3.47	3.31	262	436	175	0	87	0	0	NULL	21	33	1	18	7	NULL	13
7	Essex	Elizabeth Avenue	Newark City	7141891	0.35	2.51	2.16	218	421	117	0	100	1	0	3	21	24	2	25	5	1	12
8	Essex	Ferry Street	Newark City	7141844	0.00	2.12	2.12	235	361	174	0	58	2	1	NULL	18	14	4	26	9	NULL	18
9	Essex	Dr ML King Jr Boulevard	Newark City	7141904	0.00	2.72	2.72	192	324	126	0	66	0	0	1	14	18	1	17	1	1	12
10	Essex	14TH AVE	Newark City	7141235	0.00	1.77	1.77	149	296	76	0	72	1	0	3	17	15	NULL	1	2	2	7

NJTPA Crash Prone Locations 2008–2010, City of Newark

The NJTPA ranked Bergen Street from beginning to end—Chancellor Avenue to Park Avenue—as Essex County’s most dangerous corridor, leading the TSRC team to suggest considering Bergen Street as Newark’s 2013 RSA site. The city agreed, and after taking into consideration pending projects and known pedestrian issues along the corridors, Rutgers’ TSRC subsequently conducted a thorough crash analysis of the corridor and identified the city-owned intersections for the audit focus. Additionally, the city noted some intersections that were recently upgraded, or precluded from upgrade due to inclusion in the Red Light Running Statewide Pilot Program. The ranked high-crash locations are noted below:

Cross Street	Total Crash	Ped Crash	Jurisdiction	Traffic Control
West Market Street	64	5	Municipal	Signalized
Cabinet Street	13	1	Municipal	No signals
12th Avenue	45	10	Municipal	Signalized
14th Ave	10	2	Municipal	Signalized
15th Ave	19	1	Municipal	Signalized
16th Ave	7	0	Municipal	Signalized

Crash Data 2009–2011

After looking at the crash data, it became apparent that West Market Street and 12th Avenue would be perfect candidates for an RSA, particularly given the number of pedestrian accidents occurring at each intersection. Cabinet Street lies between the two and has a substantial number of crashes, so it was decided to investigate this intersection as well.

TSRC, the city of Newark, and NJTPA subsequently confirmed the location of the RSA to be of Bergen Street (07141895), at the specific hot-spot intersections of:

1. West Market Street
2. Cabinet Street
3. 12th Avenue

Background

The audit focused on three intersections on Bergen Street, as shown in Figure 1 below, located within Essex County, in the city of Newark:

- West Market Street
- Cabinet Street
- 12th Avenue

All of the studied intersections are within a quarter-mile section along Bergen Street. Both West Market Street and 12th Avenue are signalized, and cars exiting Cabinet Street are stop sign controlled. The land around Bergen Street accommodates a variety of activities: commercial, residential, community organizations, schools, churches, and the Rutgers and University Hospital campus. All of the intersections have bus traffic; West Market Avenue is the most active with five bus routes. The roadway is designated as an urban minor arterial and its jurisdiction is Municipal. The roadway measures 70 feet curb to curb and supports two lanes northbound and one lane southbound with parallel parking along the both sides except for the west side of Bergen Street between Cabinet Street and 12th Avenue, where there is angled parking.

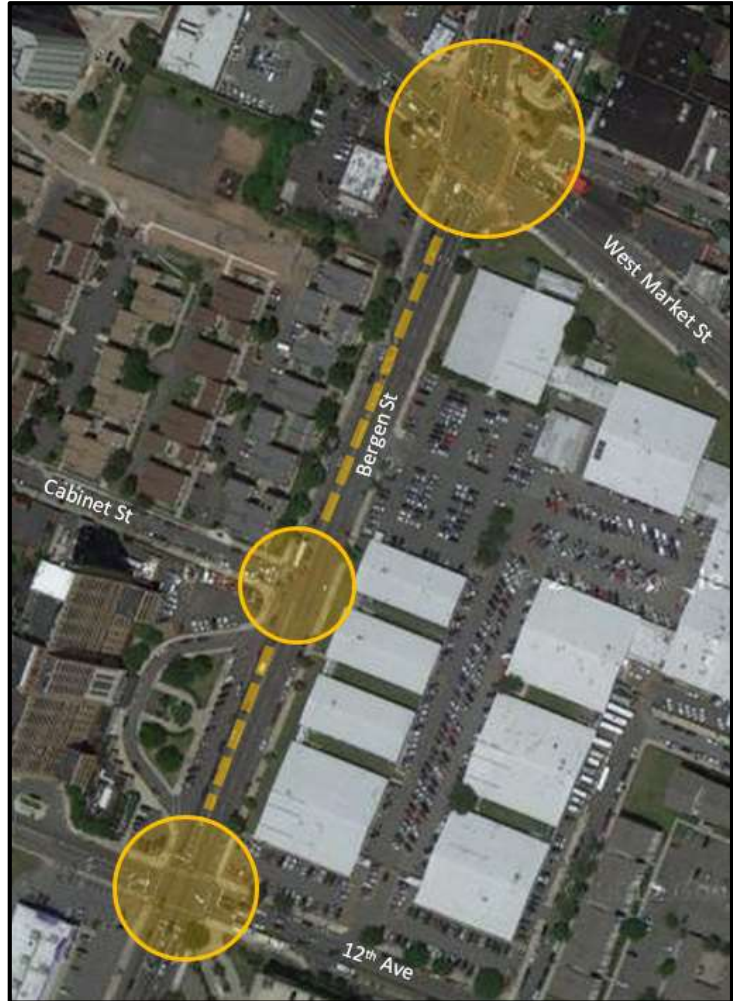


Figure 1 – Map of Intersections in RSA Study

Bergen Street runs south to north, beginning south of Chancellor Avenue (County Road 601) and ending at West Market Street. The street name changes from “Bergen Street” to “1st Street” at West Market Street, and then proceeds to cross under US Route 280 a half-mile north of the study area, approximately 1.1 miles west of the Passaic River.

On the day of the presentation, a few RSA participants also suggested that we extend the study down to the Pathmark entrance on Bergen Street. Though the official RSA did not include this intersection, it was recognized by many in the group that many of the RSA’s recommendations could be applied elsewhere, such as at the Pathmark entrance.



Figure 2 – West Market Street and Bergen Street/1st Street

The intersection of **West Market Street and Bergen Street/1st Street** is a skewed, four-legged signalized intersection. West Market Street has three lanes on both westbound and eastbound legs. Bergen Street has two southbound lanes north of the intersection but only one receiving lane south of the intersection. Furthermore, there is significant volume in and out of the McDonald's on the intersection's southwest corner, and many crashes occur at the north and east lot entrances. An RSA participant also noted that safe school crossings are an important factor at this intersection since school closings have forced many children to walk farther and cross the busy intersection of West Market Street.

The **Cabinet Street and Bergen Street** intersection is a three legged intersection, stop-controlled only for vehicles exiting Cabinet Street. Behind the intersection with Bergen Street, Cabinet Street has been vacated and is a private street, but access still exists for vehicles exiting onto Bergen Street; the remnants of a gated entrance still exist. Just south of the intersection is a driveway drop-off loop for the building 65 Bergen Street. The driveway leads to a parking lot, and just past the driveway is 200 feet of angled parking.



Figure 3 – Cabinet Street and Bergen Street



Figure 4 – 12th Avenue and Bergen Street

The intersection of **Bergen Street and 12th Avenue** is a very active intersection that includes Rutgers buildings, food trucks, a parking deck, and a Rite Aid. The area is constantly busy with both foot and vehicular traffic, particularly emergency medical vehicles (EMS) that transport patients to the emergency room entrance just south of the intersection. Twelfth Avenue has only one through-lane on each approach on the east side of the intersection, and food trucks park along the eastbound side. The northbound signal offers an outbound protected-permitted lead. The northbound approach is striped as four lanes, one dedicated left turn, two dedicated through, and one dedicated right turn. The tight curb radius and the presence of the food trucks make it difficult for bus turning movements.

The RSA team also examined the driveways at **65 Bergen Street** and the **hospital emergency room entrance** just south of the 12th Avenue intersection. The ER entrance is not clearly marked, and its sidewalks lead pedestrians to Bergen Street without providing them a safe or designated crossing to the KFC or IHOP stores located on the other side of the street.



Figure 5 – 12th Avenue and Bergen Street



Figure 6 – Emergency Room Entrance

The **65 Bergen Street** area has a small parking lot in front with angled parking, which requires a back out lane. Unfortunately, the back out lane is often utilized as an additional travel lane and ultimately an illegal turning lane when it intersects with 12th Avenue.

Road Safety Audit Process

The Bergen Street RSA followed a process that began with data collection, a crucial task that served as the backbone for recommendations for improvement. At the selected sites, crash data was collected using Plan4Safety, a crash data analysis tool, and consisted of crash types, locations, crash years, road conditions, and contributing circumstances. Using the crash data, a crash diagram, shown in Appendix A was produced for each intersection that showed crash types and locations.



Figure 7 – RSA Team Conducting Site Visit

The Road Safety Audit occurred on Wednesday, July 17, 2013. The day began with a pre-audit meeting that involved the definition of a road safety audit, an overview of the intersections, and a brief discussion on items to consider before going out to the field. A presentation was shown detailing the crash analysis and aerial images of the different sites. Following the presentation and discussion, site visits were conducted where all participants were given a chance to inspect the intersections and utilize their various backgrounds to brainstorm recommended improvements. After the site visits, the team was brought back together to discuss the issues observed and suggest recommendations to remedy the issues.

Information Sources

Several sources of information were used in the RSA process. For example, crash data from 2009 to 2011 was examined for trends and patterns. Specific resources used in the analysis include:

- NJDOT Crash Database (2009–2011)
- Plan4Safety Crash Data Analysis Tool
- NJTR-1 Crash Reports
- NJDOT Straight Line Diagrams
- Google Earth

RSA Team

The RSA team consisted of approximately 30 members, including police officers, engineers, and planners from different agencies across the state.

Name	Representing	Phone	Email
Aimee Jefferson	TSRC	848-445-2979	aimee.jefferson@rutgers.edu
Andy Kaplan	TSRC	609-213-6252	akaplan1@rutgers.edu
Angela Quevedo	NJDOT (BSP)	609-530-4677	Angela.Quevedo@dot.state.nj.us
Calvin Freeland	Resident	973-388-5041	freelandcalvin@yahoo.com
Carl Chase	University Hospital	973-972-6935	chasecg@rutgers.edu
Caroline Trueman	FHWA	609-637-4234	caroline.trueman@dot.gov
Christine Mittman	NJTPA	973-639-8448	cmittman@njtpa.org
David Schulz, AIA	University Hospital (Administration)	973-972-4600	dave.schulz@rutgers.edu
Divya Kumar	NJDOT (Local Aid)	973-877-1562	Divya.Kumar@dot.state.nj.us
Elmira Yasin	NJ Transit	973-522-3694	ElmiraYasin@njtransit.com
Gee Cureton	Resident	973-477-6403	gee.curaton@verizon.net
Isaac Ojeda	City of Newark (Engineering Dept.)	973-733-3511	ico5@njit.edu
Jack M. Nata	City of Newark (Engineering Dept.)	973-733-3985	NataJ@ci.newark.nj.us
James Campoli	University Hospital (Facilities)	973-972-7770	campolja@ca.rutgers.edu
John Bell	University Hospital PD	973-972-1980	j.bell@rutgers.edu
John Grembowiec	University Hospital EMS	973-972-6442	grembojj@njms.rutgers.edu
John Strachan	DHTS	609-633-9053	John.Strachan@lps.state.nj.us
Juan Feijoo	City of Newark (Engineering Dept.)	973-733-6460	JuanF@ci.newark.nj.us
Khalid Shaikh	NJDOT (Bike Ped)	609-530-2476	khalid.Shaikh@dot.state.nj.us
Kimberly Gasavage	Newark PD	973-733-6328	gasavagek@ci.newark.nj.us
Larry Crump	City of Newark (City Council)	973-733-8043	crumpm@ci.newark.nj.us
Maeve Lopreiato	PIPP	973-972-4006	lopreimc@njms.rutgers.edu
Marilyn Gaynor	Resident	973-818-9548	mygaynor@optonline.net
Marta Figueroa, RN	University Hospital	973-972-5901	figuerma@njms.rutgers.edu
Meeta Patel	Meadowlink TMA	201-939-4242	mpatel@ezride.org
Melissa Ramos	La Casa de Don Pedro	973-485-0701	mramos@lacasanwk.org
Michael Weber	TSRC	848-445-2893	michael.weber@rutgers.edu
Sally Karasov	TSRC	848-445-2898	sally.karasov@rutgers.edu
Sharon Clancy, MPH	PIPP	973-972-7797	sharon.clancy.mph@njms.rutgers.edu
Teresa DeCarlo	University Hospital (Facilities)	973-972-2627	decarltc@ca.rutgers.edu

Crash Data

As of the date of this report, the crash data reported by the NJDOT shows a total of 122 crashes occurring during the three-year period from 2009 to 2011. The following tables show detailed statistics of the crash data analyzed.

The intersections within the city of Newark that were selected for further analyses based on crash data are West Market Street & Bergen Street, Cabinet Street & Bergen Street and 12th Avenue & West Market Street .

The table on the following page is based loosely on the FHWA's Crash Risk Assessment Ratings¹. Rather than assessing every single accident, the crashes studied in this RSA were categorized by crash type and severity (EDPO) (Table 1) and total occurrences (Table 2) during the three years studied. Once the crashes are correctly situated within the grid, they are assigned a risk level (Table 3).

SEVERITY RATING	TYPICAL CRASHES EXPECTED	EXPECTED CRASH SEVERITY
<i>Extreme</i>	Crashes involving high speeds or heavy vehicles, pedestrians, or bicycles	Probable fatality or incapacitating injury
<i>High</i>	Crashes involving medium to high speed; head-on, crossing, or off-road crashes	Moderate to severe injury
<i>Moderate</i>	Crashes involving medium to low speeds; left-turn and right-turn crashes	Minor to moderate injury
<i>Low</i>	Crashes involving low to medium speeds; rear-end or sideswipe crashes	Property damage only or minor injury

Table 1 – Crash Type Categorization Breakdown

FREQUENCY RATING	TOTAL OCCURRENCES OF CRASH TYPE OVER THREE-YEAR PERIOD
<i>Frequent</i>	10 or more crashes
<i>Occasional</i>	3–9 crashes
<i>Infrequent</i>	2–3 crashes
<i>Rare</i>	0–1 crashes

Table 2 – Frequency Rating

	<i>A: Lowest risk level</i>
	<i>B: Low risk level</i>
	<i>C: Moderate to low risk level</i>
	<i>D: Moderate to high risk level</i>
	<i>E: High risk level</i>
	<i>F: Extreme risk level</i>

Table 3 – Risk Level Categories

¹ http://safety.fhwa.dot.gov/rsa/case_studies/fhwasa06017/page2.cfm

Risk Level Category		Severity Rating			
		Moderate to Low	Moderate to High	High	Extreme
Frequency Rating	Frequent	<p>1) Lane changing causing sideswipes--particularly north of southbound Bergen Street</p> <p>2) Motorists who see the correct green signal, but not the car in front of them (often the result of distraction)</p>	<p>1) Right-angle and rear-end crashes: turning vehicles entering/exiting driveways between Cabinet Street and 12th Avenue and at McDonald's</p> <p>2) Vehicles passing stopped or turning traffic being struck at a right angle by unexpected vehicles going straight</p> <p>3) Motorists changing lanes very near to the intersection, sometimes to pass stopped vehicles, but also, perhaps, confused</p>		
	Occasional	Striking parked vehicle	<p>1) Vehicles making sudden stops to allow for emergency vehicles to pass through the intersection;</p> <p>2) Crashing due to wide bus turning movement</p>		<p>1) Pedestrians crossing mid-block</p> <p>2) Pedestrians struck in crosswalk (usually struck by left-turning vehicles)</p> <p>3) Pedestrians running across the street to catch the bus</p>
	Infrequent	<p>Backing cars struck another to make space for bus</p>	Emergency vehicles striking cars		
	Rare	Cars striking various fixed object			

Table 4 – Crash Risk Assessment

West Market Street & Bergen Street:

As can be seen from the tables below, the above intersection has a significant number of Same Direction–Rear End crashes with Right Angle and Left Turn crashes also common. The vehicle injuries were largely from Same Direction–Rear End, Right Angle and Left / U-Turn crashes. Three injuries in the pedestrian crashes occurred due to a pedestrian crossing the street to catch the bus, and two of the crashes were from left-turning vehicles hitting pedestrians in the marked crosswalk. The most common known contributing circumstance was driver inattention, which accounted for 35 percent of the crashes in which the pre-crash action was Going Straight Ahead. There were no crashes in which anyone was killed or incapacitated.

West Market Street & Bergen Street		EPDO			
		PDO	Pain	Moderate Injury	TOTALS
Crash Type	Same Direction–Rear End	18	6		24
	Same Direction–Side Swipe	5	1		6
	Right Angle	5	7	1	13
	Opposite Direction–Head On/Angular	2			2
	Left Turn / U-Turn	4	7		11
	Fixed Object	3			3
	Pedestrian		5		5
TOTALS		37	26	1	64

Table 5 –Crash Type and Severity

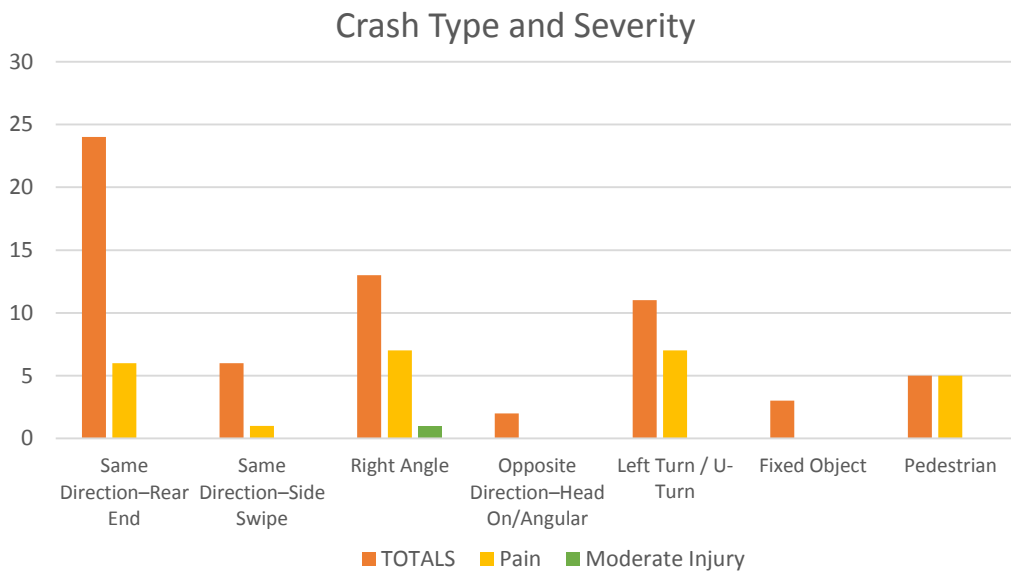


Chart 1 – Crash Type and Severity

West Market Street & Bergen Street		EPDO			
		PDO	Pain	Moderate Injury	TOTALS
Pre-Crash Action	Going Straight Ahead	40	23	3	66
	Making Right Turn (not turn on red)	4	3		7
	Making Left Turn	9	12		21
	Making U-Turn		1		1
	Starting in Traffic	1			1
	Slowing or Stopping	2	4		6
	Stopped in Traffic	12	3		15
	Changing Lanes	1			1
	Merging/Entering Traffic Lane	1	3		4
	Right Turn on Red		1		1
	NULL	3	1		4
	Other	1			1
	TOTALS	74	51	3	

Table 6 –Pre-Crash Action and Severity

West Market Street & Bergen Street		Pre-Crash Action												
		Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Making U-Turn	Starting in Traffic	Slowing or Stopping	Stopped in Traffic	Changing Lanes	Merging/ Entering Traffic Lane	Right Turn on Red	NULL	Other	TOTALS
Contributing Circumstances	Unknown	3		4										7
	Unsafe Speed	3					1							4
	Driver Inattention	23		4	1	1	2	2		1	1			35
	Failed to Yield Right of Way to Vehicle/ Pedestrian			1										1
	Improper Lane Change	1												1
	Improper Turning			2										2
	Wrong Way											1		1
	None (driver/ pedcycle)	26	6	7			1	12		1		1		54
	Other Driver/ Pedalcyclist Action	2		1					1	2				6
	Brakes	1					1							2
	Physical Obstruction (viewing)	1												1
	NULL	6		2			1	1				2	1	13
	TOTALS	66	6	21	1	1	6	15	1	4	1	4	1	

Table 7 – Contributing Circumstances and Pre-Crash Action

West Market Street & Bergen Street		Surface Condition			
		Dry	Wet	Icy	TOTALS
Light Condition	Daylight	39	5	1	45
	Dawn	1	1		2
	Dusk	1		1	2
	Dark (street lights off)	1			1
	Dark (street lights on/Continuous)	11	2		13
	Dark (street lights on/spot)	1			1
	TOTALS	54	8	2	64

Table 8 – Light Condition and Surface Condition

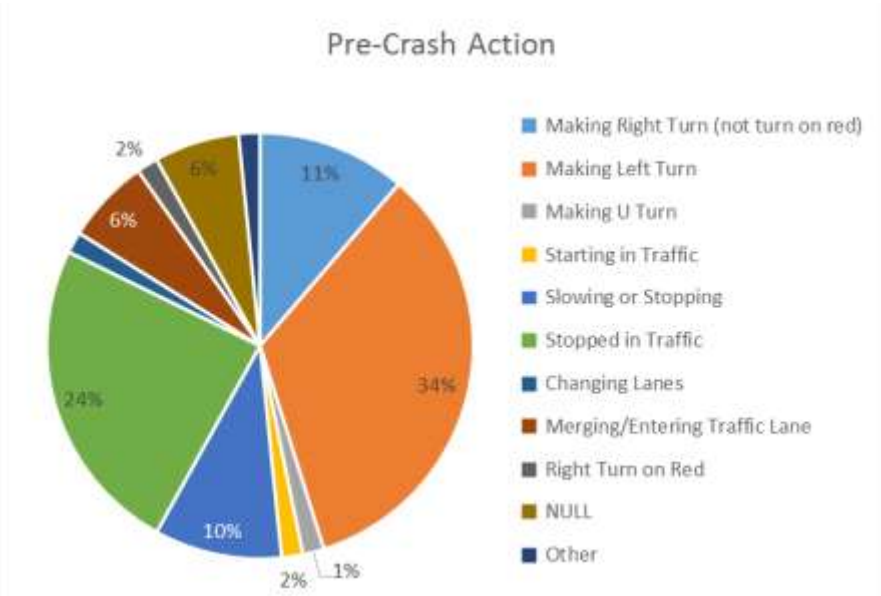


Chart 2 – Pre-Crash Action

Contributing Crash Circumstances

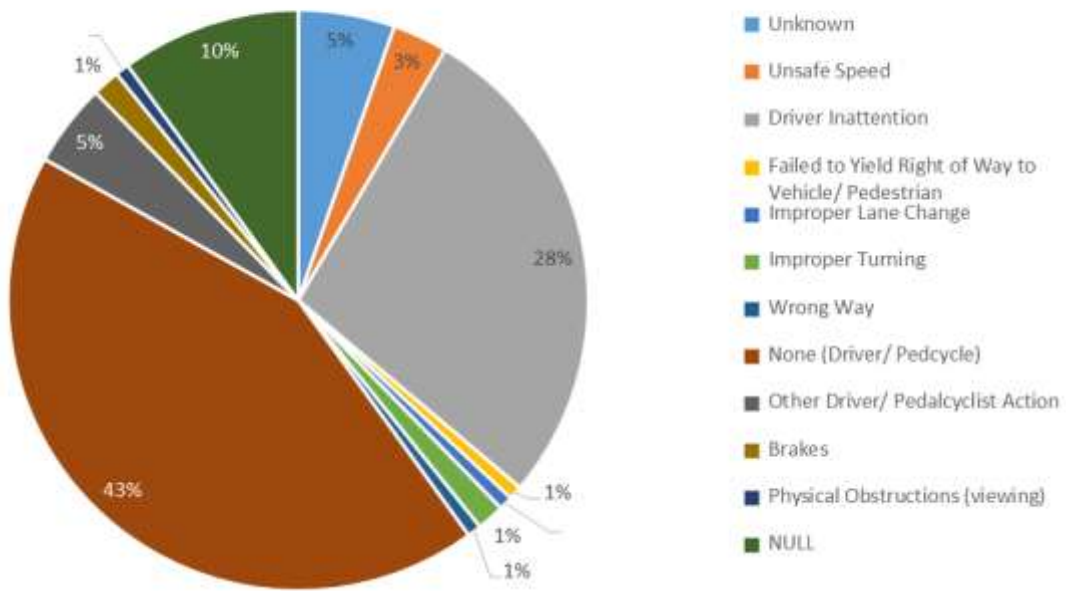


Chart 3 – Contributing Circumstances

Cabinet Street & Bergen Street:

Right Angle crashes had both the highest incident of property damage and injury. Driver inattention is also the main known contributor to crashes, particularly in Going Straight Ahead crashes. Improper passing is also a major concern at the intersection since shadow accidents are very prevalent. There were no crashes in which anyone was killed, incapacitated, or moderately injured.

Cabinet Street & Bergen Street		EPDO		
		PDO	Pain	TOTALS
Crash Type	Same Direction–Rear End		2	2
	Same Direction–Side Swipe	1	2	3
	Right Angle	3	3	6
	Struck Parked Vehicle	1		1
	Pedestrian		1	1
TOTALS		5	8	13

Table 9 – Crash Type and Severity

Cabinet Street & Bergen Street		EPDO		
		PDO	Pain	TOTALS
Pre-Crash Action	Going Straight Ahead	5	7	12
	Making Right Turn (not turn on red)	1		1
	Making Left Turn	1	2	3
	Making U-Turn		1	1
	Stopped in Traffic	1	2	3
	Parked	1	1	2
	Merging/Entering Traffic Lane		1	1
	Passing	1	1	2
	NULL		1	1
TOTALS		10	16	

Table 10 – Pre-Crash and Severity

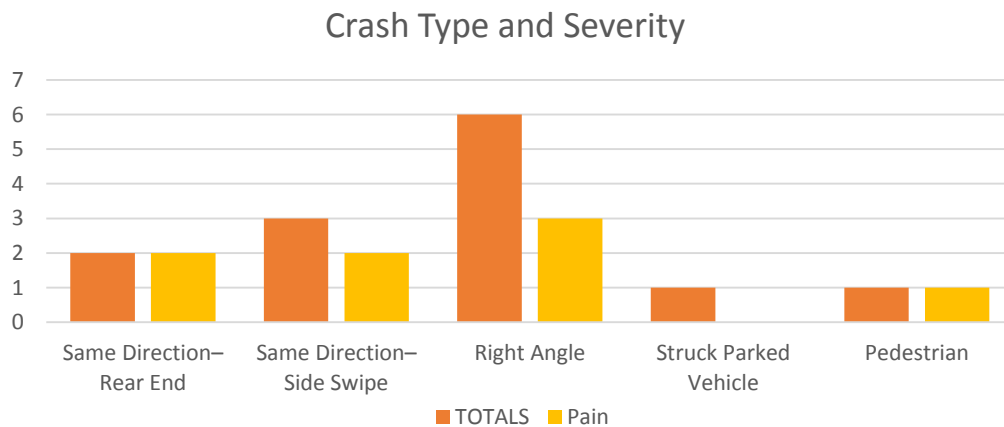


Chart 4 – Crash Type and Severity

Pre-Crash Action

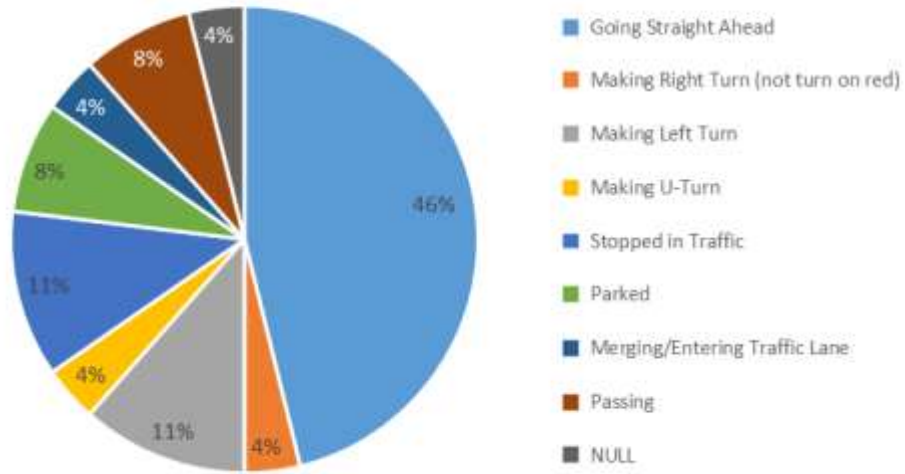


Chart 5 –Pre-Crash Action

Cabinet Street & Bergen Street		Contributing Circumstances									
		Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Making U-Turn	Stopped in Traffic	Parked	Merging/Entering Traffic Lane	Passing	NULL	TOTALS
Pre-Crash Action	Driver Inattention	5	1					1	1		8
	Improper Lane Change				1						1
	Improper Passing	3							1		4
	None (driver/pedcycle)	3		2		3					8
	NULL	1		1			2			1	5
TOTALS		12	1	3	1	3	2	1	2	1	

Table 11 – Pre-Crash Action and Contributing Circumstances

Cabinet Street & Bergen Street		Surface Condition			
		Dry	Wet	Snowy	TOTALS
Light Condition	Daylight	8	4	1	13
	TOTALS	8	4	1	13

Table 12 – Light Condition and Surface Condition

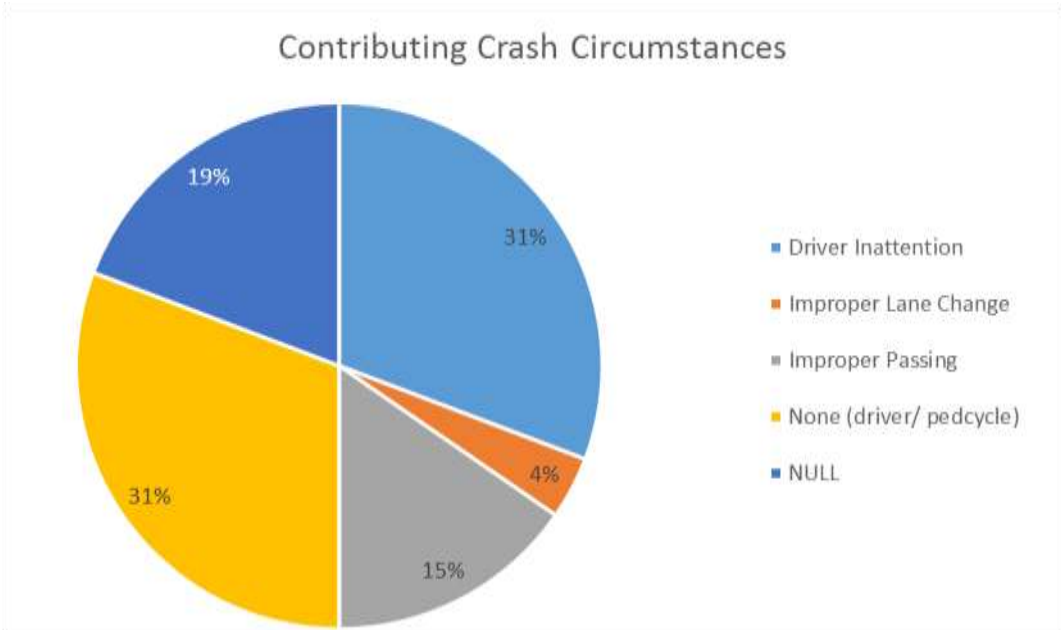


Chart 6 – Contributing Circumstances

12th Avenue & Bergen Street:

The 12th Avenue intersection ranked high in Same Direction–Rear End and Same Direction–Side Swipe crashes as well as pedestrian crashes. Of the 10 pedestrian crashes, five were the result of drivers making a left turn and striking the pedestrian in the crosswalk. Moreover, 60 percent of these crashes occurred in the northbound travel lane as pedestrians were crossing east to west across 12th Avenue. There were no crashes in which anyone was killed or incapacitated.

12 th Avenue & Bergen Street		EPDO			
		PDO	Pain	Moderate Injury	TOTALS
Crash Type	Same Direction–Rear End	9	4		13
	Same Direction–Side Swipe	12	1		13
	Right Angle	3	1	1	5
	Struck Parked Vehicle	2			2
	Backing	1			1
	Pedestrian	1	7	2	10
	Other			1	1
TOTALS		28	13	4	45

Table 13 – Crash Type and Severity

Crash Type and Severity

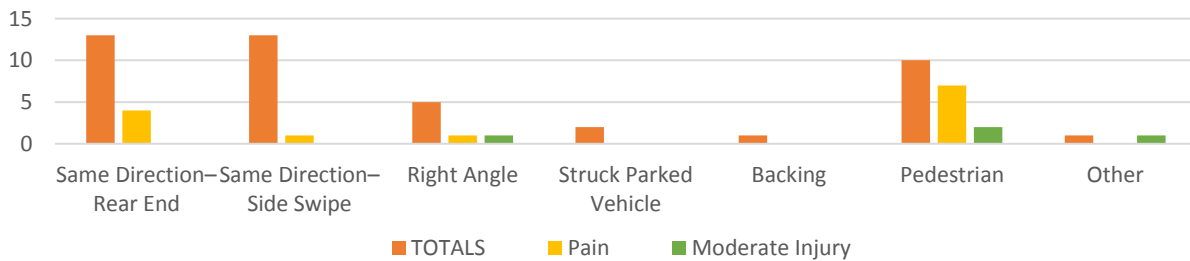


Chart 7 – Crash Type and Severity

12 th Avenue & Bergen Street		EPDO			
		PDO	Pain	Moderate Injury	TOTALS
Pre-Crash Vehicle Action	Unknown	1			1
	Going Straight Ahead	24	10	4	38
	Making Right Turn (not turn on red)	5			5
	Making Left Turn	7	3	2	12
	Starting in Traffic	2			2
	Slowing or Stopping	1			1
	Stopped in Traffic	8	8		16
	Parked	2			2
	Changing Lanes	3			3
	Backing	1	1		2
	Passing	1			1
	NULL	1	2		3
	TOTALS		56	24	30

Table 14 – Pre-Crash Action and Severity

Pre-Crash Action



Chart 8 – Pre-Crash Action

12 th Avenue & Bergen Street		Pre-Crash Action												
		Unknown	Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Starting in Traffic	Slowing or Stopping	Stopped in Traffic	Parked	Changing Lanes	Backing	Passing	NULL	TOTALS
Contributing Circumstances	Unknown		3		3									6
	Unsafe Speed		2									1		3
	Driver Inattention	1	6	2	4				1					13
	Improper Lane Change		1											1
	Improper Passing		2								1			3
	Improper Turning				1									1
	Following Too Closely		1											1
	Backing Unsafely									2				2
	None (driver/pedcycle)		19	2	3	2	1	15	1	2				45
	Other Vehicle Factor							1						1
	NULL		3		1				1				2	7
	Other		1	1										2
	TOTALS	1	38	5	12	2	1	16	2	3	2	1	3	

Table 15 – Pre-Crash Action and Contributing Circumstances

Contributing Crash Circumstances

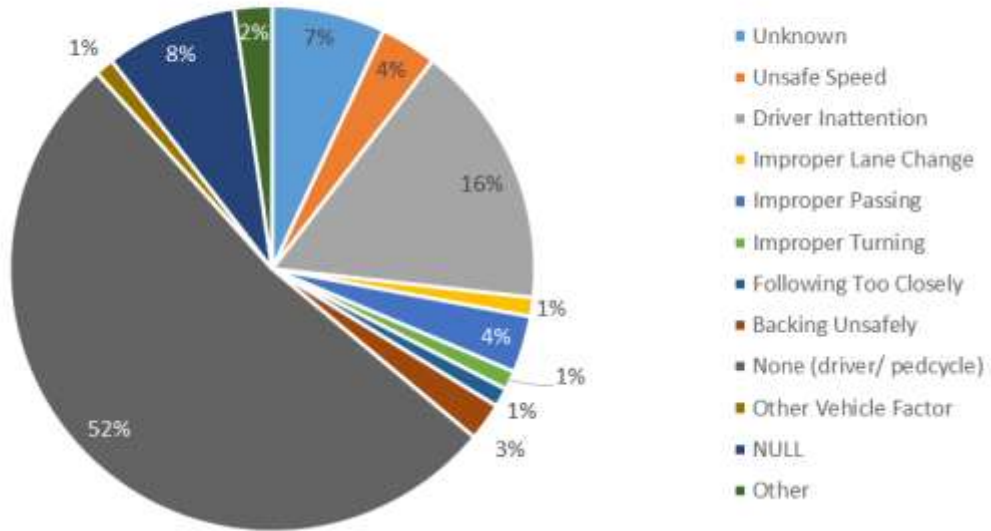


Chart 9 –Contributing Circumstances

12 th Avenue & Bergen Street		Surface Condition		
		Dry	Wet	TOTALS
Light Condition	Daylight	31	6	37
	Dawn	1		1
	Dusk	2		2
	Dark (street lights on/continuous)	4		4
	Dark (street lights on/spot)	1		1
	TOTALS	39	6	45

Table 16 –Surface Condition and Light Condition

RSA Team Findings

The following represents the specific findings and recommendations made by the RSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to codes, standards, and best practices.

Illegal and unsafe pedestrian crossing patterns.		Corridor	West Market Street	Cabinet Street	65 Bergen Street	12 th Avenue	ER Hospital Entrance
1	<p>Large distances between designated crosswalks, causing pedestrians to cross Bergen Street outside of designated areas</p> <p>Many pedestrians then choose to cross illegally at the mid-block, particularly between Cabinet and West Market Streets to access 65 Bergen Street from the parking lot on the east side of Bergen Street.</p>	X	X	X			X
2	<p>Pedestrians crossing against signal</p> <ul style="list-style-type: none"> • Pedestrian presence is often not registered by the stoplight system since pedestrians often fail to utilize the push button. • Some residents commented that some push buttons do not work. 		X	X		X	
3	<p>Limited pedestrian crossing time</p> <ul style="list-style-type: none"> • Some pedestrians, particularly hospital-goers using canes and wheelchairs, require more crossing time. • Pedestrian crossing time seems short. 		X	X		X	
4	<p>Poorly visible and located crosswalks</p> <ul style="list-style-type: none"> • The crosswalk in the slip lane of the right turn onto eastbound West Market Street is out of the way and not very visible to oncoming motorists due to the curve. • Crosswalks at 65 Bergen Street lead to a driveway entrance. 			X	X		
6	<p>Sidewalks not ADA compliant</p> <p>Sections of sidewalks are uneven, broken, or have obstacles like open grates.</p>	X			X		
7	<p>Noncompliant pedestrian push buttons</p>		X				X
8	<p>Left-turn vehicle-pedestrian crashes</p> <p>Three left-turn pedestrian crashes occurred near the northeast corner. The northwest and southwest corners also experienced left-turn pedestrian crashes over the three-year time interval.</p>					x	



Why don't pedestrians use the crosswalks?

Crosswalks alert motorists to potential pedestrian street crossings. Crosswalk installation can reduce crashes by 37 percent¹ or more, depending in part on crosswalk quality and visibility. Yet many pedestrians choose not to cross in the designated crosswalk, creating a safety hazard for both themselves and motorists. The RSA team noticed this risky behavior as pedestrians crossing Bergen Street both north and south of 12th Avenue, and area residents reported similar behavior near the Pathmark entrance. While discussing the site, it was recognized that perhaps the distances between signalized intersections is too great and that perhaps pedestrians choose to cross illegally to cut down on trip distance and time. The images below show the path required to cross at the signalized intersection (yellow) and the preferred pedestrian path (orange). To cross at a designated crosswalk near the emergency room exit, the pedestrians pictured must add five minutes or more to their journey. To cross from the parking



lot between 12th Avenue and West Market Street, the pedestrian must travel approximately four minutes out of their way. The street grid surrounding the hospital gives pedestrians more opportunities to cross at legal, signalized crosswalks; however, the two blocks on which the hospital is located have been consolidated into large “super blocks” that facilitate vehicular movements but significantly reduce safe crossing options for pedestrians.



¹http://www.cmfclearinghouse.org/study_detail.cfm?stid=73

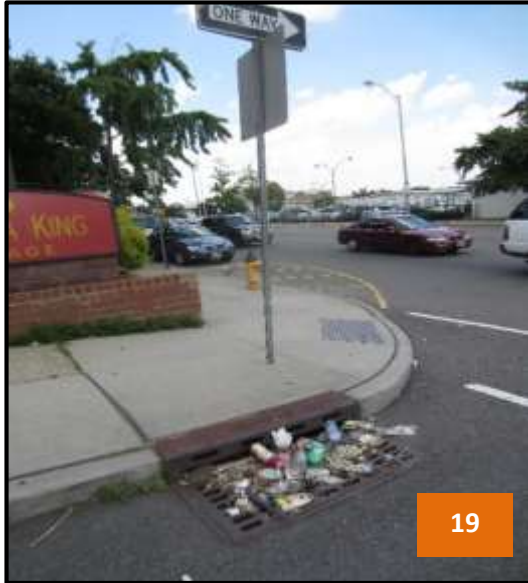


Congested intersections		Corridor	West Market Street	Cabinet Street	65 Bergen Street	12 th Avenue	ER Hospital Entrance
9	<p>Queuing during periods of heavy traffic</p> <ul style="list-style-type: none"> Vehicles turning left from southbound Bergen Street into parking lot between Cabinet and West Market Street causes queuing. The official single lane is quite wide, prompting vehicles to pass between queuing traffic and parking lanes. Bergen Street receives lots of traffic from I-280. Hospital expansions generate more traffic, making it less suitable for foot traffic. 	X				X	
10	<p>Confusing or too wide of lane width</p> <ul style="list-style-type: none"> Southbound approach to 12th Avenue intersection has one left-turning lane and one combined through and right-turn lane; however, the single through/right lane is often treated like two lanes: one through and one right turn, causing drivers to make two lanes where there is legally only one lane, which in turn leads to many merging accidents (rear ends, side swipes, etc.). Difficult for bus to turn at 12th Avenue if can't use whole lane. 		X		X		
11	<p>Improper use of back-out lane at angled parking</p> <ul style="list-style-type: none"> Back-out lane for parking at 65 Bergen Street is frequently treated as a through travel lane. When the "lane" ends, vehicles must either merge or crowd into the illegal right turn lane. 				X		
12	<p>Blocked intersection box</p> <ul style="list-style-type: none"> Traffic lights along West Market Street are not coordinated between Central Avenue and Bergen Street. 		X	X			
13	<p>EMS struggle through intersection</p>	X	X			X	
14	<p>Too many vehicles because people driving short distances</p> <p>A RSA participant noted that many hospital employees drive rather than walk the short distances to nearby stores, which contributes to the heavy vehicular traffic.</p>					X	
15	<p>Cars parked in or too near intersection</p> <ul style="list-style-type: none"> On-street parking blocks drivers line of sight when exiting driveway at hospital entrance. Parked cars block intersection at Cabinet Street and impede pedestrian crossing area. Cars parked illegally east of West Market Street intersection. The city has put up signs, but they are continuously removed. 		x	x		x	x
16	<p>Vehicles leaving driveways causing shadow crashes</p> <ul style="list-style-type: none"> Left-turning onto West Market Street from McDonald's parking lot. Vehicles turning right from 65 Bergen Street. Vehicles turning right or left from Cabinet Street. 		X	X	X		x

Intersection phasing		Corridor	West Market Street	Cabinet Street	65 Bergen Street	12 th Avenue	ER Hospital Entrance
17	<p>Left turn is not protected</p> <ul style="list-style-type: none"> West Market Street intersection currently has a lead protected-permitted signalization on the Bergen Street approaches and permitted on West Market Street approaches. 12th Avenue currently has split-phasing on the Bergen Street approaches and permitted left turns on the 12th Avenue approaches. Four pedestrian crashes involved left-turning movements from the 12th Avenue approaches. 		X			X	
18	Yellow and all-red times can be reviewed.		X	X		X	



Maintenance issues		Corridor	West Market Street	Cabinet Street	65 Bergen Street	12 th Avenue	ER Hospital Entrance
19	<p>Abandoned utilities</p> <ul style="list-style-type: none"> Mast arm bases Old grates Abandoned gate posts on Cabinet Street 	X	X	X		X	
20	<p>Missing or damaged signs</p> <ul style="list-style-type: none"> Sign at the westbound West Market Street appears to have been run over. 		X				
21	<p>Inadequate bus stop</p> <p>The stop is poorly placed on a gravel patch with no shelter.</p>					X	
22	Faded pavement markings (lanes and crosswalks)	X	X	X		X	



Distracted or careless driving		Corridor	West Market Street	Cabinet Street	65 Bergen Street	12 th Avenue	ER Hospital Entrance
23	Sign clutter or lack of signage <ul style="list-style-type: none"> • Signage to the entrance of the hospital is confusing, and many people circle around trying to find their destination or are distracted because they are looking for signage. • Northbound Bergen—duplication of lane signs. 	X				X	X
24	Vehicles appear to be speeding	X					

Other		Corridor	West Market Street	Cabinet Street	65 Bergen Street	12 th Avenue	ER Hospital Entrance
25	Sun glare At eastbound West Market Street as approaching the intersection.		X				
26	Pathmark shopping center has confusing driveway entrance						

Implementing Recommendations

The RSA team's recommendations suggested in this report should improve the safety of the three intersections along Bergen Street selected for investigation in the city of Newark. All of the recommendations fall under city of Newark roadway jurisdiction, and any potential projects generated from this report would be led by the city of Newark.

Many of the recommendations contained within this report can be implemented through routine maintenance, such as trimming vegetation and maintaining sign/pavement conditions, etc., while others will take more time and investment. Recognizing limited resources and developing partnerships can help to extend the impact of safety efforts. Rutgers' TSRC can provide support to municipalities and counties in identifying partnership opportunities. North Jersey Transportation Planning Authority (NJTPA) staff also provides a great partnership to assist with analysis with respect to crash data, capacity analysis, or any other related assistance.

Some of the recommendations may require sizable capital investment to obtain a long-term safety benefit. It is understood that larger projects may require funding assistance from nonmunicipal funds. In the section following the summary of recommendations, various potential funding sources are listed.

In addition to physical improvements, a combined effort of public education and police enforcement is necessary to make these intersections a safer place for all its users. To that end, the NJTPA will be piloting a pedestrian safety education program in Newark (as well as four other locations). This effort will seek to educate both motorists and pedestrians about their roles and responsibilities for safely sharing the road as well as increasing their awareness of and compliance with pedestrian safety laws. Both paid and earned media, including grassroots outreach (e.g., distribution of educational materials through street contacts, community and workplace presentations, in-school programs), will be used to reach both audiences with key safety messages.

The campaign will also include enforcement. Enforcement addressing parking, excessive speed, pedestrian right-of-way distraction, and jay walking can help to reduce crashes and alert drivers and pedestrians of the importance of being safety conscious. Officers may also hand out pamphlets during routine motor vehicle or pedestrian-specific traffic stops to educate roadway users about traffic safety laws.

Key:

\$ = Low cost

\$\$ = Medium cost

\$\$\$ = High cost

PSC = FHWA Proven Safety Countermeasure

CMF = Crash Modification Factor

A – Improve Pedestrian Accommodations

Issue #	Issue	Cost	Safety Benefit
Short Term			
A-1	The addition of pedestrian way-finding signs to clearly direct pedestrians may increase safer pedestrian behavior.	\$	Medium/High
A-2	Replace worn and missing striping with pavement markings in conformance with the MUTCD, while keeping style of crosswalk striping consistent throughout corridor. CMF 4123=0.6 for vehicle/pedestrian and all severity crashes; install high-visibility crosswalk http://www.cmfclearinghouse.org/detail.cfm?facid=4123	\$	High
A-3	Consider installing the missing crosswalks across Bergen Street where it intersects with Cabinet Street. CMF 4123=0.6 for vehicle/pedestrian and all severity crashes; install high-visibility crosswalk http://www.cmfclearinghouse.org/detail.cfm?facid=4123	\$	High
A-4	Employ a crossing guard at the West Market Street intersection. The intersection used to have a police officer stationed there during high-traffic times.	\$\$	Medium
A-13	Prevent vehicles from parking near intersection to allow for greater intersection visibility, possibly with plastic bollards. CMF 153=0.8 for serious and minor injury; CMF 154=0.73 for PDO; prohibit on-street parking http://www.cmfclearinghouse.org/detail.cfm?facid=153	\$	Medium
Medium Term			
A-5	Look into upgrading signal heads to have automated activation for pedestrian crossings.	\$\$	High
A-7	Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks. CMF 1786=0.63 for all crash types and severity, install pedestrian crossing (signed and marked with curb ramps and extensions) http://www.cmfclearinghouse.org/study_detail.cfm?stid=73	\$\$	Medium
A-8	Consider the installation of a midblock mountable pedestrian refuge island in a new marked crosswalk between Cabinet Street and West Market Street. PSC : Medians and pedestrian refuge areas in urban and suburban areas CMF 1811=0.31, install raised median (unsignalized intersection) http://www.cmfclearinghouse.org/study_detail.cfm?stid=73 CMF 1815=0.44, install refuge islands http://www.cmfclearinghouse.org/study_detail.cfm?stid=73	\$\$\$	Medium/High
A-9	Consider upgrading pedestrian heads to countdown timers.	\$\$	High
A-10	Consider creating a signal phase solely for pedestrians (a Barnes dance) at 12 th Avenue and Bergen Street. CMF 4117=0.49 for vehicle/pedestrian and all severity crashes, implement Barnes dance http://www.cmfclearinghouse.org/detail.cfm?facid=4117	\$	Medium/High

Long Term			
A-11	Consider the needs of pedestrian and ADA compliancy to complete a sidewalk audit to assess what sections of sidewalk need to be repaired or repaved. PSC: Walkways	\$\$	High
A-12	Reconfigure the crosswalk to reflect pedestrian desire lines at West Market Street and Bergen Street (i.e., place the crosswalk in line with the sidewalk).	\$\$	Medium



A median provides added safety for pedestrians but may make it more difficult for emergency vehicle movement. One possible way to make a median more accommodating for emergency vehicles is to make it “mountable” like the one pictured above in Princeton, N.J., at the intersection of Route 27 and Mercer Street.

Concerns Addressed:	
1	Large distances between designated crosswalks, causing pedestrians to cross Bergen Street outside of designated areas
2	Pedestrians crossing against signal
3	Limited pedestrian crossing time
4	Poorly visible and located crosswalks
6	Sidewalks not ADA compliant
7	Non-compliant pedestrian push buttons
22	Faded pavement markings (lanes and crosswalks)
24	Vehicles appear to be speeding
15	Cars parked in or too near intersections
28	Intersection visibility

B – Improve safe Vehicle Flow at West Market Street and 12th Avenue Intersections

Issue #	Issue	Cost	Safety Benefit
Short Term			
B-1	Schedule the realignment of the pedestrian push buttons in conformance with the MUTCD.	\$	Low
B-2	Evaluate the signal timing (including pedestrian signals), and consider revising the timing to improve traffic operations.	\$	Medium
B-3	Consider the installation of backplates with retroreflective borders. PSC: Backplates with retroreflective borders CMF =0.85 for “All” crashes; Add 3-inch yellow retroreflective sheeting to signal backplates http://www.cmfclearinghouse.org/study_detail.cfm?stid=85	\$	Medium
B-6	Paint "No Parking" on the street east of intersection CMF 153=0.8 for serious and minor injury; CMF 154=0.73 for PDO; Prohibit on-street parking http://www.cmfclearinghouse.org/detail.cfm?facid=153	\$	Medium/ High
B-20	Re-time signals between Central Street and West Market Street for coordination of traffic flow.	\$	Low
Medium Term			
B-7	Consider upgrading the signal heads to 12" LED. CMF 1430 & 1434=0.93 for all crashes and all severity, Improve visibility of signal heads; http://www.cmfclearinghouse.org/study_detail.cfm?stid=83 ; CMF 1411=0.69 for all crash type and severity, Add additional signal and upgrade to 12-inch lenses http://www.cmfclearinghouse.org/detail.cfm?facid=1411	\$	Medium
B-9	Review the current change and clearance intervals – and if applicable, increase to meet current standards. CMF 4211= 0.798 for all crashes and all severity, Increase all red clearance interval http://www.cmfclearinghouse.org/detail.cfm?facid=4211	\$	Medium
B-11	Install signage prior to curve at West Market Street to alert motorists to potential pedestrian presence	\$\$	Low/ Medium
B-13	Define and narrow the travel Bergen Street SB lane, possibly by extending the bike lane that currently ends on 1 st Street just north of West Market Street PSC: Road Diet; CMF 4656=0.944 for all crashes and all severity, Install bike lanes http://www.cmfclearinghouse.org/detail.cfm?facid=4656	\$\$	High
B-14	A lane drop marking to caution drivers that a lane drop is occurring further down the road.	\$\$	Low/ Medium
B-15	Add "Do Not Block the Box" sign at intersection and provide enforcement	\$	Low

B-16	Consult access agreement and consider installing a “No Left Turn” sign at the McDonald’s entrance on West Market Street and in possibly in the long run, construct a concrete median there if motorists ignore the signage CMF 391=0.32 for all crash type and severity, Prohibit left-turns with “No Left Turn” sign http://www.cmclearinghouse.org/detail.cfm?facid=391	\$	Medium
Long Term			
B-22	Road Diet on Bergen NB before McDonalds	\$\$	High
B-23	Head to head left turns at West Market Street offer a protected movement that may reduce shadow issues CMF 4576=0.01 for left turn and all severity crashes, Change left-turn phase to protected phasing on one or more approaches http://www.cmclearinghouse.org/detail.cfm?facid=4576	\$\$\$	High

Concerns Addressed:	
7	Non-compliant pedestrian push buttons
9	Queuing during periods of heavy traffic
10	Mismatched lanes through intersections
12	Blocked intersection box
15	Illegal parking near intersections
16	Vehicles leaving driveways causing shadow crashes
17	Left turn is not protected
18	Yellow and red times not sufficient
19	Abandoned utilities
23	Sign clutter or lack of signage
25	Sun glare



Current condition



With proposed improvements

With bike lanes, high visibility crosswalks, curb extensions, additional street amenities, and median (though not “mountable,” as may be optimal).

C – Improve 12th Avenue Intersection and Southbound Approach

Issue #	Issue	Cost	Safety Benefit
Short Term			
C-2	Evaluate the signal timing, and consider revising the timing to improve traffic operations.	\$	Medium
C-12	Consider the installation of Backplates with Retroreflective Borders. PSC: Backplates with retroreflective border CMF 1410=0.85; add 3-inch yellow retroreflective sheeting to signal backplates http://www.cmfclearinghouse.org/detail.cfm?facid=1410	\$	Medium
C-3	Consider the installation of backplates with retroreflective borders. CMF 4110=0.85; add 3-inch yellow retroreflective sheeting to signal backplates http://www.cmfclearinghouse.org/study_detail.cfm?stid=85	\$	Medium
Medium Term			
C-5	Consider upgrading the signal heads to 12-inch LED. CMF 1411=0.69 for all crash type and severity, add additional signal and upgrade to 12-inch lenses http://www.cmfclearinghouse.org/detail.cfm?facid=1411	\$\$	Medium
C-6	Evaluate the signal timing, and consider revising the timing to improve traffic operations	\$	Medium
C-7	Review the current change and clearance intervals—and, if applicable, increase to meet current standards.	\$	Medium
C-9	Install a lane drop marking to caution drivers that a lane drop is occurring further down the road.	\$\$	Medium
C-1	Explore ways to narrow the southbound through-lane at 12 th Avenue as it approaches the intersection (e.g., paint, bulb-out.)		
Long Term			
C-10	Consider the installation of countdown pedestrian heads.	\$\$	Medium
C-11	Schedule the realignment of the pedestrian push buttons in conformance with the MUTCD.	\$	Low
C-13	Only allow one lane to enter the intersection, and have the other lane be right-turn only.	\$\$	Medium
C-15	Change permitted left turn to dedicated left turn on southbound Bergen Street CMF 4140=0.58 for all crash type and severity, change permissive left-turn phasing to protected only or protective/permissive http://www.cmfclearinghouse.org/detail.cfm?facid=4140	\$\$	High
C-16	Consider relocating food trucks to accommodate wide-turning vehicles.	\$	Low

Concerns Addressed:	
1	Pedestrians crossing against signal
2	Pedestrians crossing against signal
4	Poorly visible and located crosswalks
6	Sidewalks not ADA compliant
7	Noncompliant pedestrian push buttons
9	Queuing during periods of heavy traffic
10	Mismatched lanes through intersections
12	Blocked intersection box
16	Vehicles leaving driveways causing shadow crashes
17	Left turn is not protected
18	Yellow and red times not sufficient
20	Missing or damaged signs
30	Many pedestrian accidents at the 12th Avenue intersection
13	EMS struggle through intersection
30	Many pedestrian accidents at the 12th Avenue intersection
11	Improper use of back-out lane at angled parking



With bike lanes, high visibility crosswalks, curb extensions, additional street amenities, countdown times, and removal of angled parking.

D – Improvements at Cabinet Street Intersection

Issue #	Issue	Cost	Safety Benefit
Short Term			
D-1	Remove illegal parking.	\$	High
D-2	Stripe a crosswalk. CMF 4123=0.6 for vehicle/pedestrian and all severity crashes; install high-visibility crosswalk http://www.cmfclearinghouse.org/detail.cfm?facid=4123	\$	High
D-3	Implement a “No Left Turn” from Cabinet Street. CMF 391=0.32 for all crash type and severity, prohibit left turns with “No Left Turn” sign http://www.cmfclearinghouse.org/detail.cfm?facid=391	\$\$	High
D-4	Increase sight triangle at intersection, possibly by daylighting corners with flexible bollards. CMF 1637=0.44 for all crashes and fatal severity, increase triangle sight distance http://www.cmfclearinghouse.org/detail.cfm?facid=1637 CMF 1752=0.51 for all crash type and severity, restrict parking near intersections (to off-street) http://www.cmfclearinghouse.org/study_detail.cfm?stid=73	\$	High
Medium Term			
D-5	Remove old, abandoned gate posts on Cabinet Street.	\$\$	High

Concerns Addressed:	
1	Large distances between designated crosswalks, causing pedestrians to cross Bergen Street outside of designated areas
4	Poorly visible and located crosswalks
6	Sidewalks not ADA compliant
5	Parked cars in intersection fail to cue drivers to potential pedestrian crossings at Cabinet Street
11	Improper use of back-out lane at angled parking
15	Illegal parking near intersections
22	Abandoned gate
29	Illegally parked cars block sight distance.

E – Corridor Improvements

Issue #	Issue	Cost	Safety Benefit
Short Term			
E-1	Conduct traffic counts as part of a large corridor study to better understand how many lanes are actually needed since the cross section seems too wide and support a resulting “road diet.”	\$\$	Medium
Medium Term			
E-2	Stripe a midblock crossing between Cabinet and West Market Streets.	\$\$	High
E-3	Conduct sidewalk inventory as part of a larger corridor study.	\$	High
E-4	Stripe bike lanes on the street that may also be utilized by wheelchair users.	\$\$	High
E-5	Restrict parking along west curb of Bergen Street during peak traffic hours.	\$\$	Medium
E-6	Use texturized paint to distinguish the parking area and back-up lane from a travel lane.	\$\$	Low/ Medium
E-7	Install bus shelter.	\$\$	Low
E-8	Consolidate traffic signs and add additional way finding signs for campus and hospital. CMF 2449= 0.984 for all crash types and severity http://www.cmfclearinghouse.org/detail.cfm?facid=2449 ; CMF 2453=0.897 for sideswipe and all severity crashes http://www.cmfclearinghouse.org/detail.cfm?facid=2453	\$\$\$	Medium
Long Term			
E-9	Construct a refuge median for pedestrians to cross Bergen Street. PSC: Medians and pedestrian refuge areas in urban and suburban areas CMF 3095= 0.97 presence of median http://www.cmfclearinghouse.org/detail.cfm?facid=3095	\$\$\$	High
E-10	Install RFF beacon for pedestrians. PSC: Pedestrian hybrid beacon CMF 2911=0.712 for all crashes and all severity; installation of a High-intensity Activated crossWalk (HAWK) (pedestrian-activated beacon) at an intersection http://www.cmfclearinghouse.org/detail.cfm?facid=2911	\$\$	High
E-11	Relocate driveway entrance at 65 Bergen Street, and restripe crosswalk to not intersect with driveway entrance.	\$\$\$	Medium
E-12	Repave, widen, and remove obstacles from sidewalks. PSC: Walkways	\$\$	High
E-14	Address safety concerns associated with angled parking lot at 65 Bergen Street. Suggestions to increase safety include: a. Restripe to reverse-angled parking. b. Remove parking and associated back out lane at 65 Bergen Street, and convert to parallel parking. CMF 165=0.72 for all crash type and severity, convert angle parking to parallel parking http://www.cmfclearinghouse.org/detail.cfm?facid=165	\$\$ \$\$\$	Medium/ High

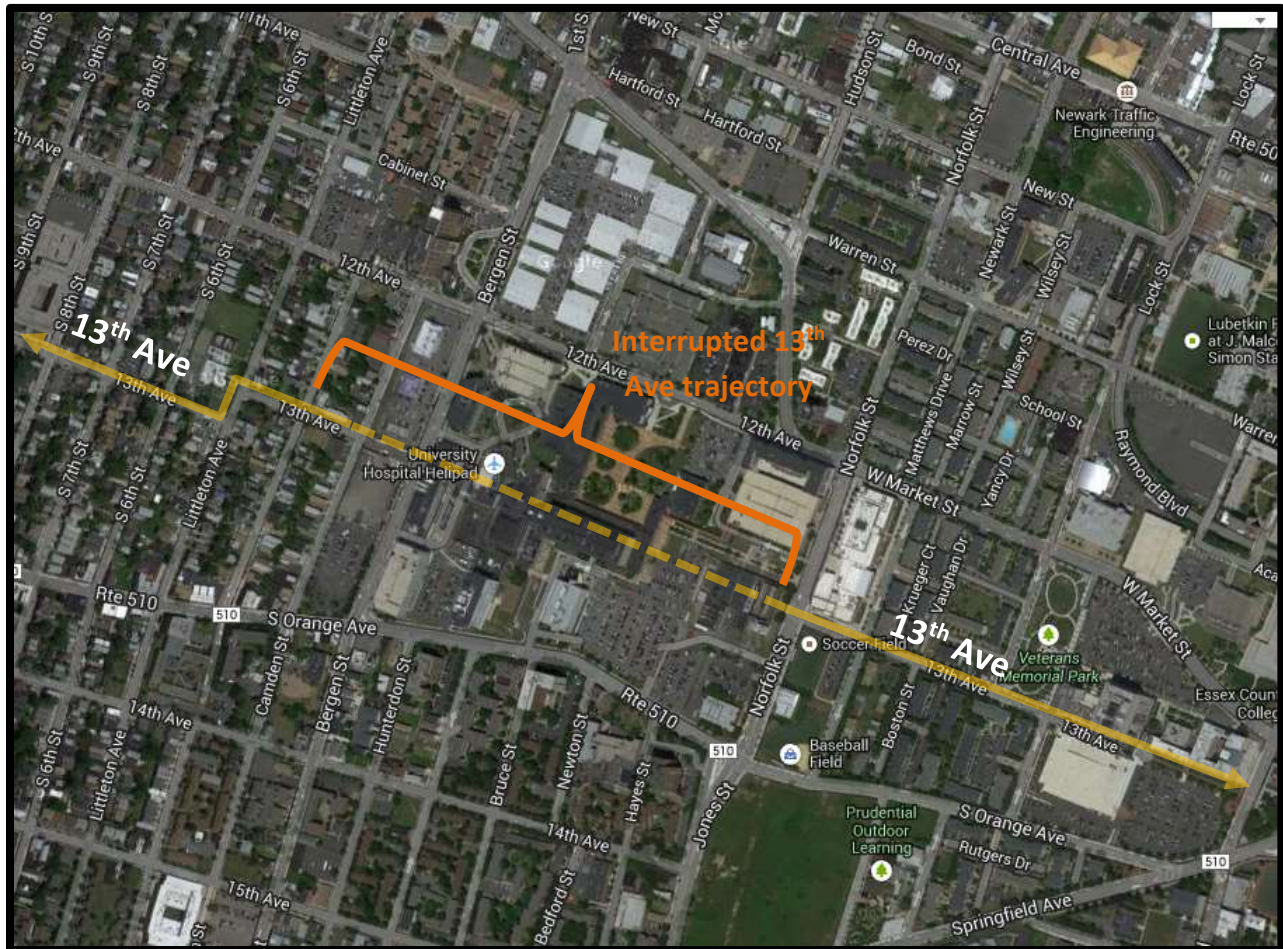
	c. Hatch or construct a mountable a bulb-out at the beginning of the parking area.	\$\$	Medium
E-13	Reconfigure parking lot opening so that entry/exit goes through back gate of lot on 12th Avenue instead of onto Bergen Street.	\$\$	High
E-18	Conduct a traffic study of the area and incorporate emerging or existing patterns into long-term plan for the area.	\$\$	High
E-19	Add additional speed limit signs.	\$	Low/ Medium

Concerns Addressed:		
1	Large distances between designated crosswalks, causing pedestrians to cross Bergen outside of designated areas	
4	Poorly visible and located crosswalks	
6	Sidewalks not ADA compliant	
9	Queuing during periods of heavy traffic	
10	Mismatched lanes through intersections	
16	Vehicles leaving driveways causing shadow crashes	
23	Faded pavement markings (lanes and crosswalks)	
24	Sign clutter or lack of signage	
25	Vehicles appear to be speeding	

F – Emergency Room Entrance

Issue #	Issue	Cost	Safety Benefit
Short Term			
F-1	Install crosswalk across driveway at hospital. CMF 4123=0.6 for vehicle/pedestrian and all severity crashes; install high-visibility crosswalk http://www.cmfclearinghouse.org/detail.cfm?facid=4123	\$	Medium/ High
F-2	“Daylight” corners with flexible bollards. CMF 1637=0.44 for all crashes and fatal severity, increase triangle sight distance http://www.cmfclearinghouse.org/detail.cfm?facid=1637 CMF 1752=0.51 for all crash type and severity, restrict parking near intersections (to off-street)	\$	High
Medium Term			
F-3	Install way finding signage to better communicate to vehicles the location of hospital entrances. CMF 2449= 0.984 for all crash types and severity; CMF 2453=0.897 for sideswipe and all severity crashes http://www.cmfclearinghouse.org/study_detail.cfm?stid=164	\$\$	Medium

Long Term			
F-4	Develop a preemption system for EMS vehicles.	\$\$\$	Medium
E-9	Construct a new, marked crosswalk with a refuge median for pedestrians to safely cross Bergen Street between 12 th Avenue and South Orange Avenue. This midblock crossing would reflect the grid of the surrounding neighborhood more accurately by continuing the 13 th Avenue trajectory. PSC: Medians and pedestrian refuge areas in urban and suburban areas CMF 4123=0.6 for vehicle/pedestrian and all severity crashes; install high-visibility crosswalk http://www.cmfclearinghouse.org/detail.cfm?facid=4123	\$\$\$	High



Concerns Addressed:	
24	Sign clutter or lack of signage
4	Poorly visible and located crosswalks

Potential Funding Sources

In this economy, budget constraints may hamper the implementation of some of these recommendations. Finding alternative funding sources is critical to ensuring the investment in the safety of the intersections' users.

Local Funding Sources:

Roadway Owner's Maintenance and Operation Budget:

Existing funds from local and county sources, as appropriate, which are allocated for investment in maintenance and operational activity, can be used to implement the above suggestions. Many of the above countermeasures may be eligible for the appropriate use of these existing funds. The manager of these funds who understands the full budget picture should be consulted.

State Funding Sources:

LOCAL AID

Contact:

NJDOT Local Aid District 2, Newark (Bergen, Essex, Hudson, Union)

153 Halsey Street - 5th floor
Newark, NJ 07102
Phone: 973-877-1500
Fax: 973-877-1556

MUNICIPAL AID/URBAN AID PROGRAM (NJDOT Local Aid):

<http://www.state.nj.us/transportation/business/localaid/municaid.shtm>

This program has been a significant resource for municipalities in funding local transportation projects. All municipalities are eligible. The department continues to encourage municipalities to consider using the Municipal Aid Program to fund projects such as resurfacing, rehabilitation or reconstruction, and signalization.

LOCAL AID INFRASTRUCTURE FUND (Discretionary Aid):

<http://www.state.nj.us/transportation/business/localaid/descrfunding.shtm>

Subject to funding appropriation, a discretionary fund is established to address emergencies and regional needs throughout the state. Any county or municipality may apply at any time. These projects are approved at the discretion of the commissioner. Payment of project costs is the same

as the Municipal Aid Program. Under this program a county or municipality may also apply for funding for local pedestrian safety and bikeway projects.

SAFE STREETS TO TRANSIT:

<http://www.state.nj.us/transportation/business/localaid/safe.shtm>

This program provides funding to counties and municipalities in improving access to transit facilities and all modes of public transportation. The objectives of the SSTT program are:

- To improve the overall safety and accessibility for mass transit riders walking to transit facilities.
- To encourage mass transit users to walk to transit stations.
- To facilitate the implementation of projects and activities that will improve safety in the vicinity of transit facilities (approximately one-half mile for pedestrian improvements).

BIKEWAY:

<http://www.state.nj.us/transportation/business/localaid/bikewaysf.shtm>

The NJDOT Bikeway Grant Program provides funds to counties and municipalities to promote bicycling as an alternate mode of transportation in New Jersey. A primary objective of the Bikeway Grant Program is to support the state's goal of constructing 1,000 new miles of dedicated bike paths. This program is available to every municipality and county throughout New Jersey.

TRANSIT VILLAGES:

<http://www.state.nj.us/transportation/business/localaid/transitvillagef.shtm>

The Transit Village Grant Program is designed to assist municipalities who have been formally designated as Transit Villages. These are municipalities that have made a commitment to grow in the area surrounding a transit facility. The facility can service commuter rail, bus, ferry, or light rail. It funds projects within a half-mile radius of major transit facilities.

Contact:

Monica Etz
Principal Planner Transportation
NJDOT Statewide Planner

NEW JERSEY DEPARTMENT OF COMMUNITY AFFAIRS

COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG)

<http://www.nj.gov/dca/divisions/dhcr/offices/cdbg.html>

This grant provides funds for economic development, housing rehabilitation, community revitalization, and public facilities designated to benefit people of low and moderate income, to prevent or eliminate slums and blight, or to address recent local needs for which no other source of funding is available.

Contact:

New Jersey Department of Community Affairs
101 South Broad Street
PO Box 811, 5TH Floor
Trenton, NJ 08625-0800
Terry Schrider
Phone: 609-633-6283
Email: terence.schrider@dca.state.nj.us

Federal Funding Sources – via NJDOT Office of Local Aid:

Contact (see details under State Funding section):

NJDOT Local Aid District 2, Newark (Bergen, Essex, Hudson, Union)

SAFE ROUTES TO SCHOOLS (SRTS):

<http://www.state.nj.us/transportation/business/localaid/srts.shtm>

The Safe Routes to Schools Program (SRTS) is a federally funded program and is administered by the State Departments of Transportation. This program provides funds to substantially improve the ability of primary and middle school students to walk and bicycle to school safely.

The purposes of the program are:

- to enable and encourage children, including those with disabilities, to walk and bicycle to school;
- to make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age;

- to facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity (approximately two miles) of primary and middle schools (grades K through 8).

The program establishes two distinct types of funding opportunities: infrastructure projects (the planning, design, and construction of engineering improvements) and noninfrastructure related activities (such as education, enforcement, and encouragement programs).

Contact:

Elise M Bremer-Nei
(609) 530-2765
elise.bremer-nei@dot.state.nj.us
Supervising Planner Transportation, NJDOT
Statewide Planning

via North Jersey Transportation Planning Authority (NJTPA):

Contact:

North Jersey Transportation Planning Authority
One Newark Center, 17th Floor
Newark, NJ 07102
Phone: 973-639-8400
Fax: 973-639-1953

LOCAL SAFETY PROGRAM:

http://www.njtpa.org/Project/Devel/local_safety/default.aspx

The federally funded Local Safety Program (LSP) is a component of wider safety planning at the NJTPA, supporting construction of quick-fix, high-impact safety improvements on county and local roadway facilities in the NJTPA region. Projects supported by this program include new and upgraded traffic signals, signage, pedestrian indications, crosswalks, curb ramps, pavement markings, and other improvements to increase the safety of drivers, bicyclists, and pedestrians.

The Local Safety Program:

- typically addresses NJTPA and/or NJDOT derived high-priority crash locations on county or local roadways;

- supports quick-fix projects, backed with detailed crash data, with minimal or no environmental or cultural resource impacts (eligible for programmatic categorical exclusion from FHWA);
- funds the construction phase of work only—planning, design, and right-of-way acquisition are the responsibility of the sponsor.

LOCAL CMAQ MOBILITY INITIATIVES:

<http://www.njtpa.org/Project/Mobility/Default.aspx>

The NJTPA has established the CMAQ Local Mobility Initiatives Program to promote a variety of initiatives to lessen the level of pollutants and greenhouse gases generated through the use of fossil fuels, including ridesharing, transit usage, travel demand management, and traffic mitigation projects. Proposals must implement strategies and policies in the Regional Transportation Plan, Plan 2040.

THE HIGH RISK RURAL ROADS PROGRAM

http://www.njtpa.org/Project/Devel/local_safety/default.aspx

High Risk Rural Roads Program (HRRRP) provides federal funds for construction improvements to address safety problems *ONLY on roadways that are functionally classified as rural major collector, rural minor collector, or rural local roads and have a crash rate that exceeds the statewide average for those functional classes of roadways*. Projects supported by this program have included skid-resistant surface treatments, guiderails, reflective pavement markings, rumbles strips and rumble stripes, safety edge, enhanced, and advanced warning signs.

This program funds the construction phase of work only, and therefore planning, design and right-of-way acquisitions are the responsibility of the sponsor

LOCAL CONCEPT DEVELOPMENT PHASE of the LOCAL CAPITAL PROJECT DELIVERY PROGRAM

http://www.njtpa.org/Project/Devel/local_capital_program/local_concept/default.aspx

The Local Capital Project Delivery Program (LCPD) provides federal funding for priority local projects. The LCD Phase involves drafting a well defined and well justified purpose and need statement focusing on the primary transportation need to be addressed. The LCD Phase elements include, but are not limited to, data collection, coordination, development of a reasonable number of prudent and feasible conceptual alternatives, and investigation of all aspects of a project: environmental, right-of-way (ROW), access, utilities, design, community involvement, constructability, etc., at a “planning level of effort,” and addressing requirements of the NJTPA Congestion Management Process (CMP).

SUBREGIONAL STUDIES Program

http://www.njtpa.org/Plan/Subregion/subregional_studies/default.aspx

This is a competitive program that provides two-year grants to individual sub-regions or sub-regional teams. The program is designed to assist sub-regions in refining and developing transportation improvement strategies rooted in the NJTPA's Regional Transportation Plan (RTP). Ultimately, the program aims to generate project concepts ready for further development or implementation consistent with the RTP and/or other transportation planning activities in the region.

TRANSPORTATION ALTERNATIVES PROGRAM

This is new under MAP-21 and is currently under development at the NJDOT.

<http://www.fhwa.dot.gov/map21/guidance/guidetap.cfm>

The Transportation Alternatives Program (TAP) provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving nondriver access to public transportation, and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for the planning, design, or construction of boulevards and other roadways largely in the right-of-way of former interstate system routes or other divided highways.

Federal Funding Sources – via NJ Department of Highway Traffic Safety:

<http://www.nj.gov/oag/hts/grants/index.html>

The NJ Division of Highway Traffic Safety offers, on an annual basis, federal grant funding to agencies that wish to undertake programs designed to reduce motor vehicle crashes, injuries, and fatalities on the roads of New Jersey. Municipal, county, state government, and law-enforcement agencies, as well as nonprofit organizations, are encouraged to apply for NJDHTS grant funding to address specific, local traffic safety issues.

Contact:

Bob Gaydosh, North Region Supervisor
609-633-9022
robert.gaydosh@lps.state.nj.us

Appendix A – Raw Crash Data

West Market Street & Bergen Street

CRASH DATE	CRASH TIME	CRASH TYPE	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
1/14/2009	3:15 PM	Opposite Direction – Head On/Angular	PDO	Daylight	0	Dry	0	4
1/17/2009	9:35 PM	Same Direction – Rear End	PDO	Dark (street lights on/continuous)	0	Dry	0	2
1/20/2009	6:15 PM	Same Direction – Rear End	PDO	Dusk	0	Icy	0	2
1/21/2009	2:13 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
1/29/2009	4:20 PM	Right Angle	Moderate Injury	Daylight	0	Dry	4	3
2/6/2009	9:49 AM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
2/13/2009	7:56 PM	Left Turn / U-Turn	PDO	Unknown	0	Wet	0	2
2/19/2009	10:10 AM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
3/6/2009	10:25 AM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
4/4/2009	5:35 PM	Same Direction – Rear End	Moderate Injury	Daylight	0	Dry	1	2
4/7/2009	8:00 AM	Right Angle	Moderate Injury	Daylight	0	Dry	2	2
4/13/2009	5:25 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
5/4/2009	3:22 PM	Right Angle	PDO	Daylight	0	Wet	0	2
5/5/2009	4:30 PM	Right Angle	Moderate Injury	Daylight	0	Wet	3	3
5/13/2009	2:10 PM	Same Direction – Rear End	Moderate Injury	Daylight	0	Dry	1	2

CRASH DATE	CRASH TIME	CRASH TYPE	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
5/16/2009	12:00 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
5/28/2009	11:45 AM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
5/28/2009	4:55 PM	Pedestrian	Moderate Injury	Daylight	1	Dry	1	1
6/1/2009	12:05 AM	Right Angle	PDO	Dark (street lights on/continuous)	0	Dry	0	2
6/9/2009	5:20 PM	Same Direction – Rear End	Moderate Injury	Daylight	0	Dry	2	2
6/10/2009	2:25 AM	Fixed Object	PDO	Dark (street lights off)	0	Dry	0	1
6/15/2009	8:57 AM	Right Angle	Moderate Injury	Daylight	0	Dry	2	2
6/28/2009	2:41 AM	Same Direction – Rear End	Moderate Injury	Dark (street lights on/continuous)	0	Dry	3	2
7/1/2009	3:26 PM	Left Turn / U-Turn	Moderate Injury	Daylight	0	Dry	1	2
7/11/2009	11:50 PM	Left Turn / U-Turn	Moderate Injury	Dark (street lights on/continuous)	0	Wet	5	3
8/21/2009	5:05 PM	Right Angle	PDO	Dawn	0	Wet	0	2
8/30/2009	2:30 AM	Same Direction – Rear End	Moderate Injury	Dark (street lights on/continuous)	0	Wet	1	2
9/8/2009	8:26 AM	Same Direction – Rear End	Moderate Injury	Daylight	0	Dry	1	2
9/26/2009	8:30 AM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
11/12/2009	6:35 AM	Left Turn / U-Turn	Moderate Injury	Dawn	0	Dry	1	2
11/20/2009	11:31 AM	Right Angle	Moderate Injury	Daylight	0	Dry	1	2
12/10/2009	4:22 PM	Same Direction – Rear End	PDO	Dark (street lights on/continuous)	0	Dry	0	2

CRASH DATE	CRASH TIME	CRASH TYPE	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
12/12/2009	5:27 AM	Fixed Object	PDO	Dark (street lights on/continuous)	0	Dry	0	1
1/30/2010	9:00 PM	Same Direction – Side Swipe	PDO	Dark (street lights on/continuous)	0	Dry	0	2
3/12/2010	N/A	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
3/31/2010	10:57 AM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
4/16/2010	8:30 AM	Left Turn / U-Turn	PDO	Daylight	0	Dry	0	2
4/27/2010	10:00 PM	Right Angle	PDO	Dark (street lights on/spot)	0	Dry	0	2
5/10/2010	12:50 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
6/25/2010	7:10 PM	Left Turn / U-Turn	Moderate Injury	Daylight	0	Dry	1	2
7/12/2010	4:45 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	3
7/14/2010	9:37 AM	Opposite Direction – Head On/Angular	PDO	Daylight	0	Dry	0	2
7/30/2010	1:20 AM	Same Direction – Side Swipe	Moderate Injury	Dark (street lights on/continuous)	0	Dry	1	3
8/3/2010	1:21 PM	Left Turn / U-Turn	Moderate Injury	Daylight	0	Dry	2	2
8/14/2010	8:45 PM	Same Direction – Rear End	PDO	Dark (street lights on/continuous)	0	Dry	0	2
10/27/2010	5:14 PM	Right Angle	Moderate Injury	Daylight	0	Wet	2	2
12/9/2010	7:10 AM	Left Turn / U-Turn	PDO	Daylight	0	Dry	0	2
12/16/2010	N/A	Pedestrian	Moderate Injury	Daylight	1	Dry	1	1
1/1/2011	3:03 PM	Same Direction – Side Swipe	PDO	Daylight	0	Wet	0	2

CRASH DATE	CRASH TIME	CRASH TYPE	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
1/5/2011	11:45 AM	Right Angle	PDO	Daylight	0	Dry	0	2
1/18/2011	8:20 AM	Same Direction – Rear End	PDO	Daylight	0	Icy	0	2
2/17/2011	10:00 PM	Same Direction – Side Swipe	PDO	Dark (street lights on/continuous)	0	Dry	0	2
2/18/2011	5:34 PM	Left Turn / U-Turn	Moderate Injury	Daylight	0	Dry	1	2
3/4/2011	7:45 PM	Fixed Object	PDO	Dusk	0	Dry	0	1
3/16/2011	4:46 PM	Left Turn / U-Turn	PDO	Daylight	0	Dry	0	2
4/15/2011	2:59 PM	Right Angle	Moderate Injury	Daylight	0	Dry	1	2
4/20/2011	5:27 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
9/16/2011	4:40 PM	Pedestrian	Moderate Injury	Daylight	2	Dry	2	1
9/28/2011	7:00 AM	Right Angle	Moderate Injury	Daylight	0	Wet	2	2
10/3/2011	2:26 PM	Left Turn / U-Turn	Moderate Injury	Daylight	0	Dry	1	2
10/25/2011	12:05 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
11/11/2011	5:18 PM	Same Direction – Rear End	PDO	Dark (street lights on/continuous)	0	Dry	0	2
12/9/2011	2:50 PM	Left Turn / U-Turn	PDO	Daylight	0	Dry	0	2
12/12/2011	4:43 PM	Pedestrian	Moderate Injury	Daylight	1	Dry	1	1

Cabinet Street & Bergen Street

CRASH DATE	CRASH TIME	CRASH TYPE	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
3/24/2009	8:52 AM	Right Angle	PDO	Daylight	0	Dry	0	2
4/28/2009	12:27 PM	Right Angle	Moderate Injury	Daylight	0	Dry	1	2
6/2/2009	10:11 AM	Struck Parked Vehicle	PDO	Daylight	0	Dry	0	2
8/5/2009	2:27 PM	Right Angle	Moderate Injury	Daylight	0	Dry	1	2
9/11/2009		Right Angle	PDO	Daylight	0	Wet	0	2
9/15/2009	2:20 PM	Right Angle	Moderate Injury	Daylight	0	Dry	1	3
10/28/2009	10:49 AM	Right Angle	PDO	Daylight	0	Wet	0	2
11/10/2009	9:56 AM	Same Direction – Side Swipe	Moderate Injury	Daylight	0	Dry	3	2
6/9/2010	1:31 PM	Pedestrian	Moderate Injury	Daylight	1	Wet	1	1
1/11/2011	2:40 PM	Same Direction – Rear End	Moderate Injury	Daylight	0	Dry	1	2
1/25/2011	3:00 PM	Same Direction – Side Swipe	PDO	Daylight	0	Wet	0	2
1/25/2011	10:05 AM	Same Direction – Rear End	Moderate Injury	Daylight	0	Snowy	1	2
8/30/2011	2:36 PM	Same Direction – Side Swipe	Moderate Injury	Daylight	0	Dry	2	2

12th Avenue & Bergen Street

CRASH DATE	CRASH TIME	CRASH TYPE	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
3/18/2009	3:25 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
4/22/2009	12:55 PM	Right Angle	Moderate Injury	Daylight	0	Wet	3	2
4/27/2009	4:00 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
5/13/2009	4:02 PM	Right Angle	Moderate Injury	Daylight	0	Dry	1	2
5/29/2009	10:00 AM	Pedestrian	Moderate Injury	Daylight	1	Wet	1	1
6/3/2009	3:04 PM	Same Direction – Rear End	Moderate Injury	Daylight	0	Wet	4	5
6/5/2009	12:54 AM	Same Direction – Rear End	Moderate Injury	Dark (street lights on/spot)	0	Dry	3	2
6/29/2009	8:33 PM	Pedestrian	Moderate Injury	Dawn	1	Dry	1	1
10/22/2009	8:10 AM	Pedestrian	Moderate Injury	Daylight	1	Dry	1	1
10/26/2009	3:00 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
11/8/2009	10:30 PM	Same Direction – Rear End	PDO	Dark (street lights on/continuous)	0	Dry	0	2
11/20/2009	6:54 PM	Pedestrian	Moderate Injury	Dark (street lights on/continuous)	1	Dry	1	1
12/11/2009	9:15 AM	Same Direction – Side Swipe	Moderate Injury	Daylight	0	Dry	2	2
12/29/2009	11:50 AM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2

CRASH DATE	CRASH TIME	CRASH TYPE	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
1/7/2010	3:02 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
1/25/2010	9:50 AM	Right Angle	PDO	Daylight	0	Wet	0	2
2/2/2010	4:00 PM	Backing	PDO	Daylight	0	Dry	0	2
2/2/2010	10:15 AM	Pedestrian	Moderate Injury	Daylight	0	Dry	1	1
2/15/2010	9:24 AM	Right Angle	PDO	Daylight	0	Dry	0	2
3/15/2010	4:48 PM	Same Direction – Rear End	PDO	Daylight	0	Wet	0	2
4/5/2010	8:30 AM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
5/10/2010	3:00 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
5/13/2010	3:45 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
6/12/2010	4:10 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
6/13/2010	4:45 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
7/21/2010	11:00 PM	Same Direction – Rear End	Moderate Injury	Dark (street lights on/continuous)	0	Dry	2	3
8/16/2010	11:00 AM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
8/27/2010	12:47 PM	Same Direction – Rear End	Moderate Injury	Daylight	0	Dry	2	3
9/27/2010	5:35 PM	Struck Parked Vehicle	PDO	Daylight	0	Wet	0	2

CRASH DATE	CRASH TIME	CRASH TYPE	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
10/12/2010	7:55 AM	Pedestrian	Moderate Injury	Daylight	1	Dry	1	1
10/22/2010	9:50 AM	Right Angle	PDO	Daylight	0	Dry	0	2
10/28/2010	12:15 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
12/9/2010	4:20 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
12/14/2010	3:45 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
3/14/2011	4:30 PM	Pedestrian	PDO	Daylight	0	Dry	0	1
4/14/2011	6:55 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
6/25/2011	1:08 PM	Same Direction – Rear End	PDO	Daylight	0	Dry	0	2
7/26/2011	1:25 PM	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
7/26/2011	1:25 PM	Struck Parked Vehicle	PDO	Daylight	0	Dry	0	2
8/3/2011	1:26 PM	Pedestrian	Moderate Injury	Daylight	1	Dry	1	1
8/22/2011	N/A	Same Direction – Side Swipe	PDO	Daylight	0	Dry	0	2
9/30/2011	10:34 AM	Pedestrian	Moderate Injury	Daylight	1	Dry	1	1
10/23/2011	3:05 AM	Other	Moderate Injury	Dark (street lights on/continuous)	0	Dry	4	2

CRASH DATE	CRASH TIME	CRASH TYPE	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
11/11/2011	5:15 PM	Same Direction – Rear End	PDO	Dusk	0	Dry	0	3
12/14/2011	6:30 PM	Pedestrian	Moderate Injury	Dusk	1	Dry	1	1

Appendix B – Crash Diagrams

West Market Street & Bergen Street

Same Direction- Rear End

A	2/6/09	9:49 AM	O
A	5/28/09	11:45 AM	O
A	6/9/09	5:20 PM	B
A	6/28/09	2:41 AM	B
A	3/12/10		O
A	1/17/09	9:35 PM	O
Struck vehicle had stopped for EMS			

B	2/19/09	10:10 AM	O
B	3/31/10	10:57 AM	O
B	8/14/10	8:45 PM	O
B	1/18/11	8:20 AM	O
B	10/25/11	12:05 PM	O
B	4/4/09	5:35 PM	B
Striking vehicle was being pursued by police			

C	1/20/09	6:15 PM	O
C	1/21/09	2:13 PM	O
C	3/6/09	10:25 AM	O
C	7/12/10	4:45 PM	O

D	8/30/09	2:30 AM	B
D	12/10/09	4:22 PM	O
D	4/20/11	5:27 PM	O
D	5/13/09	2:10 PM	B
Struck vehicle had stopped for EMS			

E	11/11/11	5:18 PM	O
F	9/8/09	8:26 AM	B
G	5/16/09	12:00 PM	O
H	4/13/09	5:25 PM	O

Same Direction - Side Swipe

I	5/10/10	12:50 PM	O
I	2/17/11	10:00 PM	O
Bus involved			
J	9/26/09	8:30 AM	O
K	1/1/11	3:03 PM	O
Striking vehicle was being pursued by police			

L	1/30/10	9:00 PM	O
N	7/30/10	1:20 AM	B

Opposite Direction - Head On/Anular

M	7/14/10	9:37 AM	O
O	1/14/09	3:15 PM	O

Left Turn / U Turn

P	11/12/09	6:35 AM	B
P	6/25/10	7:10 PM	B
P	8/3/10	1:21 PM	B
P	3/16/11	4:46 PM	O
Q	7/1/09	3:26 PM	B
Q	2/18/11	5:34 PM	B
Q	12/9/11	2:50 PM	O
R	2/13/09	7:56 PM	O
R	7/11/09	11:50 PM	B
R	9/28/11	7:00 AM	B
Labeled as "right angle" in report			

S	4/16/10	8:30 AM	O
S	10/3/11	2:26 PM	B
S	6/15/09	8:57 AM	B
Labeled as "right angle" in report			

T	12/9/10	7:10 AM	O
---	---------	---------	---

Pedestrian

U	9/16/11	4:40 PM	B
2 girls ran across street to catch bus			
V	12/16/10		B
Ped ran across street to catch bus			
W	5/28/09	4:55 PM	B
X	12/12/11	4:43 PM	B

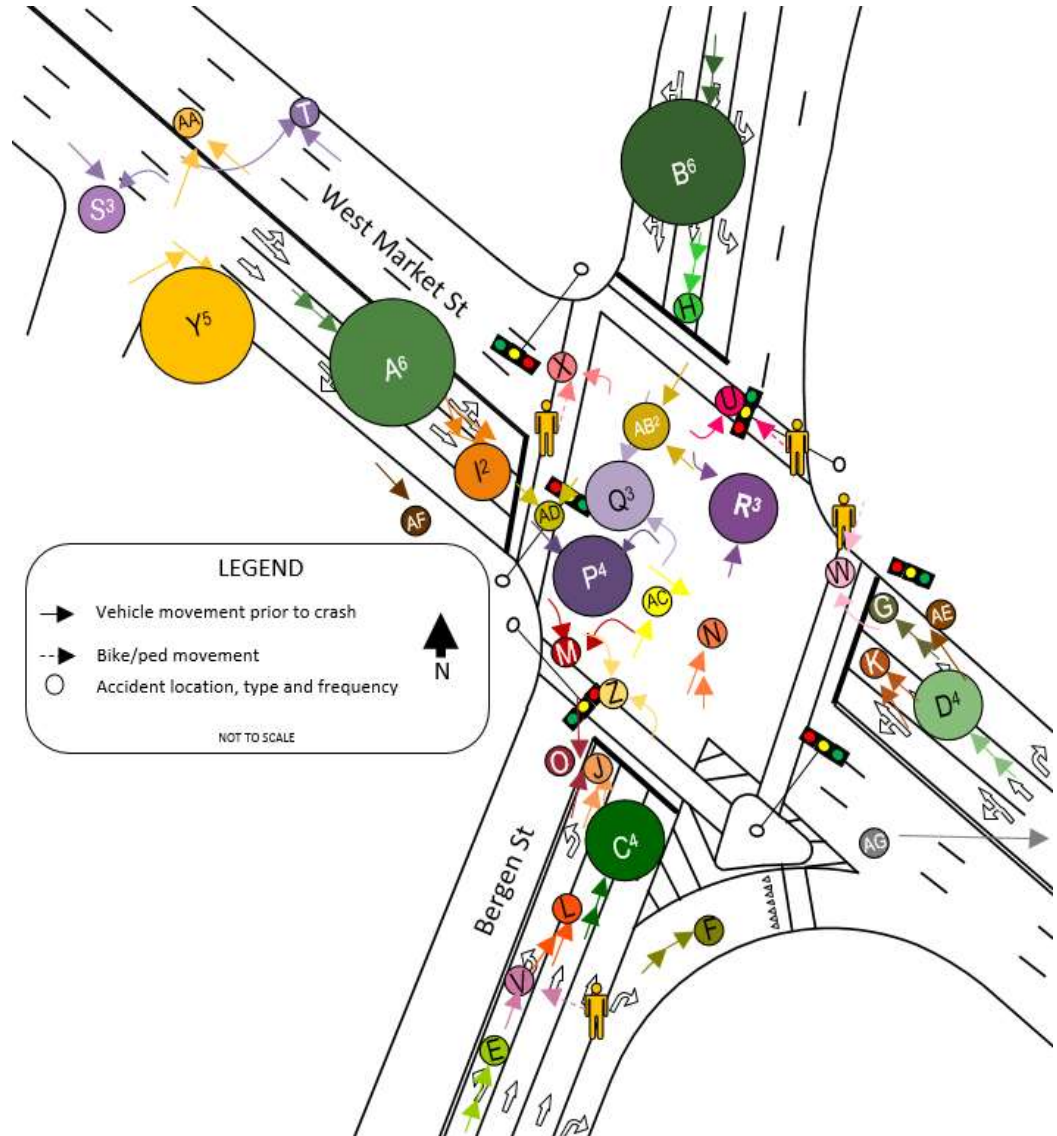
Right Angle

Y	1/29/09	4:20 PM	B
Y	5/5/09	4:30 PM	B
Y	8/21/09	5:05 PM	O
Crash due to withr.			
Y	1/5/11	11:45 AM	O
Z	4/27/10	10:00 PM	O

AA	4/15/11	2:59 PM	B
McDonald's parking lot being repaved			
AB	6/1/09	12:05 AM	O
AB	10/27/10	5:14 PM	B
Emergency vehicle struck car that failed to stop			

AC	5/4/09	3:22 PM	O
Striking vehicle was emergency vehicle and bus had blocked view			

AD	4/7/09	8:00 AM	B
----	--------	---------	---



*Crash severity uses KABCO scale: K- Fatal, A- Incapacitating injury, B- Non-incapacitating injury, C- Possible injury, O- Property damage only

Cabinet Street & Bergen Street

Right Angle

A	9/15/09	2:20 PM	B	Struck v vehicle in parking lane
B	10/28/09	10:49 AM	O	
B	8/5/09	2:27 PM	B	
B	4/28/09	12:27 PM	B	
C	9/11/09		O	Ran stop sign
F	3/24/09	8:52 AM	O	

Same direction- Side Sw ipe

G	1/25/11	3:00 PM	O	
H	8/30/11	2:36 PM	B	Pulling from parking space
I	11/10/09	9:56 AM	B	

Same direction - Rear End

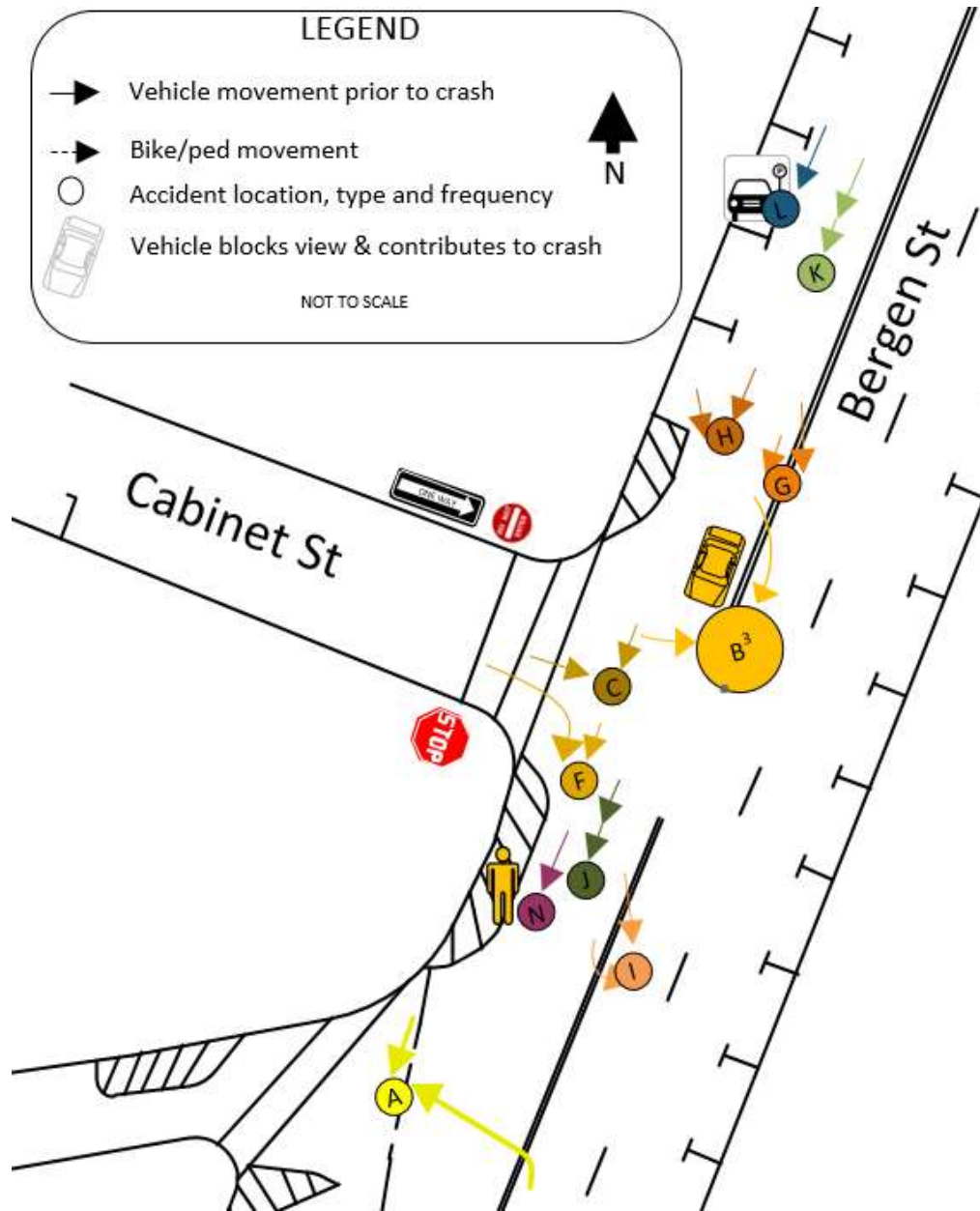
J	1/11/11	2:40 PM	B	
K	1/25/11	10:05 AM	B	

Struck Parked Vehicle

L	6/2/09	10:11 AM	O	Nearly hit pedestrian accessing rear of vehicle
----------	--------	----------	---	---

Pedestrian

N	6/9/10	1:31 PM	B	Pedestrian crossing street
----------	--------	---------	---	----------------------------



* Crash severity uses KABCO scale: K- Fatal, A- Incapacitating injury, B- Non-incapacitating injury, C- Possible injury, O- Property damage only

12th Avenue & Bergen Street

Same direction - Side Swipe

A	3/18/09	3:25 PM	O
A	12/9/10	4:20 PM	O Bus involved
A	4/14/11	6:55 PM	O
A	7/26/11	1:25 PM	O
A	8/22/11		O
B	4/27/09	4:00 PM	O Bus involved
B	12/11/09	9:15 AM	B Bus involved
B	8/16/10	11:00 AM	O
C	1/7/10	3:02 PM	O Bus involved
C	6/12/10	4:10 PM	O
C	5/13/10	3:45 PM	O Waiting for peds to cross
C	10/26/09	3:00 PM	O Labeled in report as "rear end"
D	4/5/10	8:30 AM	O
E	6/13/10	4:45 PM	O

Same direction - Rear End

F	3/15/10	4:48 PM	O
F	5/10/10	3:00 PM	O
F	8/27/10	12:47 PM	B
F	10/28/10	12:15 PM	O
G	6/3/09	3:04 PM	B 5 cars involved
G	11/8/09	10:30 PM	O
G	7/21/10	11:00 PM	B
G	12/14/10	3:45 PM	O
G	11/11/11	5:15 PM	O 3 cars involved
H	6/25/11	1:08 PM	O
I	12/29/09	11:50 AM	O
J	6/5/09	12:54 AM	B

Right Angle

K	1/25/10	9:50 AM	O
K	10/22/10	9:50 AM	O
L	4/22/09	12:55 PM	B Exits UMDNJ driveway
L	5/13/09	4:02 PM	B
M	10/23/11	3:05 AM	B After crash, vehicle jumped sidewalk
N	2/15/10	9:24 AM	O

Pedestrian

O	11/20/09	6:54 PM	B
O	10/12/10	7:55 AM	B
O	9/30/11	10:34 AM	B
P	12/14/11	6:30 PM	B
Q	8/3/11	1:26 PM	B
R	3/14/11	4:30 PM	O
S	2/2/10	10:15 AM	B
T	10/22/09	8:10 AM	B
U	5/29/09	10:00 AM	B
V	6/29/09	8:33 PM	B

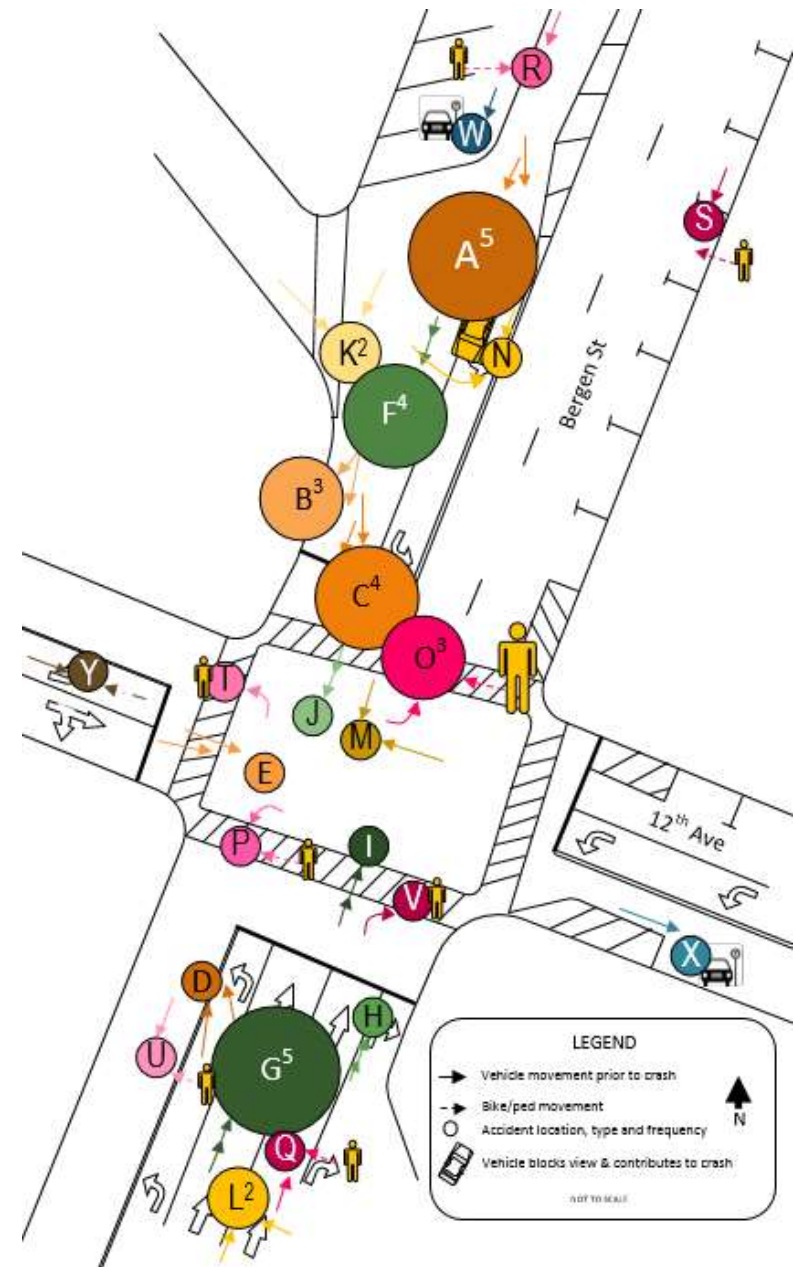
Struck Parked Vehicle

W	7/26/11	1:25 PM	O UMDNJ police vehicle parked parallel to lane
---	---------	---------	--

X	9/27/10	5:35 PM	O
---	---------	---------	---

Backing

Y	2/2/10	4:00 PM	O Bus involved making wide turn from SB Bergen
---	--------	---------	--

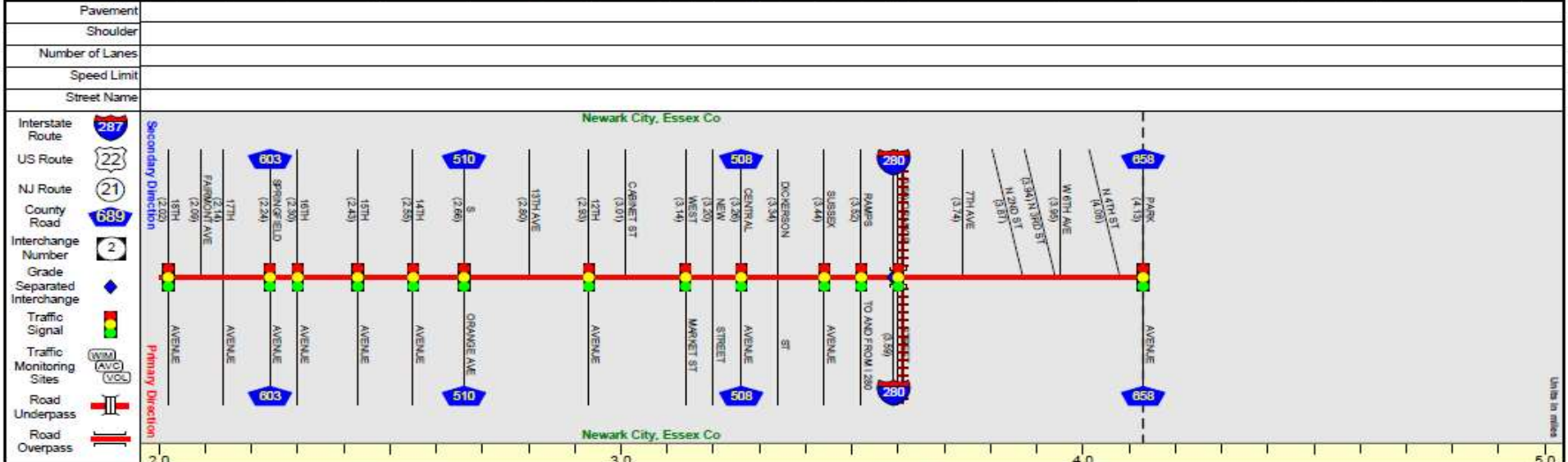


*Crash severity uses KABCO scale: K- Fatal, A- Incapacitating injury, B- Non-incapacitating injury, C- Possible injury, O- Property damage only

Appendix C – Straight Line Diagram

BERGEN ST (South to North)

Mile Posts: 2.000 - 4.130



Street Name	Bergen Street					1st Street	
Jurisdiction	Municipal						
Functional Class	Urban Minor Arterial						
Federal Aid - NHS Sy	STP						
Control Section							END BERGEN ST MP=4.13
Speed Limit	25						
Number of Lanes	2		4	3		2	
Med. Type	None						
Med. Width	0						
Pavement	50	40		70		40	
Shoulder	0						
Traffic Volume							
Traffic Sta. ID							
Structure No.							
Enlarged Views							

SRI = 07141895_

Date last inventoried: January 2001

Appendix D – Bus Routes

Bus Routes

71
ISSUED 8/22/13

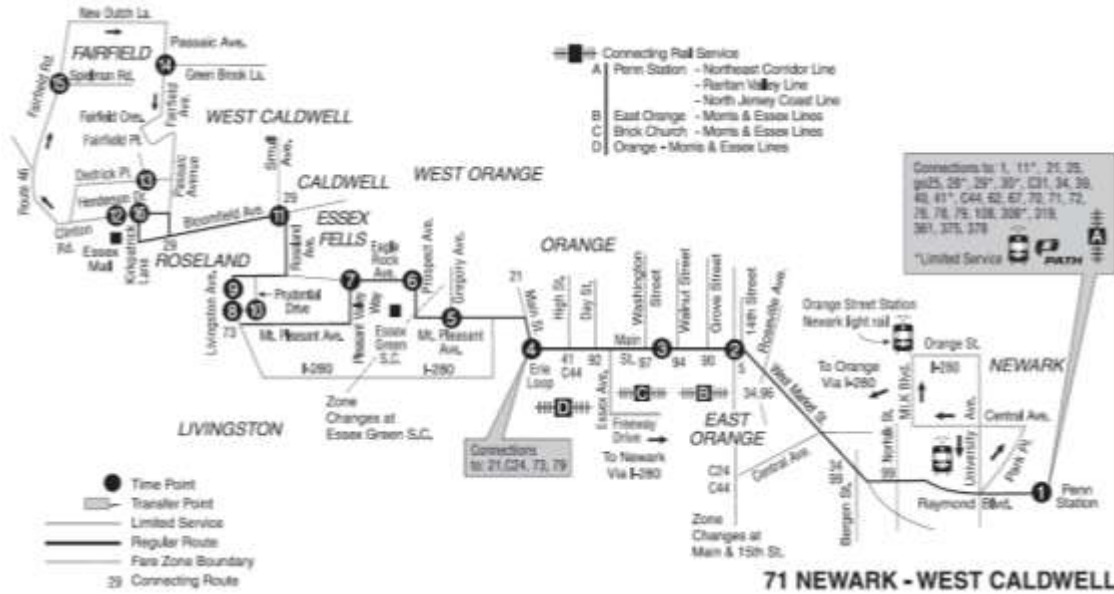
BUS Newark → West Caldwell

WEST CALDWELL
FAIRFIELD
WEST COORVELL
CALDWELL
ESSEX FIELDS
ROSELAND
LIVINGSTON
WEST ORANGE
ORANGE
EAST ORANGE
NEWARK

Connects to: 1, 11*, 21, 25, 28, 29*, 30*, 31, 34, 39, 40, 41*, 44, 45, 57, 70, 71, 72, 76, 78, 79, 108, 308*, 319, 361, 375, 378

*Limited Service

MTA TRANSIT NEW JERSEY



All Bus Routes
 = Study Area

73
ISSUED 8/29/13

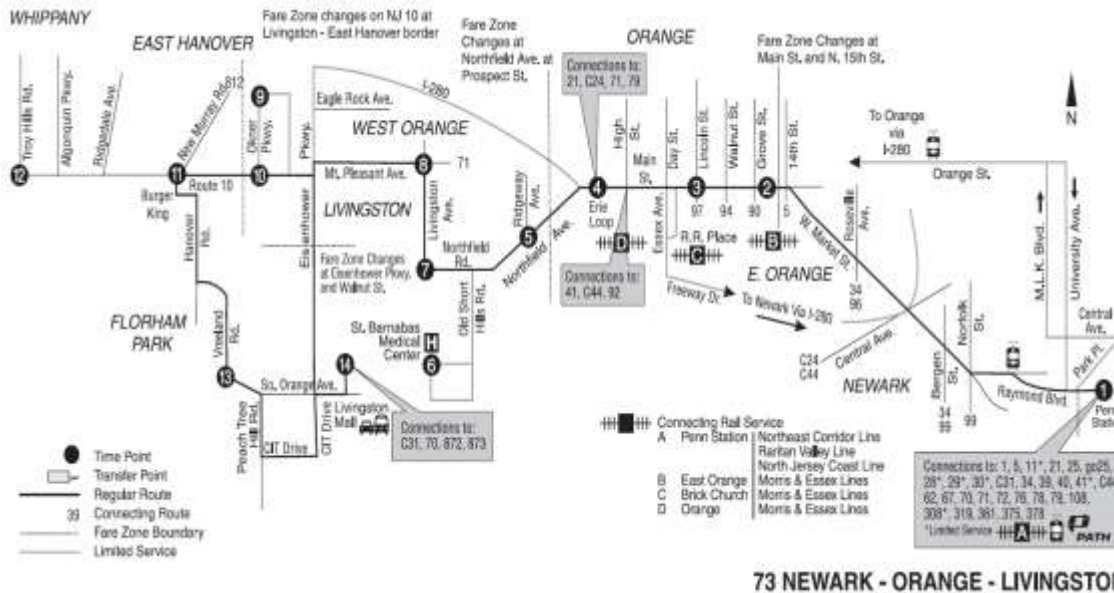
BUS Newark → Orange → Livingston

ORANGE
WEST ORANGE
LIVINGSTON
EAST ORANGE
NEWARK

Connects to: 1, 11*, 21, 25, 28, 29*, 30*, 31, 34, 39, 40, 41*, 44, 45, 57, 70, 71, 72, 76, 78, 79, 108, 308*, 319, 361, 375, 378

*Limited Service

MTA TRANSIT NEW JERSEY



21

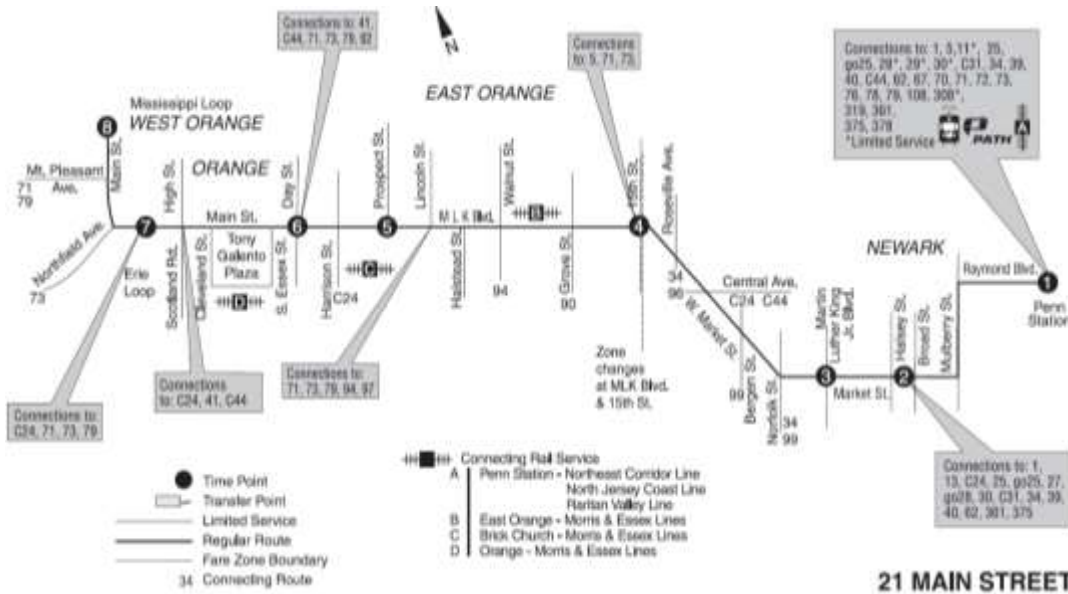
ISSUED 6/22/13



**WEST ORANGE
ORANGE
EAST ORANGE
NEWARK**

For information on routes, schedules and fares, visit www.njtransit.com

BUS Main Street



34

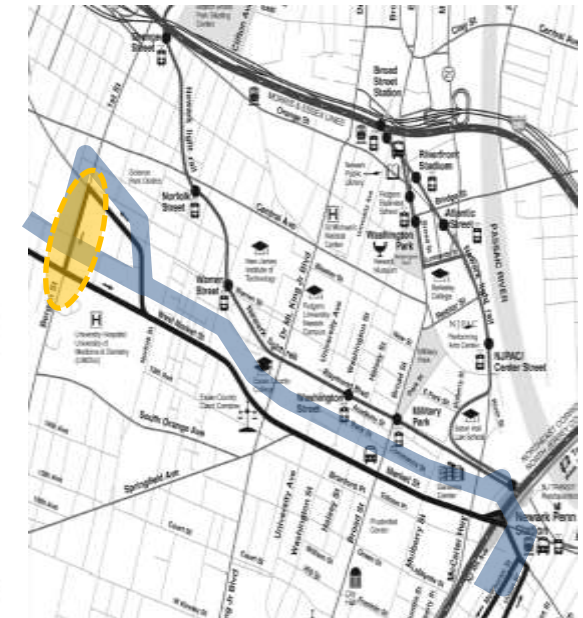
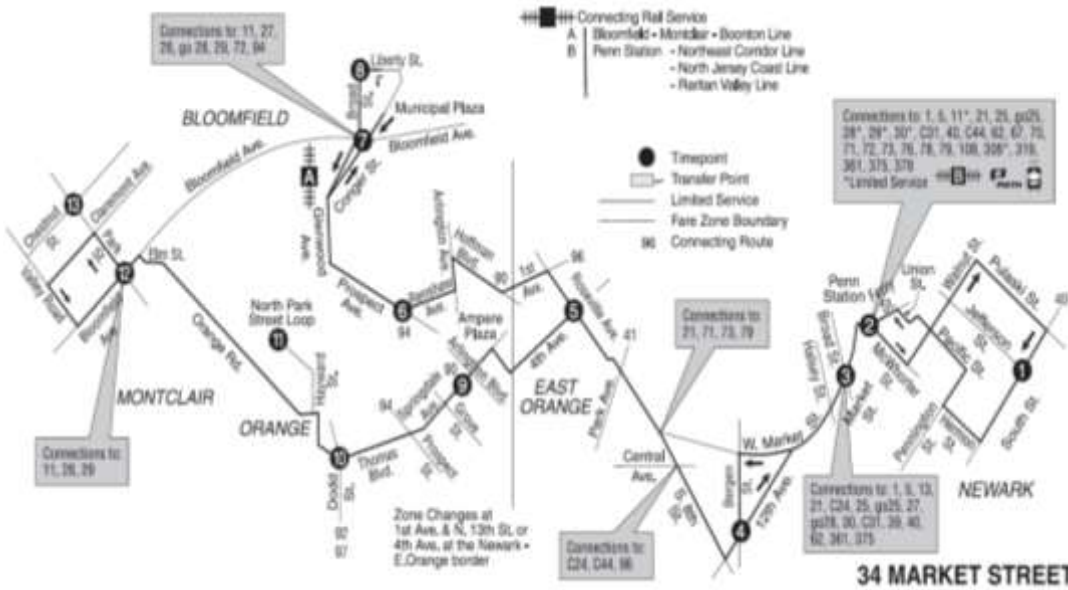
ISSUED 6/22/13



**MONTCLAIR
ORANGE
BLOOMFIELD
EAST ORANGE
NEWARK**

For information on routes, schedules and fares, visit www.njtransit.com

BUS Market Street

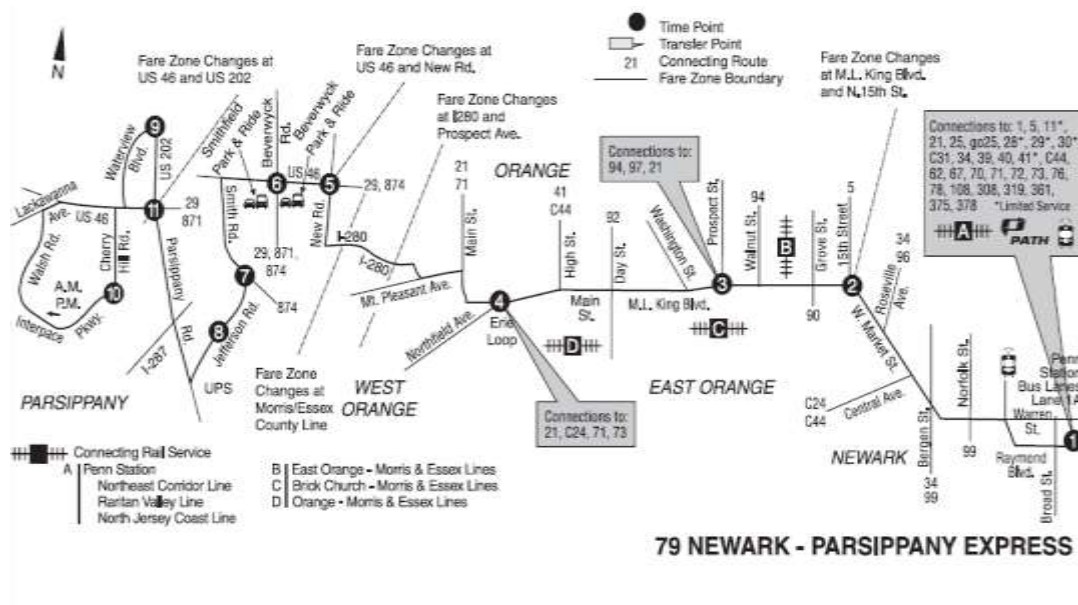


79

ISSUED 4/22/13

BUS Newark - Parsippany Express

NEWARK
 Newark Penn Station
 Newark Light Rail Station
 Newark Penn Station
 Newark Penn Station
 Newark Penn Station



99

ISSUED 4/22/13

BUS Clifton Avenue Crosstown

NEWARK
 Newark Penn Station
 Newark Light Rail Station
 Newark Penn Station
 Newark Penn Station

