Road Safety Audit:

CR 514 (Hamilton Street) between Berry Street and New Brunswick Border
Franklin Township, Somerset County

MARCH 2018
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Executive Summary

This document is the final report of the CR 514, Hamilton Street Road Safety Audit (RSA). It was conducted from Berry Street to the New Brunswick border (MP 22.35-23.85) in Franklin Township, Somerset County. An RSA is an effective way of identifying crash-causing trends and appropriate countermeasures utilizing a nontraditional approach that promotes transportation safety while maintaining mobility.

This section of CR 514, Hamilton Street was identified on NJTPA’s Local Safety Program Network Screening list as a high priority location. According to the NJDOT crash database, 250 crashes occurred during the three-year period between January 1, 2014 and December 31, 2016 along the study area section of CR 514, Hamilton Street with 78, 82 and 90 crashes occurring in 2014, 2015 and 2016, respectively. Additionally, 16 pedestrian crashes occurred over the five-year period between January 1, 2012 and December 31, 2016, one of which was fatal.

This one-day RSA was conducted on Thursday, October 19, 2017 from 9:00 am to 3:30 pm. The pre- and post-audit meetings were held in the Council Chambers at the Franklin Township Municipal Complex, located at 475 Demott Lane, Somerset, NJ. Representatives from FHWA, NJDOT, NJTPA, Somerset County and Franklin Township were in attendance with NJDOT serving as the facilitator.

The RSA site and crash history is described in Sections II and III of this report, respectively. Section II also identifies previous and on-going studies conducted by the aforementioned agency representatives. Corridor-wide and site-specific issues and recommendations, organized by location, are discussed in Section IV. The most common recommendations were to consider developing an access management and parking plan; traffic signal and ADA ramp upgrades; and investigate curb extensions at unsignalized intersections.

The recommendations contained herein were developed collaboratively with the roadway owner and local stakeholders from the RSA Team (members listed in Appendix A). The study partners have expressed interest in implementing many of the recommendations as time and funds allow. Many of the maintenance items, which are typically low cost, can be addressed without additional engineering.

Please note this RSA report does not constitute an engineering report. The agency responsible for design and construction should consult a licensed professional engineer in preparing the design and construction documents, to implement any of the safety countermeasures mentioned in this report.
I. Introduction

A. Site Selection

The section of CR 514, Hamilton Street (herein referred to as Hamilton Street), from Berry Street to the New Brunswick border (MP 22.35-23.85), was identified on NJTPA’s Local Safety Program Network Screening list as a high priority location, as shown in the below FY 2017-2018 ranking. Of note, these rankings are based on 2011-2013 vehicular and 2009-2013 pedestrian crash data.

<table>
<thead>
<tr>
<th>Regional Corridors</th>
<th>Ped Corridors</th>
<th>Intersections</th>
<th>Pedestrian Intersections</th>
</tr>
</thead>
<tbody>
<tr>
<td>#2 County, MP 22.35-23.35</td>
<td>#5 County, MP 23.57-24.57</td>
<td>#3 Lewis/Berry St</td>
<td>#18 County: Lafayette Ave</td>
</tr>
<tr>
<td>#101 County, MP 23.56-24.56</td>
<td>#233 NJTPA Region</td>
<td>#38 Franklin Blvd</td>
<td>#20 County: Sydney Pl</td>
</tr>
<tr>
<td>#45 NJTPA Region</td>
<td>#54 Home St</td>
<td></td>
<td>#28 County: Home St</td>
</tr>
</tbody>
</table>

B. What is a Road Safety Audit?

A Road Safety Audit (RSA) is a formal safety performance examination of an existing or future road or intersection by a multi-disciplinary audit team. It qualitatively estimates and reports on existing and potential road safety issues and identifies opportunities for improvements in safety for all road users. RSAs can be used on any size project, from minor maintenance to mega-projects, and can be conducted on facilities with a history of crashes, or during the design phase of a new roadway or planned upgrade. RSAs consider all road users, account for human factors and road user capabilities, are documented in a formal report, and require a formal response from the road owner.

The RSA program is conducted to generate improvement recommendations and countermeasures for roadway segments demonstrating a history of, or potential for, a high frequency of crashes, or an identifiable pattern of crash types. Recommendations range from low-cost, quick-turnaround safety improvements to more complex strategies. Implementation of improvement strategies identified through this process may be eligible for Local Federal Aid Safety Funds. Because the RSA process is adaptable to local needs and conditions, recommendations can be implemented incrementally as time and resources permit.

The RSA process, one of FHWA’s proven safety countermeasures, is shown in the figure below.

C. The Hamilton Street RSA Event

This one-day RSA was conducted on Thursday, October 19, 2017 from 9:00 am to 3:30 pm. The pre- and post-audit meetings were held in the Council Chambers at the Franklin Township Municipal
Complex, located at 475 Demott Lane, Somerset, NJ. Representatives from FHWA, NJDOT, NJTPA, Somerset County and Franklin Township were in attendance with NJDOT serving as the facilitator. A list of team members can be found in Appendix A.

II. Corridor Description and Analysis

A. Study Location

The study area consists of approximately 1.5 miles of CR 514 (Hamilton Street) from the Lewis/Berry Street intersection to the municipal/County border with New Brunswick City/ Middlesex County. The area lies within Franklin Township, Somerset County. This stretch of Hamilton Street is a mix of commercial and residential properties. Commercial sites consist of mainly one- and two-story retail, automotive repair and service, eating establishments, churches, beauty salons, banks, and grocery store-anchored shopping plazas. Residential units are primarily detached single family homes. An apartment complex is located in the eastern project limits. Of note, this section of Hamilton Street is part of the Hamilton Street Special Improvement District (SID) and a Priority Growth Investment Area (PGIA) in Somerset County. Hamilton Street provides access to downtown New Brunswick, Rutgers University and Robert Wood Johnson University Hospital.

B. Roadway and Intersection Characteristics

Hamilton Street is classified as an urban minor arterial. The corridor study section is two-lanes, undivided, with a posted speed limit of 25 and 35 mph east and west of Franklin Boulevard, respectively. On-street parking is allowed in designated areas. The roadway’s horizontal alignment is tangential, with the exception of the eastern and western limits. There are four (4) signalized intersections, 25 unsignalized intersections and numerous driveways along this section of Hamilton Street.

C. Existing Bicycle/Pedestrian Accommodations

Sidewalks are provided on both sides of Hamilton Street throughout the study area. Sidewalk conditions vary from newly installed to needing maintenance. Continental style crosswalks are provided at most intersections; however, not all crossings are marked across Hamilton Street. Norma Avenue and Highland Avenue are signed as school crossings. A bus shelter was also identified near Franklin Boulevard (see Part E for additional information). There is no defined bicycle lane along Hamilton Street and bicyclists were observed traveling either along the roadway or on the sidewalk.

Of additional note, the Franklin Township School District rezoned its schools for the 2018-2019 school year to create Pre-K through Grade 5 elementary schools and a grades 6-8 middle school on two campuses, referred to as the One Less Move Referendum. This rezoning aims to improve the educational experience by reducing school changes and address overcrowding. The District anticipates that an increasing number of students will walk to school based on this rezoning and a Safe Routes to School travel plan may be necessary to safely accommodate the increase in pedestrian traffic.
D. Traffic Volumes
Based on available data, the ADT along Hamilton Street ranges from approximately 11,300 to 16,900 in the eastern and western portions of the study area, respectively. A copy of the available data can be found in Appendix C.

E. Transit Service
NJ Transit bus or rail services do not directly serve Hamilton Street. However, the corridor is served by Somerset County’s CAT 1R and DASH 853 bus routes. One bus shelter was identified near Franklin Boulevard. The New Brunswick Park and Ride, located along Route 27 near Matilda Avenue, is serviced by Suburban Transit, which operates three lines between Princeton and New York City. The NJ Transit Northeast Corridor Line stop at the Jersey Avenue and New Brunswick Train Stations are located within one mile of Hamilton Street.

F. Community Profile
The Supporting Priority Investment in Somerset County Phase III Study conducted an Environmental Justice (EJ) Assessment along Hamilton Street and within a 500-foot buffer of the same. The EJ analysis utilized data from the 2010 U.S. Census and updates through the 2014 American Community Survey (ACS) estimate. A summary of the demographics is listed below and a portion of the Technical Memorandum with additional detail and figures can be found in Appendix I.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Hamilton St Area</th>
<th>County Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty</td>
<td>7.9%</td>
<td>4.9%</td>
</tr>
<tr>
<td>Minority Black or African American</td>
<td>41.8%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>32.6%</td>
<td>13.0%</td>
</tr>
<tr>
<td>Limited English Proficiency (LEP)</td>
<td>11.1%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>

In addition, approximately 2.4% of the population uses public transportation. It is evident that the limited service noted above results in low usage.

G. Redevelopment
As aforementioned, Hamilton Street is part of the Hamilton Street SID and a PGIA in Somerset County. Properties along this corridor are currently or are anticipated to be redeveloped to include more mixed-use, multi-story buildings with first-floor retail and upper floor residential units. Due to its proximity and convenient access to New Brunswick, the transportation improvements in the Phase III Study focused on multimodal mobility, such as expanded bus service and enhanced pedestrian and bicyclist connectivity. Specifically, the Phase III Study recommends investigating shared-use pavement markings (connecting to those installed in New Brunswick). The study also proposes to create a bicycle boulevard along Lewis Street, which runs parallel to Hamilton Street, as well as improved pedestrian crossings, wider sidewalks and enhanced streetscape.

The Supporting Priority Investment in Somerset County Through Access and Mobility Improvements Study goal was to identify land use and transportation improvements to support redevelopment and targeted growth. The study identified, screened, and evaluated candidate locations, and proposed a series of pilot sites to serve as templates for redevelopment of other sites. One pilot site in the Access and Mobility Study was the Nora Shopping Center, located along Hamilton Street within the
RSA limits. In addition to creating additional retail space on the site, proposed transportation improvements included bicycle, pedestrian, and streetscape improvements along Hamilton Street; access control at the site; and investigation of improved transit service along Hamilton Street. The study also recommended improvements along Hamilton Street near the Nora Shopping Center such as traffic signal upgrades, ADA curb ramps, high visibility crosswalks, “sharrow” markings and transit accommodations. Excerpts from the Phase III Study and Access and Mobility Study can be found in Appendix I.

III. Crash Findings

The analysis used in the RSA was based on reportable crashes that resulted in a fatality, injury and/or property damage as found in the NJDOT crash database. Corridor-wide crash characteristics and overrepresentations were compared to the 2016 statewide average for the county road system as further detailed below. All crashes were plotted onto a collision diagram, which can be found in Appendix D.

A. Temporal Trends

According to the NJDOT crash database, there were 250 crashes from 2014 to 2016 along the study area section of Hamilton Street with 78, 82 and 90 crashes occurring in 2014, 2015 and 2016, respectively. Total crashes were highest in March and lowest in June compared to the county average. Day of week trends were similar to the county averages.

Additionally, 16 pedestrian crashes occurred over the five-year period from 2012 to 2016, one of which was fatal. The majority of these crashes included minor injury and occurred during the day, on Wednesdays and Thursdays, and in March. It should be noted that the low number of crashes compared to the county road system may be statistically insignificant since they could not be correlated with an identified event. For example, while the monthly chart indicates 11% of pedestrian crashes occurred in March, this equates to a total of 28 crashes versus the county average of 2505 crashes (8%) for the same month.

![Figure 1 – Total Crashes by Month and Day of Week](image-url)
B. Collision Types

Overrepresented crash types over the three-year period from 2014 to 2016 included right angle, left turn, parked vehicle, and pedestrian/cyclist. The availability of on-street parking contributes to the struck parked vehicle crashes. Of the 16 pedestrian/cyclist crashes over the five-year period from 2012 to 2016, one was a bicyclist travelling with traffic adjacent to the on-street parking. Right angle crashes were concentrated at both signalized and unsignalized intersections. Left turn crashes had similar concentrations, but also included crashes where one vehicle was performing a U-turn maneuver into a parking space on the opposite side of the roadway. Parked vehicle and pedestrian crashes were more dispersed throughout the corridor.

*An additional eight (8) crashes occurred from 2012 to 2013.*
C. Severity

Crashes resulting in injury were overrepresented compared to the county road system. This is due to the overrepresented crash types of right angles and left turns, which tend to be more severe crashes. The majority of injury-related crashes resulted in minor injuries, while the county road system had a higher percentage of moderate injuries. In addition, one fatal crash occurred in 2012 and resulted in the death of one pedestrian and injury of another.
D. Roadway Surface & Light Condition

Overrepresented crash types included dry surface and at night. Dry surface conditions accounted for approximately 85% of total crashes, suggesting that road surface was not a significant contributing factor in the majority of crashes. While 71% of crashes occurred during daylight, approximately 26% occurred at night, which is slightly higher than the county road statewide average of 24%.
In addition, two (2) or approximately 13% of pedestrian crashes occurred during dawn or dusk, which is more than double the county road statewide average of 40 crashes or 5%. The low number of crashes compared to the county road system may be statistically insignificant.

**Figure 8 – Light Conditions (Pedestrian/Bicycle Crashes)**

E. Location

Crashes at unsignalized intersections were overrepresented compared to the county road system average. Thirty percent (30%) of crashes occurred at unsignalized intersections compared to 24% on all county roads. More crashes occurred at or near Lewis/Berry Street, Franklin Boulevard and Matilda, Lawrence and Highland Avenues. Crash frequency in 0.1-mile increments for the three-year period from 2014 through 2016, as shown in the following figure, shows the highest concentration of crashes at Franklin Boulevard.
Figure 9 – Total Crash Locations (2014-2016)

- Crashes per Year:
  - 2014: 78
  - 2015: 82
  - 2016: 90

Figure 10 – Pedestrian Crash Locations (2012-2016)

- Crashes per Year:
  - 2012: 5
  - 2013: 3
  - 2014: 1
  - 2015: 4
  - 2016: 3
IV. Identified Issues

This section summarizes the site-specific and corridor-wide safety issues identified during the RSA. They are categorized into operations (including visibility), pedestrian, bicyclist, and maintenance. Additional issues and photographs can be found in Appendix F.

<table>
<thead>
<tr>
<th>Pedestrian</th>
<th>Bicyclist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrians were observed crossing midblock</td>
<td>Lack of on-street bicycle facilities</td>
</tr>
<tr>
<td>Many side streets lacked sidewalks (Berry St NB)</td>
<td>Many bicyclists were observed riding on sidewalks</td>
</tr>
<tr>
<td>Parking on sidewalks was a common issue</td>
<td>There was a lack of bicycle corals/racks</td>
</tr>
<tr>
<td>Operations &amp; Visibility</td>
<td>Maintenance</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>4-lane section at Berry St causes shadowing crashes</td>
<td>Ponding is an issue at multiple locations</td>
</tr>
<tr>
<td>Certain signs are obstructing other signage</td>
<td>Many side streets have faded or missing pavement markings</td>
</tr>
<tr>
<td>Sidewalk not continuous across some driveways</td>
<td>Some curbs and sidewalks are crumbling</td>
</tr>
</tbody>
</table>
Additional issues, observations and details identified during the RSA include the following, listed from west to east:

- Berry Street is in a speed transition area (45-35-25 mph) and the four-lane section results in a high number of right angle crashes due to shadowing. There were also a lot of kids crossing here to get to the schools.

- A common issue was cars parked too near the intersection blocking the sight triangle. Other cars were parked in the intersection (especially at T-intersections).
V. Findings and Recommendations

This section summarizes the site-specific and corridor-wide safety issues, potential strategies and recommendations to improve the same, safety benefit, time frame, cost, and jurisdiction. Ratings used in the recommendation tables are described as follows:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Low safety benefit potential</td>
<td>May reduce total crashes by 1-25%¹</td>
</tr>
<tr>
<td>✓ ✓</td>
<td>Low to moderate safety benefit potential</td>
<td>May reduce total crashes by 26-49%¹</td>
</tr>
<tr>
<td>✓ ✓ ✓</td>
<td>Moderate safety benefit potential</td>
<td>May reduce total crashes by 50-74%¹</td>
</tr>
<tr>
<td>✓ ✓ ✓ ✓</td>
<td>High safety benefit potential</td>
<td>May reduce total crashes by 75+%¹</td>
</tr>
<tr>
<td>$</td>
<td>Low cost</td>
<td>Could be accomplished through maintenance</td>
</tr>
<tr>
<td>$$</td>
<td>Medium cost</td>
<td>May require some engineering or design and funding may be readily available</td>
</tr>
<tr>
<td>$$$</td>
<td>High cost</td>
<td>Longer term; may require full engineering, ROW acquisition, and new funding</td>
</tr>
<tr>
<td>◁</td>
<td>Short term</td>
<td>Could be accomplished within 1 year</td>
</tr>
<tr>
<td>◁ ◁</td>
<td>Medium term</td>
<td>Could be accomplished in 1 to 3 years; may require some engineering</td>
</tr>
<tr>
<td>◁ ◁ ◁</td>
<td>Long term</td>
<td>Could be accomplished in 3 years or more; may require full engineering</td>
</tr>
</tbody>
</table>

A. Recommendations

The following represents the specific findings and recommendations made by the independent RSA team. Section B discusses the County’s response to these suggestions. RSAs identify opportunities to improve safety, with the understanding that there may be competing or conflicting suggestions, and that some RSA recommendations may not or could not be implemented.

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 all applicable codes, standards, and best practices.

<table>
<thead>
<tr>
<th>No.</th>
<th>Recommendation</th>
<th>Safety Benefit</th>
<th>Cost</th>
<th>Time Frame</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Consider development of an access management plan within the project limits (many sidewalks are disrupted by poorly constructed/wide driveways)</td>
<td>✓</td>
<td>$$</td>
<td>◁</td>
<td>County/Township</td>
</tr>
<tr>
<td>2</td>
<td>Investigate on-street parking requirements where business have existing parking lots (parking analysis study) and for conformance with Title 39.</td>
<td>✓ ²</td>
<td>$$</td>
<td>◁</td>
<td>Township</td>
</tr>
</tbody>
</table>

¹ Based on existing Crash Modification Factors (CMFs), the Highway Safety Manual (HSM), FHWA Proven Safety Countermeasures and current research, where applicable. All safety benefits are approximate.
² CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.
<table>
<thead>
<tr>
<th>No.</th>
<th>Recommendation</th>
<th>Safety Benefit</th>
<th>Cost</th>
<th>Time Frame</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Consider upgrading all ramps for ADA compliance</td>
<td>✓ ✓ ✓ ²</td>
<td>$$$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>4</td>
<td>Consider addressing ponding issues at street junctions</td>
<td>✓ ²</td>
<td>$$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>5</td>
<td>Consider corridor-wide signal upgrades (replace 8” traffic signal heads with 12”, install backplates with retroreflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)</td>
<td>✓ ✓</td>
<td>$$$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>6</td>
<td>Consider extending safety improvements listed in this RSA to Francis Street (i.e. speed and/or lane reduction) since this is this is the middle school entrance</td>
<td>✓ ²</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>7</td>
<td>Study improvements to existing highway and pedestrian scale lighting</td>
<td>✓ ✓ ✓</td>
<td>$$</td>
<td></td>
<td>County/Township</td>
</tr>
<tr>
<td>8</td>
<td>Investigate converting to a 3-lane section (2 travel lanes, TWLTL and bike lanes; i.e. road diet) west of Franklin Blvd</td>
<td>✓</td>
<td>$$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>9</td>
<td>Explore one-way street operation along side streets such as Berry St (one-way away both sides) and Home St (one-way away northern side)</td>
<td>✓ ✓</td>
<td>$</td>
<td></td>
<td>Township/County</td>
</tr>
<tr>
<td>10</td>
<td>Examine installation of edge lines where there is no parking to help bicyclists and slow vehicular speeds</td>
<td>✓ ²</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>11</td>
<td>Explore extension of reduced speed limit west of Berry Street either permanently or via school speed limit zone and consider conducting a speed study</td>
<td>✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>12</td>
<td>Consider impacts of new zoning regulations and new residential buildings that will increase number of vehicles/pedestrians within the project area</td>
<td>N/A</td>
<td>$$</td>
<td></td>
<td>Township/County</td>
</tr>
<tr>
<td>13</td>
<td>Examine existing cross slope for proper drainage</td>
<td>✓ ²</td>
<td>$$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>14</td>
<td>Investigate the location of boxes, poles, and posts to minimize their interference of sight distances</td>
<td>✓ ✓</td>
<td>$$</td>
<td></td>
<td>Township/County</td>
</tr>
<tr>
<td>15</td>
<td>Investigate timing directives; coordinate signals if they are not currently coordinated</td>
<td>✓ ✓</td>
<td>$$</td>
<td></td>
<td>Township/County</td>
</tr>
<tr>
<td>16</td>
<td>Bicycle/Pedestrian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inspect, repair and construct sidewalks in compliance with ADA as needed.</td>
<td>✓ ✓ ✓</td>
<td>$$</td>
<td></td>
<td>Township</td>
</tr>
<tr>
<td>17</td>
<td>Examine inlets and install bicycle-safe grates</td>
<td>✓ ²</td>
<td>$$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>18</td>
<td>Consider installing a bicycle lane or sharrow striping on Hamilton St per NJ Complete Streets Design Guide (extension of striping in New Brunswick)</td>
<td>✓</td>
<td>$</td>
<td></td>
<td>County/Township</td>
</tr>
</tbody>
</table>
## Table 5 – Site-Specific Recommendations

<table>
<thead>
<tr>
<th>No.</th>
<th>Recommendation</th>
<th>Safety Benefit</th>
<th>Cost</th>
<th>Time Frame</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Study the need for a traffic signal or HAWK by performing a warrant analysis per MUTCD</td>
<td>✓✓✓</td>
<td>$$</td>
<td>⏰</td>
<td>County</td>
</tr>
<tr>
<td>29</td>
<td>Investigate a roundabout</td>
<td>✓✓✓</td>
<td>$$$</td>
<td>⏰</td>
<td>County</td>
</tr>
</tbody>
</table>

2 CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.

3 HSM Table 14A-1 indicates that bicycle lanes at signalized intersections appear to have no crash effect. Clearinghouse CMFs range from 0.8 to 2.03.
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Consider extending sidewalk onto Berry Street for connectivity to the school (as well as adding a “Gateway” to the schools)</td>
<td>✓✓ ✓</td>
<td>$</td>
<td>☐</td>
<td>Township</td>
</tr>
<tr>
<td>31</td>
<td>Explore prohibiting left turns from Berry Street during peak hours</td>
<td>✓✓ ✓</td>
<td>$</td>
<td>☐</td>
<td>County/Township</td>
</tr>
<tr>
<td>32</td>
<td>Investigate designating this location as an official school crossing</td>
<td>✓✓ ✓</td>
<td>$$</td>
<td>☐</td>
<td>Township</td>
</tr>
<tr>
<td>33</td>
<td>Consider maintaining one lane westbound past Berry Street and restripe for a shoulder due to the overrepresentation of right angle crashes (ranked #3 in the county for high crash intersection)</td>
<td>✓✓ ✓</td>
<td>$</td>
<td>☐</td>
<td>County</td>
</tr>
<tr>
<td>34</td>
<td>Consider merging eastbound into one lane west of Berry Street and restripe for a shoulder</td>
<td>✓✓ ✓</td>
<td>$</td>
<td>☐</td>
<td>County</td>
</tr>
<tr>
<td>35</td>
<td>Investigate installing stop bars on the Berry Street southbound approach to Hamilton Street</td>
<td>✓✓ ✓</td>
<td>$</td>
<td>☐</td>
<td>County/Township</td>
</tr>
<tr>
<td>36</td>
<td>Consider corridor-wide recommendation 11 regarding the extension of the school speed zone westward, beyond Berry Street</td>
<td>✓ ✓</td>
<td>$</td>
<td>☐</td>
<td>County</td>
</tr>
<tr>
<td>37</td>
<td>Consider sidewalk widening (students walk in roadway due to limited width on sidewalks)</td>
<td>✓✓ ✓</td>
<td>$$</td>
<td>☐</td>
<td>County/Township</td>
</tr>
<tr>
<td>38</td>
<td>Explore options to make pedestrians more visible during school hours (i.e. striping, colored and/or textured pavement, signing, curb extensions)</td>
<td>✓✓ ✓</td>
<td>$</td>
<td>☐</td>
<td>County/Township</td>
</tr>
<tr>
<td>39</td>
<td>Study additional lead left phasing for Franklin Boulevard approaches</td>
<td>✓</td>
<td>$</td>
<td>☐</td>
<td>County</td>
</tr>
<tr>
<td>40</td>
<td>Investigate providing unobstructed view of signal heads (currently obstructed by aerial wires)</td>
<td>✓ ✓</td>
<td>$$</td>
<td>☐</td>
<td>County</td>
</tr>
<tr>
<td>41</td>
<td>Consider advanced signing for eastbound lane drop (into left turn only)</td>
<td>✓</td>
<td>$</td>
<td>☐</td>
<td>County</td>
</tr>
<tr>
<td>42</td>
<td>Explore incorporating Lead Pedestrian Intervals (LPI) into the signal timing</td>
<td>✓✓ ✓</td>
<td>$</td>
<td>☐</td>
<td>County</td>
</tr>
<tr>
<td>43</td>
<td>Consider revisions to the signal timing to include pedestrian recall (does not require push button activation) so that pedestrian walk and clearance intervals come up each cycle</td>
<td>✓✓ ✓</td>
<td>$</td>
<td>☐</td>
<td>County</td>
</tr>
<tr>
<td>44</td>
<td>Investigate revisions to the NW corner curb radius to accommodate truck turns since they currently traverse over the sidewalk</td>
<td>✓✓ ✓</td>
<td>$$</td>
<td>☐</td>
<td>County</td>
</tr>
<tr>
<td>45</td>
<td>Consider making the bus stop/shelter ADA compliant (possibly moving back to improve intersection visibility)</td>
<td>✓✓ ✓</td>
<td>$$</td>
<td>☐</td>
<td>County</td>
</tr>
</tbody>
</table>

2 CMF/quantitative data not available for this type of roadway or treatment. Therefore, perceived safety benefit of the same was estimated relative to other similar treatments.
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</thead>
<tbody>
<tr>
<td>46</td>
<td>Examine additional delineation of lane use via striping along WB approach</td>
<td>✓</td>
<td>$</td>
<td>⏱</td>
<td>County</td>
</tr>
<tr>
<td>47</td>
<td>Explore options to make pedestrians more visible during school hours (i.e. striping, colored and/or textured pavement, signing, curb extensions)</td>
<td>✓✓</td>
<td>$</td>
<td>⏱</td>
<td>County/Township</td>
</tr>
<tr>
<td>48</td>
<td>Consider corridor-wide recommendation 11 regarding the extension of the speed zone</td>
<td>✓</td>
<td>$</td>
<td>⏱</td>
<td>County</td>
</tr>
<tr>
<td>49</td>
<td>Investigate a road diet to accommodate left turning vehicles and bicyclists between Franklin Boulevard and Berry Street</td>
<td>✓✓</td>
<td>$$</td>
<td>⏱</td>
<td>County</td>
</tr>
</tbody>
</table>

**Millstone Road**

<table>
<thead>
<tr>
<th>No.</th>
<th>Recommendation</th>
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</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>Consider removal of any existing on-street parking striping between this intersection and Norma Ave</td>
<td>✓</td>
<td>$</td>
<td>⏱</td>
<td>County/Township</td>
</tr>
<tr>
<td>51</td>
<td>Explore geometric changes to the Millstone Road approach to make it perpendicular and reduce pedestrian crossing distance</td>
<td>✓✓</td>
<td>$$$</td>
<td>⏱</td>
<td>County/Township</td>
</tr>
<tr>
<td>52</td>
<td>Consider upgrading sidewalks and ramps for ADA compliance</td>
<td>✓✓</td>
<td>$$</td>
<td>⏱</td>
<td>County/Township</td>
</tr>
<tr>
<td>53</td>
<td>Investigate additional signing since this intersection is adjacent to a school crossing</td>
<td>✓</td>
<td>$$</td>
<td>⏱</td>
<td>County</td>
</tr>
<tr>
<td>54</td>
<td>Explore feasibility of installing HAWK via MUTCD warrant analysis</td>
<td>✓✓</td>
<td>$$$</td>
<td>⏱</td>
<td>Township/County</td>
</tr>
<tr>
<td>55</td>
<td>Consider the removal of on-street parking on Hamilton Street WB, between Norma Avenue and Millstone Road (see corridor-wide recommendation 2 regarding a parking study)</td>
<td>✓</td>
<td>$</td>
<td>⏱</td>
<td>County/Township</td>
</tr>
</tbody>
</table>

**Norma Avenue, Chester/Shevchenko Avenue & N. Dover Avenue**

<table>
<thead>
<tr>
<th>No.</th>
<th>Recommendation</th>
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<th>Cost</th>
<th>Time Frame</th>
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</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street</td>
<td>✓✓</td>
<td>$$$</td>
<td>⏱</td>
<td>County/Township</td>
</tr>
<tr>
<td>57</td>
<td>Consider adding curb along Chester/Shevchenko Avenues</td>
<td>✓</td>
<td>$$</td>
<td>⏱</td>
<td>Township</td>
</tr>
<tr>
<td>58</td>
<td>Consider adding crosswalks across Hamilton Street</td>
<td>✓</td>
<td>$</td>
<td>⏱</td>
<td>County</td>
</tr>
<tr>
<td>59</td>
<td>Study the need for a traffic signal at Chester/Shevchenko Avenues by performing a warrant analysis per MUTCD</td>
<td>✓✓</td>
<td>$$$</td>
<td>⏱</td>
<td>Township/County</td>
</tr>
</tbody>
</table>

**Pershing Avenue**

<table>
<thead>
<tr>
<th>No.</th>
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<th>Cost</th>
<th>Time Frame</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✓✓</td>
<td>$$</td>
<td>⏱</td>
<td>County</td>
</tr>
<tr>
<td>61</td>
<td>Consider connecting northern sidewalk between Pershing and Chester/Shevchenko Avenues (missing slabs) and replacement where settlement was</td>
<td>✓</td>
<td>$</td>
<td>⏱</td>
<td>Township</td>
</tr>
</tbody>
</table>

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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>patched with asphalt between this intersection and Norma Avenues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62</td>
<td>Consider corridor-wide recommendation 3 regarding ADA upgrades</td>
<td>✓✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>63</td>
<td>Examine intersection sight distance and consider clearing vegetation to improve the same</td>
<td>✓✓</td>
<td>$</td>
<td></td>
<td>Township/County</td>
</tr>
<tr>
<td>64</td>
<td>Matilda Avenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consider corridor-wide recommendation 5 regarding signal upgrades (i.e. countdown pedestrian signal heads and corresponding push button signs)</td>
<td>✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>65</td>
<td>Consider corridor-wide recommendation 3 regarding ADA upgrades</td>
<td>✓✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>66</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>67</td>
<td>Consider adding a sidewalk along Matilda Avenue</td>
<td>✓✓✓</td>
<td>$</td>
<td></td>
<td>Township</td>
</tr>
<tr>
<td>68</td>
<td>Investigate the cause of many potholes at this intersection</td>
<td>✓✓</td>
<td>$</td>
<td></td>
<td>Township/County</td>
</tr>
<tr>
<td>69</td>
<td>Investigate intersection operation due to impacts of new residential development south of intersection</td>
<td>N/A</td>
<td>$</td>
<td></td>
<td>Township/County</td>
</tr>
<tr>
<td>70</td>
<td>Dewald Avenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Explore feasibility of installing HAWK via MUTCD warrant analysis</td>
<td>✓✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>71</td>
<td>Investigate a roundabout</td>
<td>✓✓✓</td>
<td>$$$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>72</td>
<td>Evaluate a speed table and pedestrian crossing signs</td>
<td>✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>73</td>
<td>Investigate how new housing development in NW corner will impact intersection operation</td>
<td>N/A</td>
<td>$</td>
<td></td>
<td>Township/County</td>
</tr>
<tr>
<td>74</td>
<td>Baier Avenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consider upgrades to the existing emergency preemption for the firehouse and possibly incorporating the same into all signals</td>
<td>✓✓</td>
<td>$</td>
<td></td>
<td>Township/County</td>
</tr>
<tr>
<td>75</td>
<td>Investigate installing a crosswalk on the westbound approach</td>
<td>✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>76</td>
<td>Consider corridor-wide recommendation 5 regarding signal upgrades</td>
<td>✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>77</td>
<td>Consider corridor-wide recommendation 3 regarding ADA upgrades</td>
<td>✓✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
<tr>
<td>78</td>
<td>Explore Do Not Block intersection markings</td>
<td>✓✓✓</td>
<td>$</td>
<td></td>
<td>County</td>
</tr>
</tbody>
</table>

---

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<tbody>
<tr>
<td>79</td>
<td>Investigate impact of new development on NW corner that will have: parking (1st floor), retail (2nd), residential (3rd)</td>
<td>N/A</td>
<td>$</td>
<td>⚫</td>
<td>Township/County</td>
</tr>
</tbody>
</table>

**Douglas Avenue**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✓ ✓ ²</td>
<td>$$$</td>
<td>⚫</td>
<td>County</td>
</tr>
<tr>
<td>81</td>
<td>Consider elimination of on-street parking to improve intersection sight distance in conformance with Title 39</td>
<td>✓</td>
<td>$</td>
<td>⚫</td>
<td>Township/County</td>
</tr>
<tr>
<td>82</td>
<td>Explore on-street parking restrictions since vehicles are parking too close to the corner in conformance with Title 39</td>
<td>✓</td>
<td>$</td>
<td>⚫</td>
<td>Township/County</td>
</tr>
<tr>
<td>83</td>
<td>Consider realigning intersection</td>
<td>✓ ✓ ²</td>
<td>$$$</td>
<td>⚫</td>
<td>County</td>
</tr>
<tr>
<td>84</td>
<td>Consider adding a crosswalk across Douglas Avenue</td>
<td>✓ ✓</td>
<td>$</td>
<td>⚫</td>
<td>County</td>
</tr>
</tbody>
</table>

**N. Lafayette Street**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✓ ✓ ²</td>
<td>$$$</td>
<td>⚫</td>
<td>County</td>
</tr>
<tr>
<td>86</td>
<td>Consider installing a striped crosswalk to cross Hamilton Street. Because pedestrians were hit crossing at striped crosswalks both on Hamilton Street and Douglas Avenue, consider installing some type of traffic control signal flashing beacon, HAWK, etc., in conjunction with the striped crosswalk to Hamilton Street.</td>
<td>✓ ✓</td>
<td>$</td>
<td>⚫</td>
<td>County</td>
</tr>
</tbody>
</table>

**N. & S. Lawrence Avenue**

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>87</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✓ ✓ ²</td>
<td>$$$</td>
<td>⚫</td>
<td>County</td>
</tr>
<tr>
<td>88</td>
<td>Consider revisions to the sidewalk area (to reduce areas that give the appearance of a crossing point), green infrastructure elements such as pervious strips, and on-street parking adjacent to Nora Shopping Center in conformance with Title 39</td>
<td>✓</td>
<td>$$$</td>
<td>⚫</td>
<td>County/Township</td>
</tr>
<tr>
<td>89</td>
<td>Examine removal or relocation of the solid fence in the NW corner of N. Lawrence Avenue that is obstructing intersection sight distance</td>
<td>✓ ✓</td>
<td>$</td>
<td>⚫</td>
<td>Township</td>
</tr>
<tr>
<td>90</td>
<td>Investigate consolidating Nora Shopping Center driveways (from Lawrence Avenue to Kee Avenue)</td>
<td>✓</td>
<td>$</td>
<td>⚫</td>
<td>Township</td>
</tr>
<tr>
<td>91</td>
<td>Investigate left turn lane (many cars are passing left turning vehicles in the parking lane)</td>
<td>✓</td>
<td>$</td>
<td>⚫</td>
<td>County</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td>92</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✔ ✔ ²</td>
<td>$$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>93</td>
<td>Explore feasibility of installing HAWK via MUTCD warrant analysis</td>
<td>✔ ✔</td>
<td>$$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>94</td>
<td>Consider foliage maintenance to improve sight distance at this intersection</td>
<td>✔ ✔</td>
<td>$$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>95</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✔ ✔ ²</td>
<td>$$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>96</td>
<td>Consider enhanced signing and delineation of the crosswalk between this intersection and Kee Avenue</td>
<td>✔</td>
<td>$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>97</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✔ ✔ ²</td>
<td>$$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>98</td>
<td>Explore on-street parking restrictions since vehicles are parking too close to the corner in conformance with Title 39</td>
<td>✔</td>
<td>$</td>
<td>☄</td>
<td>Township/County</td>
</tr>
<tr>
<td>99</td>
<td>Consider adding and/or restriping worn crosswalk and stop bars on the Kee Avenue and Henry Street approaches</td>
<td>✔ ✔</td>
<td>$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>100</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✔ ✔ ²</td>
<td>$$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>101</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✔ ✔ ²</td>
<td>$$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>102</td>
<td>Examine removal or relocation of the fence and vegetation in the SE corner that is obstructing sight distance</td>
<td>✔ ✔</td>
<td>$</td>
<td>☄</td>
<td>Township</td>
</tr>
<tr>
<td>103</td>
<td>Consider replacing the stop sign due to its poor condition</td>
<td>✔</td>
<td>$</td>
<td>☄</td>
<td>County</td>
</tr>
<tr>
<td>104</td>
<td>Investigate installing curb extensions to reduce crossing time across Hamilton Street and evaluate the need for crosswalks</td>
<td>✔ ✔ ²</td>
<td>$$</td>
<td>☄</td>
<td>County</td>
</tr>
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Of note, during the field visit, worn and outdated signs noted by the RSA Team were “called in” to the responsible agency to be flagged for replacement. There was also at least one instance where the police officers on the RSA Team had to stop traffic to allow team members to cross Hamilton Street.

B. Road Owner Response

An important part of the RSA process is the road owner’s response: an acknowledgment of the audit’s findings and recommendations, and their planned follow-up. In responding to the RSA’s findings, the road owner must bear in mind all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected
to implement these recommended improvements as time and funds allow in coordination with other projects and priorities. It is also understood that there may be competing or conflicting suggestions, and that some RSA recommendations may not or could not be implemented.

Somerset County delivered their response following the finalization of the findings and recommendations table, a copy of which can be found in Appendix J.

C. Recommendation Visualizations

Examples of some of the site-specific and corridor-wide safety recommendations identified in Tables 4 and 5 are shown below and are based on current practices and standards. Descriptions and images of each treatment are from the 2017 NJ Complete Street Design Guide (CSDG) and NACTO’s Urban Street Design Guide (NACTO-US) and Urban Bikeway Design Guide (NACTO-UB), including sources contained therein.

1. Pedestrian Facilities

Curb extensions visually and physically narrow the roadway at intersections and midblock locations, creating safer and shorter pedestrian crossings, while increasing the available space for streetscape. They increase the overall visibility of pedestrians by aligning them with the parking lane and help prohibit vehicles from parking in violation of Title 39. Crossing islands, or pedestrian refuge islands, reduce the exposure time of pedestrians to vehicular traffic. They enable pedestrians to make a crossing in two stages — crossing one direction of vehicular travel lanes, pausing at the island, and then completing the crossing. They are recommended where a pedestrian must cross three lanes of traffic in one or both directions but may be implemented on smaller cross sections where space permits.

![Figure 11 – Pedestrian Facility Examples](image)

*Left: Curb Extension. Right: Crossing Island (Source: CSDG)*

2. Bicycle Facilities

Bicycle lanes provide an exclusive space for bicyclists using pavement markings and signage. Intended for one-way travel, they are typically located on both sides of a two-way street. Bicycle lanes enable bicyclists to ride at their preferred speed, free from interference from motorists. Where it is not feasible or appropriate to provide dedicated bicycle facilities, shared-lane markings (e.g. “sharrows”) may be used to indicate a shared environment for bicycles and vehicles, such as the ones currently implemented along Hamilton Street in New Brunswick.
Bicycle lanes and shared-lane markings should be extended through intersections and major driveways to enhance continuity, guide bicyclists through the intersection, and improve driver awareness of bicycle activity and movement.

Figure 12 – Bicycle Facility Examples
Left: Bicycle Lane Adjacent to Parking or Curb (Source: NACTO-UB). Right: Sharrow Markings (Source: CSDG)

3. Roadway Reconfiguration
This treatment allows reallocation of existing street space (i.e. roadway cross section) to accommodate multi-modal users. Lane configuration and width for travel, turning movements, parking, and bicycle lanes can be adjusted to optimize use for vehicles, pedestrians, bicyclists and transit. The most common roadway reconfiguration, known as a road diet, involves converting an existing four-lane undivided segment into a three-lane segment with two through lanes and a center two-way left turn lane (TWLTL). On an existing two-lane roadway that currently has room on both sides for parking, the road diet could still be implemented to repurpose the cross section for bicycle lanes, bus stops and/or to widen sidewalks.

Figure 13 – Typical Four-Lane Main Street Typology (Source: NACTO-US)
4. Roundabout
Roundabout design, which was recommended at the intersection of Hamilton Street and Dewald Avenue, should create conditions that reduce vehicle speed and provide a consistent speed into, through, and out of the roundabout. Lower speeds reduce crash frequency and severity for all roadway users, allow safer and easier merging of traffic, provide more reaction time for drivers, and make the facility more accessible for novice users.

*Figure 14 – Typical Road Diet Application on a Main Street Typology (Source: NACTO-US)*

*Figure 15 – Roundabout Example (Source: CSDG)*
Of note, roundabouts typically take up more space than a conventional four-way intersection, but they can also be scaled to fit a wide range of contexts and street typologies. Urban compact roundabouts can balance efficient vehicle flow with the needs of bicyclists and pedestrians.

5. Green Infrastructure

Bioswales are vegetated, shallow, landscaped depressions designed to capture, treat, and infiltrate stormwater runoff as it moves downstream. They are the most effective type of green infrastructure facility in slowing runoff velocity and cleansing water while recharging the underlying groundwater table. They have flexible siting requirements, allowing them to be integrated with medians, curb extensions, and other public space or traffic calming strategies.

Figure 16 — Example of Bioswale

Pervious strips are long, linear landscaped areas or linear areas of pervious pavement that capture and slow runoff. Depending on the underlying subsurface soil condition, pervious strips can provide some infiltration, but to a much lesser extent than bioswales. Irrigation requirements can be reduced by using pervious pavement and native plantings.

Figure 17 — Example of Pervious Strips
VI. Conclusions

The Hamilton Street RSA was conducted to identify safety issues and corresponding countermeasures that compromise multimodal use of the roadway. The team identified a long list of issues from the field visit, as well as many practical short-, mid- and long-term improvements during the post-audit.

The recommendations documented in this report are designed to improve safety for all users of Hamilton Street. Some of the strategies identified can be implemented through routine maintenance; all will be constrained by available time and budgetary priorities. The audit process and the resulting final document highlight the safety issues and present the needed improvements by location organized for systematic implementation by the roadway owner.

It is important to note that when it comes to improving safety, engineering strategies alone only go so far, especially in areas undergoing redevelopment. Education, with support from a targeted enforcement campaign, is an effective approach for addressing driver and pedestrian behaviors that lead to crashes. Employing a multipronged approach is an effective course of action to advance the goal of improved safety on the corridor.
Appendix A - RSA Team
## Audit Team

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Appendix B - Area Map
## New Jersey Department of Transportation
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| Funct. Urban Minor Arterial | Axle Factor Group: RG3_FC16 |
| Location: BET ANNASPOLIS ST GIRARD AVE | Growth Factor Group: RG3_FC16 |

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DV03: Page 1 of 1
# New Jersey Department of Transportation

## Daily Volume from 04/29/2011 to 04/24/2011

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## New Jersey Department of Transportation
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Created: 09/03/2014 1:25:22PM

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DV03: Page 1 of 1
## New Jersey Department of Transportation
### Daily Volume from 07/15/5017 to 07/1h/5017

**Site Names:** 111815, , FRANKLIN BLVD - 27, 18000617, __, Franklin Twp  
**County:** SOMERSET  
**Funct.:** Urban Minor Arterial  
**Location:** BET ELLEN ST DAVIS AVE  
**Seasonal Factor Group:** RG3_FC16  
**Daily Factor Group:** RG3_FC16  
**Axle Factor Group:** RG3_FC16  
**Growth Factor Group:** RG3_FC16

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- 4,532
- 15,193
- 7,746
- 7,447
- 6,323
- 3,368
- 2,953

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- 959
- 566
- 427
- 963
- 566
- 414

**Peak Wet:**
- 0.93
- 0.89
- 0.95
- 0.96
- 0.94

**Peak Hr:**
- 8.15
- 17.00
- 17.30
- 17.00

**Peak Wet:**
- 1.138
- 540
- 606

**Peak Wet:**
- 0.95
- 0.91
- 0.90

**Peak Wet:**
- 17.00
- 17.30

**seasonal Wet:**
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**Daily Wet:**
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- 0.946
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- 0.955

**Axle Wet:**
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**Pulse Wet:**
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### New Jersey Department of Transportation

**Daily Volume from 07/15/2014 through 07/20/2014**

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Created 5/13/91 1k 1:33:21s
Appendix D - Vehicular Crash Diagrams
Appendix F - Existing Site Photographs
School sign (St-5) on Hamilton St WB to warning of school area, not a crossing

Berry St NB towards school lacks sidewalk for walking students

Broken sidewalk in NW corner of Hamilton St and Franklin Blvd due to truck turns

Vehicle parked on sidewalk to load and unload into businesses

Concrete sidewalk settlement filled and patched with asphalt

Signal has 8" heads, lacks countdown pedestrian signal heads and ramps are not ADA compliant

Bus shelter along Hamilton St EB for county bus routes

Approach skewed with long crosswalk and ponding at curb ramp

Reconstruction of business driveway and sidewalk (preferred design for continuous level pedestrian access)

Wide driveway openings and warn out crosswalk stripping at Chester Ave
Appendix G - Straight Line Diagrams
Appendix H - Pre-Audit Presentation
Road Safety Audit:
CR 514 (Hamilton Street), Lewis/Berry Street to New Brunswick Border
Franklin Township, Somerset County
October 19, 2017

Audit Team Introductions

- Funded by Federal Highway Administration and NJDOT
- NJDOT, Bureau of Transportation Data & Safety
  - Safety Programs
- NJTPA
- Somerset County
  - Engineering and Planning
  - Board of Chosen Freeholders
- Franklin Township
  - Engineering and Planning
  - Police and Fire Prevention
- Greenman-Pedersen, Inc., NJDOT Consultant
Today’s Schedule

9:00a
• Welcome and Introductions
• Project Overview Presentation

10:30a
• Field Visit and Observations

12:30p
• Lunch and Regroup at Presentation Location
• Discuss Observations
• Make Recommendations

2:00p
• Discuss Observations
• Make Recommendations

3:30p
• Adjourn

Highway Safety Improvement Program/Local Safety Program

• GOAL: Reduce serious injury and fatality (K+A) crashes on all of NJ’s public roads
  • 40,000 centerline miles of public roads
  • 33% K+A crashes occur on state highways
  • 57% K+A crashes occur on local roads
• Achieve zero deaths on all public roads
  • Established 2.5%/year reduction in 5-year rolling average
• Performance-based goals consistent with SHSP
• Data-driven, strategic approach to improving highway safety
Highway Safety Improvement Program (HSIP)

- 14 Emphasis Areas
- Pedestrian Safety and Intersection Focus State
- Top priority: lane departure, intersections, and pedestrians
- 7 sub-programs including Local Safety Program
- Core Federal Aid Program, NJ receives ~$57M

Local Safety Program (LSP)

- NJDOT supports LSP:
  - Dedication of HSIP funds
  - Technical assistance
  - Screening lists for MPOs
  - Road Safety Audits
- MPOs support LSP:
  - Local Road Safety/High Risk Rural Roads
  - PE/FD Assistance Program
- Focus annual HSIP funding:
  - 40% on state highways
  - 60% percent on county and municipal network
National Strategy – Toward Zero Deaths

5-Year Rolling Average of Serious Traffic Injuries and Fatalities

- 5-Year Rolling Average K+A Injuries
- Statewide K+A Injuries at 2.5% Reduction

Federal Transportation Funding

through the
North Jersey Transportation Planning Authority
The Metropolitan Planning Organization for Northern New Jersey

Local Safety and High Risk Rural Roads Programs
Over $98 million in funding since 2005 on County and Local Roadways
Relatively quick-fix safety improvements

Highway Safety Improvement Program (HSIP) funds
Emphasizes a data-driven, strategic approach to improving highway safety

Network Screening
Identifies locations experiencing high crash frequencies
Severe crash injuries
Specific crash types such as right-angle or roadway departures

Community Outreach
Provides the public, local stakeholders and officials with opportunities to provide comments and ask questions
RSA Purpose

• Formal safety performance examination
• Qualitatively estimates and reports on potential road safety issues
• Identifies safety improvement opportunities for all road users.
• Independent, multidisciplinary audit team

• Goals:
  - 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?

RSA Benefits

• Pro-actively address safety
• Audited designs should produce fewer, less severe crashes
• Identify low-cost/high-value improvements
• Enhance consistency in how safety is considered and promote a “safety culture”
• Provide continuous advancement of safety skills and knowledge
• Contribute feedback on safety issues for future projects
• Support optimized savings of lives, money and time

• Not a replacement for:
  - Design quality control
  - Standard compliance
  - Traffic or safety impact studies
  - Safety conscious planning
  - Road safety inventory programs
  - Traffic safety modeling efforts
RSA Process

Step 1 Identify Project
Step 2 Select RSA Team
Step 3 Conduct Start-up Meeting
Step 4 Perform Field Reviews
Step 5 Analyze/Report Findings
Step 6 Present Findings to Owner
Step 7 Prepare Formal Response
Step 8 Incorporate Findings

Responsibilities:
- RSA Team
- Design Team/Project Owner

FHWA Proven Safety Countermeasures

Descriptions provided in your handouts
FHWA Proven Safety Countermeasures

- Longitudinal Rumble Stripes / Center Line Rumble Stripes (CLRS)
- Roundabout
  Chesterfield Township, Burlington County

Additional Considerations

- Clearing for sight distance
- Enhanced signing / pedestrian crossings
Project Area

- Urban Minor Arterial, undivided 2-lanes
- 25/35 mph east/west of Franklin Blvd
- On street parking permitted (striped)
- Sidewalk on both sides
- Continental style crosswalks

Area Map

Begin: Lewis/ Berry St (MP 22.35)
End: New Brunswick border (MP 23.85)
Project Area

- Land Use
  - Commercial/residential
  - Medium density
  - Detached single family
  - Apartments near eastern project limits

- Demographics
  - 41% Black or African American
  - 30% Hispanic/Latino
  - 2.9% below poverty level
  - 2.4% use public transportation

Crash Data

All Crashes 2014-2016
• Total=257
• Overrepresentations:
  • Injury
  • Right Angle & Left Turn
  • Parked Vehicle
  • Pedestrian
  • At Unsignalized Intersections
  • Dry
  • Night

Pedestrian Crashes 2012-2016
• Total=16
• Overrepresentations:
  • Minor Injury
  • Dawn/Dusk
  • Wednesdays
  • May & October

NJTPA’s FY 2017-2018 Local Safety Program Network Screening List Ranking

<table>
<thead>
<tr>
<th>Regional Corridors</th>
<th>Ped Corridors</th>
<th>Intersections</th>
<th>Pedestrian Intersections</th>
</tr>
</thead>
<tbody>
<tr>
<td>#2 County</td>
<td>#5 County</td>
<td>#3 Lewis/Berry St</td>
<td>#18 County: Lafayette Ave</td>
</tr>
<tr>
<td>#45 NJTPA Region</td>
<td>#233 NJTPA Region</td>
<td>#38 Franklin Blvd</td>
<td>#20 County: Sydney Pl</td>
</tr>
<tr>
<td>#28 County</td>
<td>#20 County: Home St</td>
<td>#20 County: Sydney Pl</td>
<td>#20 County: Home St</td>
</tr>
</tbody>
</table>
Crash Diagrams (2016)

Crashes: RSA Project Area v. County Road System

Crash Type Breakdown

- 2014-2016 RSA Project Area
- 2014-2016 County Road System
## Crashes: Severity

### Severity (All Crashes)

<table>
<thead>
<tr>
<th>Severity</th>
<th>County Road System</th>
<th>RSA Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>0.2%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Major Injury</td>
<td>0.4%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Moderate Injury</td>
<td>4.4%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Minor Injury</td>
<td>20.9%</td>
<td>24.9%</td>
</tr>
<tr>
<td>Property Damage Only</td>
<td>74.1%</td>
<td>72.4%</td>
</tr>
</tbody>
</table>

### Severity of Overrepresented Crash Types & Conditions

- Right Angle Struck
- Parked Vehicle
- Left Turn
- Pedestrian
- Dry
- Night
- All Unsg. Intersections

### Crashes: Light & Surface Conditions

#### Surface Conditions (All Crashes)

<table>
<thead>
<tr>
<th>Condition</th>
<th>County Road System</th>
<th>RSA Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>0.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Icy</td>
<td>2.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Snowy</td>
<td>2.6%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Wet</td>
<td>15.9%</td>
<td>14.5%</td>
</tr>
<tr>
<td>Dry</td>
<td>78.6%</td>
<td>84.6%</td>
</tr>
</tbody>
</table>

#### Light Conditions (All Crashes)

- Unknown: 0.5%
- Night: 24.4%
- Dawn/Dusk: 4.0%
- Day: 71.1%
Crash Data (2014-2016)

Pedestrian Crash Data (2012-2016)
Pedestrian Crash Diagrams (2012-2016)

Pedestrian Crashes

- Property Damage Only: 62.5%
- Minor Injury: 12.5%
- Moderate Injury: 25.0%
- Major Injury: 65.8%
- Fatal: 3.4%

Light Condition for Pedestrian Crashes

- Dark: 28.8%
- Dawn/Dusk: 5.4%
- Daylight: 65.8%
Pedestrian Crashes: Temporal Data

Pedestrian Crashes by Day of Week

Pedestrian Crashes by Month

Crash Statistics

5-Year Temporal

14-Year Totals

Total Crashes by Month

Crashes by Collision Type
Crash Statistics (continued)

14-Year Totals

![Crashes by Collision Type](chart1.png)

Field Visit Itinerary

- 9:00a • Welcome and Introductions
  • Project Overview Presentation
- 10:30a • Field Visit and Observations
- 12:30p • Lunch and Regroup at Presentation Location
- 2:00p • Discuss Observations
  • Make Recommendations
- 3:30p • Adjourn

- Verify Identified Issues
- Observe Operations
- Note Other Safety Concerns
- Document Findings
  - Photographs
  - Checklist
- Safety First!
  - Use proper safety equipment
  - Stay alert to your surroundings
Field Visit & Observations
(pause presentation)

Post Audit Analysis
(resume presentation)
RSA Schedule

- **9:00a**
  - Welcome and Introductions
  - Project Overview Presentation
- **10:30a**
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- **12:30p**
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- **2:00p**
  - Discuss Observations
  - Make Recommendations
  - Discuss Observations
  - Make Recommendations
- **3:30p**
  - Adjourn

Post Audit Analysis

**Observations**

- 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?

**Recommendations**

- What corridor safety issues did you observe?
- What localized safety issues did you observe?
- What improvements would you make?
- Are any of the FHWA countermeasures beneficial?
**Next Steps**

- Preparation of RSA Report
- Review/comments from RSA Team
- Preparation of Preliminary Final Report
- NJDOT review
- Preparation of Final Report
- Approximate timeframe: 10 weeks

**Thank you!**
Questions/Comments
Appendix I - Excerpts from the Supporting Priority Investment in Somerset County Phase III Study & Access and Mobility Study
Description

Location / Franklin Township, NJ
Principal Roadways / NJ 27, CR-617, CR-514
Acreage / 320
Existing Uses / Residential, Commercial Corridor, Warehousing
Complete Streets Policy / No

PGIA Summary
The Hamilton Street (CR 514) corridor was chosen as the focus area of this PGIA. This corridor includes a mix of commercial and residential uses, including traditional commercial adjacent to the road frontage, strip commercial plazas designed with significant front-yard parking, single-family and multi-family housing, and mixed-use buildings with first floor commercial and upper floor residential. Dense neighborhoods of single-family, detached homes are located to the north and south of the corridor. The Hamilton Street corridor provides convenient access to downtown New Brunswick approximately 0.8 miles to the east, including the Rutgers University campus, Robert Wood Johnson University Hospital, and the New Brunswick train station on the Northeast Corridor.

Multi-Modal Access Metrics

Transit Access

0.34
MODERATE TRANSIT SERVICE

Network Walking Reach

0.45
SLIGHTLY WALKABLE

Access Summary
Multi-modal access metrics indicate an autocentric environment across the broader PGIA. Although there are no NJ TRANSIT services in the PGIA, the PGIA is served by Somerset County’s CAT and DASH bus routes and Middlesex County’s MCAT route. NJ TRANSIT’s New Brunswick and Jersey Avenue train stations are within one mile of the PGIA. While the corridor is relatively dense, it scores as slightly walkable due to gaps and fragmentation of the roadway network, which limit connectivity. A detailed analysis of the transportation infrastructure can be found in the Existing Conditions Technical Memorandum.
Investment Area Overview

**Strengths**
- Proximity to New Brunswick, Rutgers University, hospitals, and Northeast Corridor rail services
- Access to New Jersey Route 27
- Compact development, which facilitates bicycle and pedestrian improvements

**Weaknesses**
- Pedestrian crash history along Hamilton Street (6 pedestrian and 3 bicyclist crashes during 3-year period 2012-2014; identified by NJTPA Local Safety Program Network Screening)
- Narrow right of way on Hamilton Street constrains widening for multimodal improvements
- Lack of parallel street network alternatives to Hamilton Street
- Many cul-de-sacs and short street links limit overall street network connectivity
- Lacks municipal Complete Streets policy

**Opportunities**
- Enhance multimodal access through bicycle and pedestrian-only linkages and development of a bicycle boulevard network
- Support local business and neighborhood commercial corridor
- Use corridor to better connect New Brunswick and Franklin
- Leverage proximity to New Brunswick employment hubs, transportation links, and Rutgers University
- Seek funding for Road Safety Audit (RSA) on Hamilton Street
- Utilize the Mile Run Brook as a greenway
- Promote findings of the Strategic Zoning and Economic Development Recommendations Study

**Constraints**
- There are 14 known contaminated sites within the PGIA
- Mile Run Brook limits roadway connectivity to the east of the PGIA
- Hamilton Street roadway width limits on-street bicycle facility options
Multimodal Transportation Improvements

The proposed transportation improvements focus on enhancing multimodal mobility. These strategies seek to strengthen Hamilton Street as a neighborhood commercial corridor, improve linkages to major destinations and employment hubs in New Brunswick, and enhance safety for all roadway users. Improvement strategies are outlined below and illustrated on the map on the following page. Adoption of a Complete Streets policy would also support these efforts.

Hamilton Street Corridor

- Investigate shared-lane markings, connecting to existing markings in New Brunswick and emphasizing use of the roadway by bicyclists
- Repair deteriorating and/or heaved sidewalk sections
- Widen sidewalk (min. 10 feet) in front of commercial properties (e.g. Nora Shopping Center) to encourage pedestrian activity and accommodate street furniture, kiosks, and other amenities
- Enhance pedestrian crossings with curb extensions to improve visibility, shorten crossings, and slow traffic. Integrate green stormwater features into curb extensions, when feasible
- Upgrade traffic signal equipment to include pedestrian signal heads with countdown timers
- Build upon recent streetscape improvements by installing high-visibility, continental crosswalks and ADA-compliant curb ramps at unmarked crossings along the corridor
- Incorporate bicycle parking into streetscape
- Require bicycle parking with new development activity
- Replace improperly sited street trees and install additional street trees along the corridor, particularly along the westbound side where there are fewer conflicts with utilities
- Investigate opportunities to expand transit access along the corridor, such as NJ TRANSIT and/or Rutgers University bus service. Prioritize locations for potential stops and develop a design concept for integrating bus pull-outs
- Install bus stop signage

Lewis Street Bicycle Boulevard

Lewis Street provides a relatively continuous, parallel route one to two blocks north of Hamilton Street along the majority of the corridor. Designating and designing the route as a bicycle boulevard will prioritize bicycle movement, create a bicycle route comfortable for most bicyclists, and provide convenient access to commercial destinations along Hamilton Street, the Franklin Middle School, and connections into New Brunswick.
Investigate path connections to improve access to Mile Run Greenway and linkages between Franklin and New Brunswick.

Investigate new Mile Run Creek Greenway to support opportunities for recreation, preservation, and healthy communities.

Create a bicycle boulevard parallel to Hamilton Street, providing a more comfortable route for bicyclists of all ages and abilities.

Improve streetscape with wider sidewalks, more frequent and enhanced crossings, and traffic calming elements.

Investigate road diet to support a safer, more multimodal friendly environment.

Potential Improvements:
- Streetscape Improvements
- Road Diet / Speed Reduction
- Bicycle Boulevard
- Key Bicycle Boulevard Crossings
- Shared-Lane Markings
- Path Connection
- Mile Run Creek Greenway
Design considerations include:

- Consider 20 mph speed limit
- Install wayfinding signage and bicycle boulevard pavement markings
- Introduce traffic calming elements to reinforce low traffic speeds
- Provide crossing improvements of Franklin Boulevard, such as marked crossings, Rectangular Rapid Flashing Beacons (RRFBs), and median island to slow traffic speeds
- Install a multi-use path between Frederick Street and Berry Street, creating more direct access to the Middle School, and extending the bicycle boulevard concept for a greater distance

- Install contraflow bicycle lane on Lewis Street between Franklin Boulevard and Norma Avenue, connecting the bicycle boulevard through a one-block, one-way segment
- Mark and sign the crossings of Matilda, Baier, and Highland Avenues
- Leverage redevelopment of the Nora Shopping Center as an opportunity to route the bicycle boulevard across the rear of the property. This would provide the most direct connection between the current network gap between North Lawrence Avenue and Kee Avenue, route bicyclists more directly and conveniently to commercial destinations, and extend the bicycle boulevard farther via Green and/or Jefferson Streets

Enhance Multimodal Connectivity

- Provide bike/ped-only linkages to enhance network connectivity:
  - Burns Street between Jurocko Avenue and North Lawrence Avenue
  - Between Winslow Avenue and Miller Avenue
- Provide bike/ped connection from Eugene Avenue and Victor Street to the rear and side, respectively, of the Hamilton Street Center shopping plaza. These connections would require cooperation from the property owner and/or could be incorporated into future development activity to provide more direct bike/ped access from the surrounding neighborhoods.
- Fill gaps in sidewalk network in the surrounding residential neighborhoods
- Investigate opportunities to utilize the Mile Run Creek as a greenway to support recreation, mobility, and conservation. The corridor links New Brunswick, residential neighborhoods, and several schools
- Investigate opportunities to enhance bike/ped connectivity between Franklin and New Brunswick with bike/ped-only, prefabricated structures crossing over Mile Run Creek

Franklin Boulevard

- Investigate lowering the speed limit between NJ 27 and Lewis Avenue (currently 40 mph). This section has denser development patterns and development closer to the roadway than the section north of Lewis Avenue
- Investigate a road diet between Hamilton Street and NJ 27, as discussed in the following section
- Fill sidewalk gaps between Ellen and Frank Streets, south of Field Street, and between Fuller Street and NJ 27
Bicycle Boulevard Design

Bicycle boulevards are linear corridors of interconnected, traffic-calmed streets where bicyclists are afforded a high level of safety and comfort. Many local streets have existing low motor vehicle travel speeds and volumes that form the basic components of a comfortable bicycling environment. These streets can be enhanced to create a bicycle boulevard. Many of these treatments benefit not only bicyclists, but all users of the street by supporting a safe and quiet environment.

Bicycle boulevard treatments prioritize travel for bicyclists by simplifying navigation and discouraging high vehicle speeds and volumes while still accommodating local access. Some bicycle boulevards also include links for bicyclists that are not open to vehicular traffic. Intersection crossing treatments are also crucial to creating more comfortable streets for users of all ages and abilities.

The following design treatments, where applicable, are the primary strategies to support a bicycle boulevard.

Reduced Speed Limits

The maximum speed limit for a bicycle boulevard is 25 mph; however, a speed limit of 20 mph or lower is preferred.

Signage and Markings

Signage, pavement markings, and wayfinding convey that the corridor is intended as a shared, slow street, prioritize bicycle movement, and help cyclists navigate the corridor.

Speed Management

Traffic calming elements reinforce slow travel speeds along the corridor and create a more comfortable cycling environment consistent with local context.

Volume Management

Volume management techniques discourage motor vehicle through traffic on designated bicycle boulevards. Bicycle boulevards should be designed for traffic volumes under 1,500 vehicles per day.

(left) Photo simulation of a bicycle boulevard in Princeton, NJ, includes pavement markings, wayfinding, and traffic calming; (right) Bicycle boulevard on Haven Avenue in Ocean City, NJ, has a 15 mph speed limit and uses curb extensions and a raised median to slow traffic and reduce cut-through traffic along this local residential street.
Transit Stop Design

As Hamilton Street continues to undergo redevelopment and increase in density, the Township should continue to coordinate with NJ TRANSIT, Somerset County, and Rutgers University to explore opportunities for bus transit services along the corridor. Bus service would enhance the multimodal aspect of the corridor and increase transportation options for accessing Rutgers University, employment hubs, nearby train stations, and downtown New Brunswick.

Provision of bus services would require minor alterations to the roadway and streetscape to better accommodate bus stops and transit passengers at key destinations along the corridor.

At each stop, on-street parking would be prohibited in order to provide bus pull-outs. Bus pull-outs facilitate convenient, curbside boarding/alighting for passengers while still enabling through traffic to pass relatively unimpeded. Depending on the unique characteristics of a stop location, bus stops may be sited midblock or on the near-side or far-side of an intersection. Stops at intersections would require removal of approximately three parking spaces, while midblock stops may require removal of approximately five spaces.

Each stop should include signage and lighting. Additional passenger amenities, such as seating, a transit shelter, and traveler information are also preferred. The sidewalk should be wider at bus stop locations in order to accommodate transit passenger activity and amenities while maintaining a minimum 5-foot wide through travel zone for pedestrians.

(top) Typical cross-section for a transit stop along Hamilton Street (bottom) Example layout of a far-side bus pull-out stop (NACTO Transit Street Design Guide)
Franklin Boulevard Road Diet Analysis and Conceptual Design

A road diet, or right sizing, is a low cost method of reconfiguring the existing roadway space to improve safety, enhance multimodal mobility, and support local community needs while still efficiently moving traffic. Road diets typically involve reducing the number of vehicle lanes from four to three and reallocating the remaining space to on-street parking, pedestrian and streetscape improvements, bicycle lanes, transit accommodations, or shoulders.

The Federal Highway Administration (FHWA) endorses road diets as a proven safety countermeasure and they are becoming standard practice in New Jersey. Forty-seven road diet projects have been implemented in New Jersey in the last five years, including Washington Avenue (CR 529) in Green Brook in 2016.

The benefits associated with road diets include:

- Improved safety for all roadway users
  - Fewer conflict points
  - Reduced crash frequency by 19 percent to 43 percent (FHWA)
  - Reduced crash severity
- Provide space for improved accommodations for bicyclists, pedestrians, and/or transit passengers
- Reduced and more consistent vehicle speeds
- Provides a pedestrian-friendly streetscape, supporting the local economy and quality of life

Analysis

Franklin Boulevard has an annual average daily traffic (AADT) of 13,748 vehicles (2015) and approximately 665 vehicles per hour per direction (VPHPD) during the peak hour (2016 analysis). Both metrics are within general feasibility guidelines for identifying and advancing road diet candidates. To further investigate potential impacts on traffic flow, the project team collected peak hour turning movement traffic counts and conducted a microsimulation analysis for the signalized intersections at Hamilton Street and NJ Route 27.

The analysis compared the level-of-service (LOS) and delay for each intersection approach in the existing condition and the proposed road diet scenario. As shown in the table below, the analysis indicates essentially no negative impact to the operation of the intersections, as the existing LOS is maintained with the road diet in place.

<table>
<thead>
<tr>
<th>Capacity Analysis for Road Diet Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Existing LOS</strong></td>
</tr>
<tr>
<td><strong>AM</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Franklin Blvd at Hamilton Street</td>
</tr>
<tr>
<td>Franklin Blvd NB</td>
</tr>
<tr>
<td>Franklin Blvd SB</td>
</tr>
<tr>
<td>Hamilton St EB</td>
</tr>
<tr>
<td>Hamilton St WB</td>
</tr>
<tr>
<td>Franklin Blvd at NJ Route 27</td>
</tr>
<tr>
<td>Oliver Ave NB</td>
</tr>
<tr>
<td>Franklin Blvd SB</td>
</tr>
<tr>
<td>NJ 27 EB</td>
</tr>
<tr>
<td>NJ 27 WB</td>
</tr>
</tbody>
</table>
The analysis also indicates that the Hamilton Street intersection currently operates at a peak hour LOS F. Reevaluating and optimizing the signal timing may be considered as a part of the road diet implementation for this intersection.

**Conceptual Design**

The road diet concept proposes reconfiguring the existing roadway from four travel lanes to two travel lanes, along with a two-way center turn lane. The remaining space could be allocated to bicycle lanes or striped shoulders. The figures below illustrate the current and potential cross sections, as well as the extent of the road diet. Road diets tend to facilitate lower operating speeds, and the implementation of the road diet should also investigate lowering the existing 40 mph speed limit. The roadway reconfiguration and reduced speed limit would improve safety and better support the local context and development patterns.

Based on the intersection analysis and typical queue lengths, turn lanes are required to provide adequate stacking capacity and maintain existing intersection performance. The intersection at Hamilton Street would maintain the existing configuration with a northbound left-turn lane extending approximately to Field Street. At NJ Route 27, the southbound left-turn lane should extend at least 150 feet in order to accommodate typical vehicle queues.

This concept provides an initial design alternative for further evaluation. The concept should be explored in greater detail with local, county, and NJDOT stakeholders.
<table>
<thead>
<tr>
<th>Improvement</th>
<th>Order of Magnitude Cost (Est.)</th>
<th>Time Frame</th>
<th>Potential Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamilton Street / Renaissance Redevelopment PGIA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hamilton Street Corridor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Install bus stop signage</td>
<td>Low</td>
<td>Short</td>
<td>County</td>
</tr>
<tr>
<td>Promote findings of the Strategic Zoning and Economic Development Recommendations Study</td>
<td>Low</td>
<td>Short</td>
<td>Town / County</td>
</tr>
<tr>
<td>Investigate shared-lane markings connecting to existing markings in New Brunswick</td>
<td>Low</td>
<td>Med</td>
<td>Town / County</td>
</tr>
<tr>
<td>Repair deteriorating and / or heaved sidewalk sections</td>
<td>Low</td>
<td>Med</td>
<td>Town / County</td>
</tr>
<tr>
<td>Widen sidewalk (min. 10 ft) in front of commercial properties</td>
<td>Low</td>
<td>Long</td>
<td>Town / Developer</td>
</tr>
<tr>
<td>Enhance pedestrian crossings with curb extensions and integrate green stormwater features into curb extensions</td>
<td>Low</td>
<td>Long</td>
<td>Town / County / Developer</td>
</tr>
<tr>
<td>Upgrade traffic signal equipment to include pedestrian signal heads and countdown timers</td>
<td>Low</td>
<td>Long</td>
<td>County</td>
</tr>
<tr>
<td>Install high-visibility crosswalks and ADA compliant curb ramps at unmarked crossings</td>
<td>Low</td>
<td>Long</td>
<td>County / Developer</td>
</tr>
<tr>
<td>Investigate opportunities to incorporate bicycle parking into streetscape and require bicycle parking for new developments</td>
<td>Low</td>
<td>Long</td>
<td>Town / County / Developer</td>
</tr>
<tr>
<td>Investigate opportunities to expand transit access along the corridor, such as NJ TRANSIT and/or Rutgers University bus service</td>
<td>Low</td>
<td>Long</td>
<td>County / NJ TRANSIT / Rutgers / Town</td>
</tr>
<tr>
<td><strong>Lewis Street Bicycle Boulevard</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Install wayfinding signage and bicycle boulevard pavement markings</td>
<td>Low</td>
<td>Med</td>
<td>Town</td>
</tr>
<tr>
<td>Install a multi-use path between Francis Street and Berry Street</td>
<td>Low</td>
<td>Long</td>
<td>Town</td>
</tr>
<tr>
<td>Provide marked crossings and median islands on Franklin Boulevard</td>
<td>Low</td>
<td>Long</td>
<td>County / Town</td>
</tr>
<tr>
<td>Improvement</td>
<td>Order of Magnitude Cost (Est.)</td>
<td>Time Frame</td>
<td>Potential Partners</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Install contraflow bicycle lane on Lewis Street between Franklin Boulevard and Norma Avenue</td>
<td>Low</td>
<td>Long</td>
<td>Town</td>
</tr>
<tr>
<td>Investigate opportunity to install bicycle boulevard behind the Nora Shopping Center</td>
<td>Low</td>
<td>Long</td>
<td>Town / Developer</td>
</tr>
<tr>
<td><strong>Enhanced Multimodal Connectivity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adopt Complete Streets policy</td>
<td>Low</td>
<td>Short</td>
<td>Town</td>
</tr>
<tr>
<td>Investigate opportunities to enhance bike/ped connectivity between Franklin and New Brunswick with bike/ped-only, prefabricated structures crossing over Mile Run Creek</td>
<td>Low</td>
<td>Long</td>
<td>Towns</td>
</tr>
<tr>
<td>Provide bike/ped connections on Burns Street between Jurocko Avenue and North Lawrence Avenue and Winslow Avenue and Miller Avenue</td>
<td>Low</td>
<td>Long</td>
<td>Town</td>
</tr>
<tr>
<td>Provide bike/ped connection from Eugene Avenue and Victor Street to the rear and side, respectively, of the Hamilton Street Center shopping plaza</td>
<td>Low</td>
<td>Long</td>
<td>Town / Property Owner / Developer</td>
</tr>
<tr>
<td>Investigate opportunities to utilize the Mile Run Creek as a greenway</td>
<td>Low</td>
<td>Long</td>
<td>Town</td>
</tr>
<tr>
<td><strong>Franklin Boulevard</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investigate lowering the speed limit between NJ 27 and Lewis Avenue (currently 40 mph)</td>
<td>Low</td>
<td>Med</td>
<td>County / Town</td>
</tr>
<tr>
<td>Fill sidewalk gaps between Ellen Street and Frank Street, and between Fuller Street and NJ 27</td>
<td>Low</td>
<td>Long</td>
<td>Town</td>
</tr>
<tr>
<td>Investigate a road diet between Hamilton Street and NJ 27</td>
<td>Low</td>
<td>Long</td>
<td>County / Town / NJDOT</td>
</tr>
</tbody>
</table>

**NOTE:**
Order of Magnitude Cost tiers:
- Low: <$5M
- Medium: $5M - $25M
- High: >$25M

Time Frame tiers:
- Short: <3 year
- Med: 3-8 years
- Long: >8 years
HAMILTON ST/RENAISSANCE DEVELOPMENT PGIA

The study area for the EJ analysis was determined based on a 500 foot buffer around the segments where improvements have been proposed, as shown in (Figure 17). The EJ analysis for the study area included all block groups that overlapped the 500 foot buffer.

According to 2010 Census Data, the Investment Area contains an estimated 13,302 individuals accounting for 4.1% of Somerset County's overall population. Meanwhile, the block groups that overlap the study area contain approximately 11,279 individuals, accounting for 3.49% of Somerset County's overall population.

Figure 17 Study Area
Poverty

Poverty within PGIA
Census data on poverty populations in the Hamilton St/Renaissance Development PGIA boundary and Somerset County as a whole was obtained from the 2014 ACS for block groups. The data collected provides information about poverty status in the past 12 months by household type.

An analysis of the data reveals that the percentage of those living below poverty level in the Investment Area (7.9%) is significantly higher than the Somerset County average percentage of population living below poverty level of 4.9%. Approximately 5.5% of Somerset County’s population living below poverty level resides within the PGIA, as displayed in Figure 18.

A complete breakdown by block group is displayed in Table 4 below. The map (Figure 19) also displays each block group’s share of the County’s below poverty level population.

Poverty within Study Area
The data show that 5.3% (303) of Somerset County’s living below poverty level households are located in the study area. Of the households located within the block groups in the study area, approximately 9.1% live below poverty level. Figure 20 displays the households living below poverty level within the study area.
Environmental Justice Assessment Technical Memorandum

Figure 18 Comparison of Households Living Below Poverty Level

- Households (HH) Above Poverty Level in Somerset County
- HH Below Poverty Level in Somerset County
- HH Below Poverty Level in Investment Area compared to HH Below Poverty Level in Somerset County

Table 4 Households Living Below Poverty Level by Block Group

<table>
<thead>
<tr>
<th>Tract</th>
<th>Block Group</th>
<th>Household Population</th>
<th>Households below Poverty Level</th>
<th>% Households in PGIA below Poverty Level</th>
<th>Share of County's Population below Poverty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>532</td>
<td>3</td>
<td>464</td>
<td>27</td>
<td>5.82%</td>
<td>0.47%</td>
</tr>
<tr>
<td>532</td>
<td>2</td>
<td>481</td>
<td>81</td>
<td>16.84%</td>
<td>1.41%</td>
</tr>
<tr>
<td>532</td>
<td>4</td>
<td>653</td>
<td>17</td>
<td>2.60%</td>
<td>0.30%</td>
</tr>
<tr>
<td>532</td>
<td>1</td>
<td>402</td>
<td>27</td>
<td>6.72%</td>
<td>0.47%</td>
</tr>
<tr>
<td>533</td>
<td>2</td>
<td>557</td>
<td>122</td>
<td>21.90%</td>
<td>2.13%</td>
</tr>
<tr>
<td>533</td>
<td>1</td>
<td>769</td>
<td>29</td>
<td>3.77%</td>
<td>0.51%</td>
</tr>
<tr>
<td>534.04</td>
<td>1</td>
<td>683</td>
<td>14</td>
<td>2.05%</td>
<td>0.24%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4,009</td>
<td>317</td>
<td>7.91%</td>
<td>5.54%</td>
</tr>
</tbody>
</table>

XX = Block groups overlapping the study area
Minority

Data on minority populations in the Hamilton Street PGIA boundary and Somerset County as a whole was obtained from the 2010 Census for block groups.

Minority within PGIA

A comparison of racial composition in the PGIA and Somerset County is displayed in Figure 21. The comparison shows that the percentage of minority populations in the PGIA surpass that of Somerset County across every category, with the exception of the Asian population – 6.7% percent within the PGIA, in comparison to Somerset County with an Asian population average of 14.1%.

An analysis of the data reveals that the total minority population within the Investment Area (84.2%) greatly exceeds the Somerset County minority population average of 37.6%. This indicates that the overwhelming majority of the population within the PGIA is considered minority. A complete breakdown by Block Group is displayed in Table 5.

The Minority Population map (Figure 22) displays the total percentage of minority population within each block group, denoted by the color. Additionally, the map displays the share of the County’s overall Minority population located within each individual block group. Approximately 9.2% of Somerset County’s minority population lives within the PGIA.

Minority within Study Area

The data show that the concentration of minority populations within the study area (57.6%) is marginally higher compared to the PGIA (54.1%). Figure 23 displays the minority population located within the study area.
Figure 21 Comparison of Racial Composition

![Bar chart showing racial composition](chart.png)

Table 5 Population Breakdown by Block Group

<table>
<thead>
<tr>
<th>Tract</th>
<th>Block Group</th>
<th>Total Pop.</th>
<th>Minority Pop.</th>
<th>White</th>
<th>Hispanic</th>
<th>Asian</th>
<th>Black</th>
<th>Indian Alaskan</th>
<th>Hawaiian Islander</th>
<th>Multi Race</th>
<th>Other</th>
<th>% Minority Pop.</th>
<th>Share of County's Minority Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>532</td>
<td>3</td>
<td>1,658</td>
<td>1,604</td>
<td>54</td>
<td>615</td>
<td>19</td>
<td>911</td>
<td>13</td>
<td>-</td>
<td>39</td>
<td>7</td>
<td>96.74%</td>
<td>1.32%</td>
</tr>
<tr>
<td>532</td>
<td>2</td>
<td>1,751</td>
<td>1,601</td>
<td>150</td>
<td>826</td>
<td>73</td>
<td>648</td>
<td>9</td>
<td>-</td>
<td>33</td>
<td>12</td>
<td>91.43%</td>
<td>1.32%</td>
</tr>
<tr>
<td>532</td>
<td>4</td>
<td>1,535</td>
<td>1,506</td>
<td>129</td>
<td>341</td>
<td>84</td>
<td>1,032</td>
<td>2</td>
<td>1</td>
<td>32</td>
<td>14</td>
<td>92.11%</td>
<td>1.24%</td>
</tr>
<tr>
<td>532</td>
<td>1</td>
<td>1,532</td>
<td>1,058</td>
<td>474</td>
<td>471</td>
<td>97</td>
<td>441</td>
<td>1</td>
<td>3</td>
<td>38</td>
<td>7</td>
<td>69.06%</td>
<td>0.87%</td>
</tr>
<tr>
<td>533</td>
<td>2</td>
<td>1,663</td>
<td>1,559</td>
<td>104</td>
<td>411</td>
<td>72</td>
<td>1,021</td>
<td>-</td>
<td>-</td>
<td>48</td>
<td>7</td>
<td>93.75%</td>
<td>1.28%</td>
</tr>
<tr>
<td>533</td>
<td>1</td>
<td>3,040</td>
<td>2,542</td>
<td>498</td>
<td>1,476</td>
<td>243</td>
<td>727</td>
<td>12</td>
<td>-</td>
<td>59</td>
<td>25</td>
<td>83.62%</td>
<td>2.09%</td>
</tr>
<tr>
<td>534.04</td>
<td>1</td>
<td>2,023</td>
<td>1,325</td>
<td>698</td>
<td>196</td>
<td>307</td>
<td>773</td>
<td>2</td>
<td>-</td>
<td>43</td>
<td>4</td>
<td>65.50%</td>
<td>1.09%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>13,302</td>
<td>11,195</td>
<td>2,107</td>
<td>4,336</td>
<td>895</td>
<td>5,553</td>
<td>39</td>
<td>4</td>
<td>292</td>
<td>76</td>
<td>84.16%</td>
<td>9.21%</td>
</tr>
</tbody>
</table>

**XX = Block groups overlapping the study area**
Figure 22 Minority Population

Minority Population

- > 75%
- 15% - 25%
- 50% - 75%
- < 15%
- 25% - 50%
- X% - Share of County’s Minority Population

Source: U.S. Census Bureau, 2019 Decennial Census 10-Year Estimates
Figure 23 Minority Population within Study Area

Environmental Justice Study Area

- Investment Area Boundary
- Study Area 500ft Buffer
- Share of County's Minority Pop

Minority Population
- >75%
- 50% - 75%
- 25% - 50%
- 15% - 25%
- <15%

Source: U.S. Census Bureau, 2019 Decennial Census 5-Year Estimates
Limited English Proficiency

Census data on Limited English Proficiency (LEP) population within the Hamilton Street PGIA boundary and Somerset County as a whole was obtained from the 2014 ACS for block groups. Limited English Proficiency households were identified as one where all members 14 years old and over speak English less than “very well.”

LEP within PGIA

A comparison of the LEP households in the PGIA and Somerset County is displayed below (Figure 24). The graphic displays percentages of LEP households according to household language – this includes Spanish, Indo-European, Asian and Pacific Island, and other languages. The percentages show that the LEP population within the PGIA is fairly similar in composition to that of Somerset County, however the PGIA contains a significantly higher percentage of Spanish-speaking LEP population (7.8%) than the County with 2.6%.

The census data reveals that the LEP population in the PGIA (11.1%) far exceeds the average percentage of LEP population in Somerset County of 5.3%. Approximately 7.3% of Somerset County’s LEP population lives within the PGIA. A complete breakdown by Block Group is displayed in Table 6.

The Limited English Proficiency map (Figure 25) displays the percentage of LEP population located within each of the Block groups. The map also displays the share of the County’s LEP population located within each block group.

LEP within Study Area

The data show that the LEP households approximately 6.7% (406) of Somerset County’s LEP households reside within the study area, displayed in Figure 26.
Figure 24 Comparison of Limited English Proficiency Households

Table 6 Limited English Proficiency by Block Group

<table>
<thead>
<tr>
<th>Tract</th>
<th>Block Group</th>
<th>Household Population</th>
<th>LEP Households</th>
<th>% LEP Households in PGIA</th>
<th>Share of County's LEP Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>532</td>
<td>1</td>
<td>402</td>
<td>67</td>
<td>16.67%</td>
<td>1.10%</td>
</tr>
<tr>
<td>532</td>
<td>4</td>
<td>653</td>
<td>52</td>
<td>7.96%</td>
<td>0.85%</td>
</tr>
<tr>
<td>532</td>
<td>2</td>
<td>481</td>
<td>111</td>
<td>23.08%</td>
<td>1.82%</td>
</tr>
<tr>
<td>532</td>
<td>3</td>
<td>464</td>
<td>27</td>
<td>5.82%</td>
<td>0.44%</td>
</tr>
<tr>
<td>533</td>
<td>1</td>
<td>769</td>
<td>116</td>
<td>15.08%</td>
<td>1.90%</td>
</tr>
<tr>
<td>533</td>
<td>2</td>
<td>557</td>
<td>33</td>
<td>5.92%</td>
<td>0.54%</td>
</tr>
<tr>
<td>534.04</td>
<td>1</td>
<td>683</td>
<td>38</td>
<td>5.56%</td>
<td>0.62%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>4,009</td>
<td>444</td>
<td>11.08%</td>
<td>7.27%</td>
</tr>
</tbody>
</table>

XX = Block groups overlapping the study area
Figure 25 Limited English Proficiency

Limited English Proficiency

- > 30%
- 20% - 30%
- 10% - 20%
- < 5%
- 5% - 10%
- Block Group Boundary
- PGIA Boundary
- Share of County’s LEP HHs

Source: U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates
Appendix J - Road Owner Response: Somerset County
Somerset County Response to Hamilton Street Road Safety Audit (owner's response)

Somerset County agrees with the recommendations of the Hamilton Street Road Safety Audit. The County strives to make our roads safer for all users and is willing to investigate any recommendations that can assist in achieving that goal. Our agreement with the assessment should in no way be perceived as a commitment to the implementation of such suggestions.

The following general points should be noted:

- Somerset County does not maintain or inspect sidewalks along county roadways. That responsibility lies with the municipality or property owner.
- Traffic impacts of land development projects are analyzed when these developments are submitted for review. Approval of land development projects is contingent on implementation of measures that ameliorate those impacts. Review of the traffic impacts of new developments would therefore be redundant.
- Some recommendations may not be warranted or feasible due to engineering or fiscal constraints. Additional analysis is necessary.