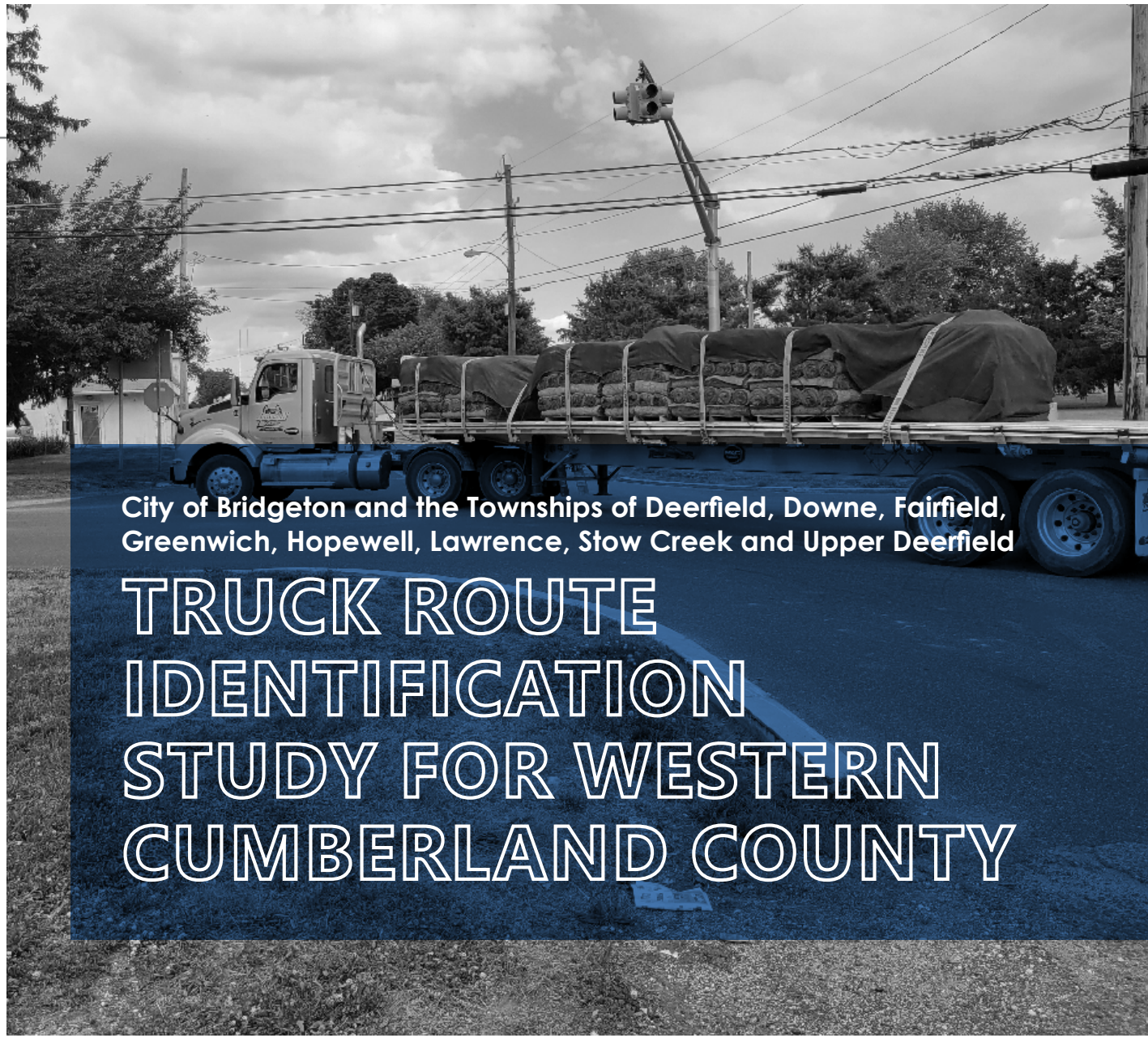

City of Bridgeton and the Townships of Deerfield, Downe, Fairfield, Greenwich, Hopewell, Lawrence, Stow Creek and Upper Deerfield

TRUCK ROUTE IDENTIFICATION STUDY FOR WESTERN CUMBERLAND COUNTY

June 2021

Est. 1989 TRAFFIC PLANNING AND DESIGN, INC.

Imperial TRAFFIC & DATA COLLECTION

THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF CUMBERLAND NEW JERSEY

SJTPO

With funding assistance from:

Acknowledgements

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This report, with funding from the South Jersey Transportation Planning Organization, provides an implementation strategy for pursuit of future funding opportunities under the NJDOT Local Freight Impact Fund (LFIF) Program focused on potentially eligible county routes within the western part of Cumberland County including the city of Bridgeton and the Townships of Deerfield, Downe, Fairfield, Greenwich, Hopewell, Lawrence, Stow Creek and Upper Deerfield.

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Introduction

Introduction

Traffic Planning and Design, Inc. (TPD), with subconsultant Imperial Traffic Data Collection, LLC, was retained by Cumberland County to study truck travel on the county roadway system within Western Cumberland County. The primary goal of the study was to identify potential projects that would be eligible for future rounds of funding under the New Jersey Department of Transportation (NJDOT) Local Freight Impact Fund (LFIF) Grant program. The study documents the development of the Truck Route Study to address the stated goal and outlines the findings from the evaluation of the County Road network.

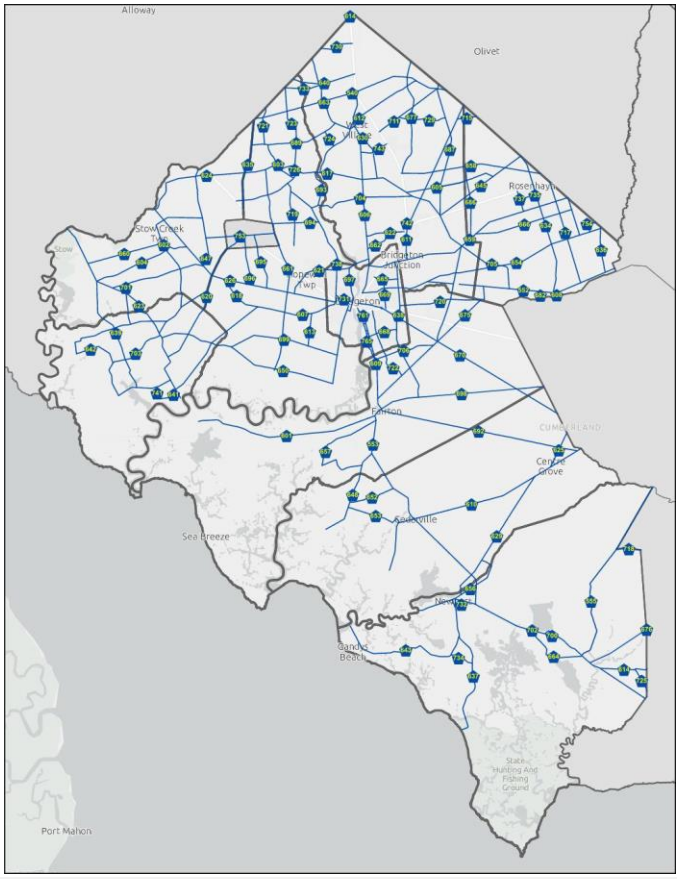
Project Purpose

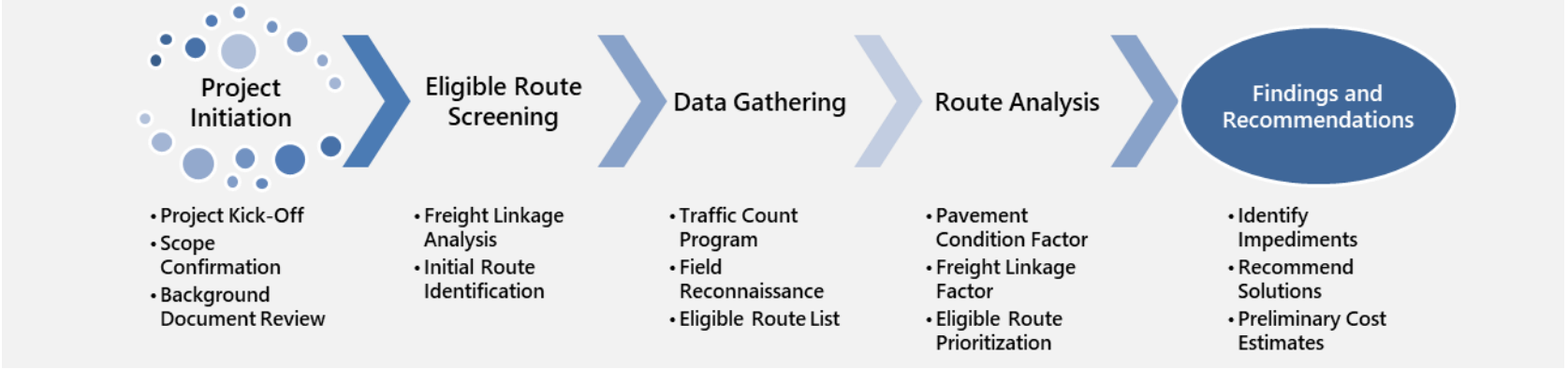
The purpose of this study was to identify existing and potential truck routes within and through the western portion of the County that will link the regional highway network with facilities generating a significant volume of truck traffic.

Project Overview

- **Identify** truck routes that connect the region's major freight destinations and provide efficient flow of truck traffic
- **Evaluate** infrastructure impediments to connect freight land uses with freight transportation facilities
- **Recommend** solutions that provide the most efficient benefit to regional truck connectivity
- **Develop** an implementable plan that can translate to pursuit of future funding through NJDOT's Local Freight Impact Funds

Figure 1. County Roadway System within the Focus Area





Background

Background

The Local Freight Impact Fund (LFIF) Program is a competitive state-funded grant established by the legislature with the adoption of Assembly Bill No. 10(4R). The LFIF program provides approximately $30.1 million in annual funding to assist counties and local municipalities in addressing local transportation system impacts associated with the State's freight industry. Since Fiscal Year 2018, the LFIF program has funded 96 projects throughout the State aimed at improving the transportation infrastructure. Within Cumberland County, $10.232 million has been awarded to the county and local municipalities.

Cumberland County has been successful in receiving funding for four projects for a total $4.602 million in grant money through the LFIF program since FY 2018. Most recently, Cumberland County was a grant recipient of over $2 million in funding from the latest round.

Past projects have been awarded funding between $0.183 million to $4.0 million with an average award amount value of $1.25 million. Counties have been awarded higher value amounts compared to Municipalities since FY 2018 - $2.2 million compared to $1.0 million. A majority of the awarded projects were categorized under Pavement Preservation. For example, in FY 2021, 87% of the funded projects fell in this category.

Projects submitted for consideration must meet the following eligibility criteria:

- Projects must be **within the jurisdictional limits** of the applicant's municipality and/or county unless filed jointly with an adjacent municipality and/or county
- Applicants must demonstrate that the project will **provide access to a port, warehouse distribution center or any other freight node** by providing a narrative and a map supporting their request
- Projects must have as a **minimum 10% Large Truck Volume** within the project limits. A traffic study must be submitted to support this information

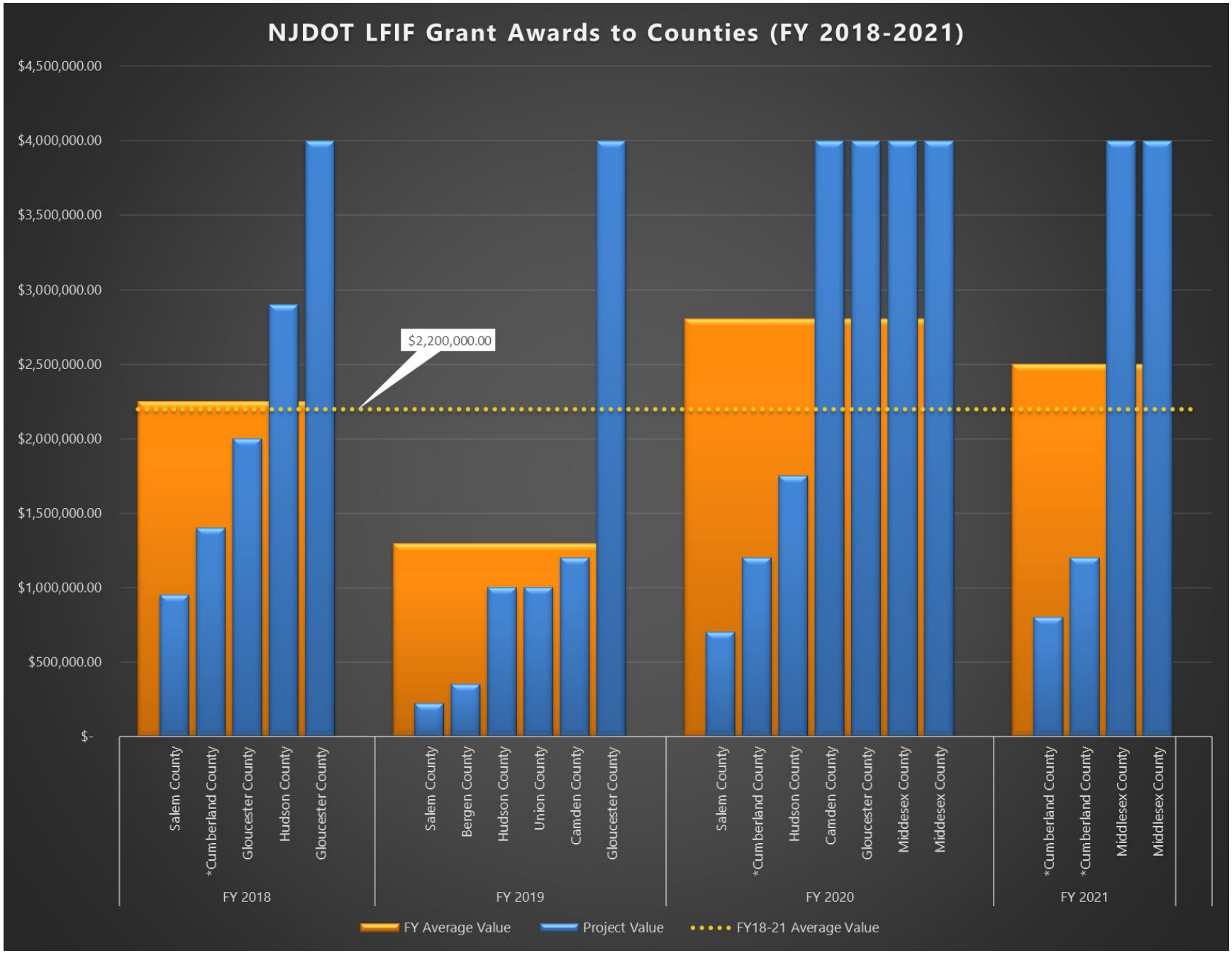
Projects for the LFIF program need to be classified in one of the following categories:

- **Pavement Preservation** to improve pavement conditions in support of freight travel on municipal/county transportation infrastructure
- **Truck Safety and Mobility** to improve large truck access, routing and mobility along the municipal/county roadway system
- **Bridge Preservation** to improve bridge ratings/conditions in support of freight travel on municipal/county transportation infrastructure
- **New Construction** to promote new construction in support of freight travel on municipal/county transportation infrastructure

Exhibit 1. NJDOT Local Freight Impact Fund – Cumberland County Awards

Recipient	FY	Project Name	Amount
Vineland City	2018	Gallagher Drive Resurfacing	$330,000
	2021	Resurfacing of Forest Grove Road	$450,000
Millville City	2019	Wade Boulevard & Orange Street Road Reconstruction	$1,000,000
	2020	Wade Boulevard & Orange Street Road Reconstruction	$450,000
Commercial Township	2019	Port Norris Riverfront Roadway Improvements	$1,500,000
	2020	Port Norris Riverfront Roadway Improvements - Phase II	$600,000
	2021	Port Norris Riverfront Roadway Improvements - Phase 3	$1,300,000
Cumberland County	2018	Cumberland County Freight Enhancement Project	$1,400,000
	2020	Resurfacing of CR 720	$1,200,000
	2021	FY 2021 LFIF: CR 614 (James Moore Road)	$800,000
	2021	Resurfacing of CR 646 (Port Elizabeth Cumberland Road)	$1,202,000

Exhibit 2. Summary of NJDOT Local Freight Impact Grant Funds Awarded to Counties




Study Process
& Approach

Study Process and Approach

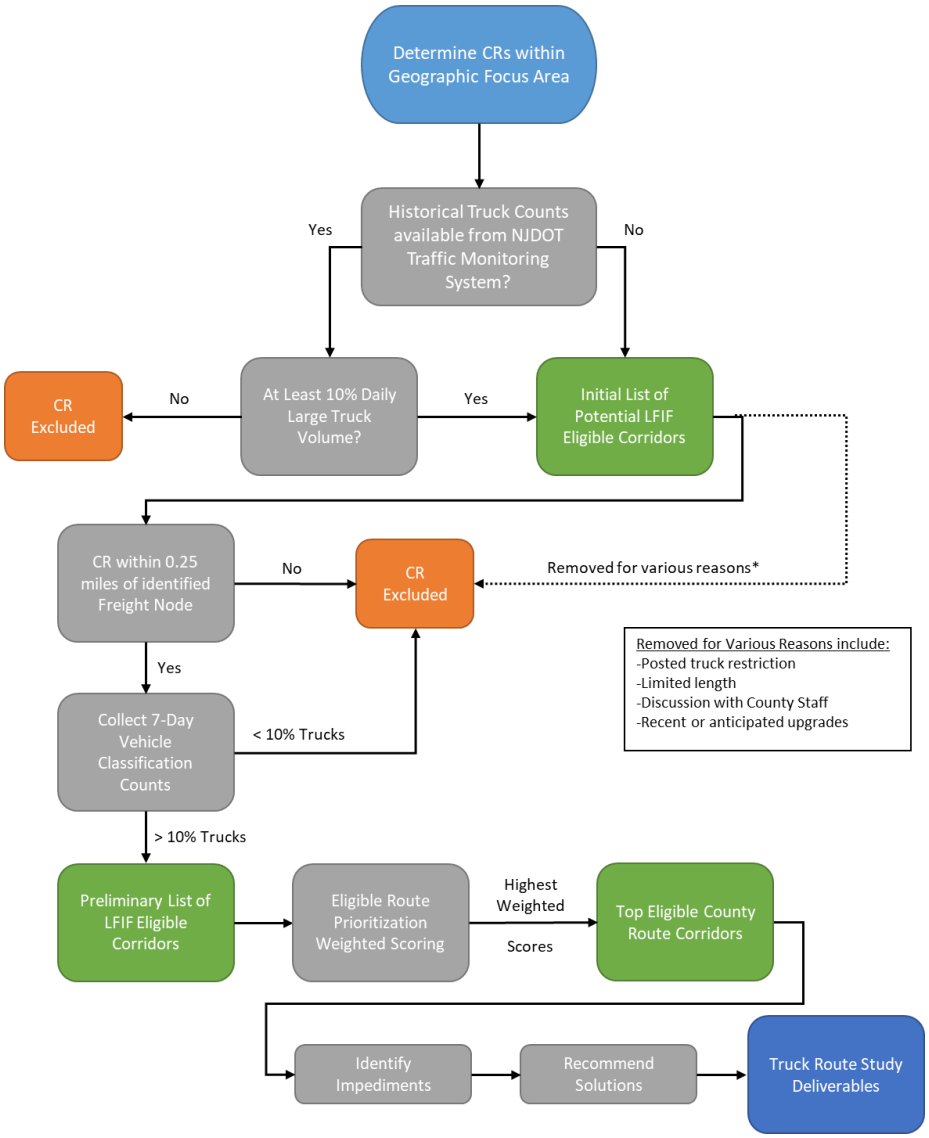
Study Process Overview

The geographic focus is Western Cumberland County and the industrial parks and farming operations generating truck traffic in the city of Bridgeton and the Townships of Deerfield, Downe, Fairfield, Greenwich, Hopewell, Lawrence, Stow Creek and Upper Deerfield. The study area encompasses a rather expansive area in terms of land area and county roadway system. The 51 county routes identified within the study area total approximately 335 miles of roadway system. The nine municipalities in the study area total approximately 260 square miles of land area. It was important to develop a study process that would evaluate the county roadway system in an efficient manner.

The Study Process consisted of five primary steps and followed a similar framework to the previously completed truck route study for Eastern Cumberland County:

- The first step involved an initial filter screening of the county roadway system based on historical truck count data to remove roadways that historically did not meet the truck volume requirement threshold.
- The second step evaluated the linkage of the county roadway system to freight nodes.
- The third step developed a traffic count program for the potentially eligible county roadway system to confirm the identified roadways meet the required truck volume threshold.
- The fourth step included evaluation and ranking of the eligible roadways.
- The fifth and final step involved the identification of truck impediments, development of recommendations and a prioritization strategy for future funding applications.

Figure 2. Study Process Flowchart



Relevant Document Review

TPD conducted a review of all relevant documents regarding trucking in the study area. TPD searched for and reviewed many documents, studies and programs that could contain potential trucking projects and important information including:

- NJ Statewide Freight Plan, December 2017
- NJDOT Large Truck Map for the State of New Jersey, January 2018
- NJDOT Southern New Jersey Freight Transportation and Economic Development Assessment, December 2010
- Transportation Plan Cumberland County, March 2013
- Bridgeton Master Plan Reexamination Report, 2018
- Bridgeton Southeast Gateway Plan, 2018
- Downe Township Master Plan, April 2000
- Deerfield Township Zoning Map, November 2018
- Fairfield Township Master Plan, 2012
- Greenwich Township Master Plan Reexamination, February 2010
- Hopewell Township Master Plan Statement, February 2007
- Lawrence Township Master Plan Reexamination, 2020
- Stow Creek Township Zoning Map, 2016
- Upper Deerfield Township Traffic Plan, 1992
- Upper Deerfield Master Plan Reexamination Report, April 2017

A brief summary of the relevant data within these documents is provided below.

NJ Statewide Freight Plan

This plan, completed in 2017, meets the specific guidelines outlined in the FAST Act requiring any state that received funding under the National Highway Freight Program (NHFP) to develop a state freight plan. The plan provides future opportunities to freight-specific federal funding opportunities and competitive grant resources. The plan identifies a range of projects aimed at maintaining efficient movement of goods through the State, and identifies focus areas around critical freight corridors or highway problem areas. The plan identifies several locations in the Eastern portion of Cumberland County, but none are specific to the Western portion.

NJDOT Southern New Jersey Freight Transportation Report

This report by the NJDOT, completed in 2010, built on the efforts from the year prior to publication and focused on the assessment of freight transportation, logistics, and industrial activity in the South Jersey region. The study looked to prioritize transportation needs to support freight, logistics, and industrial clusters across the South Jersey region.

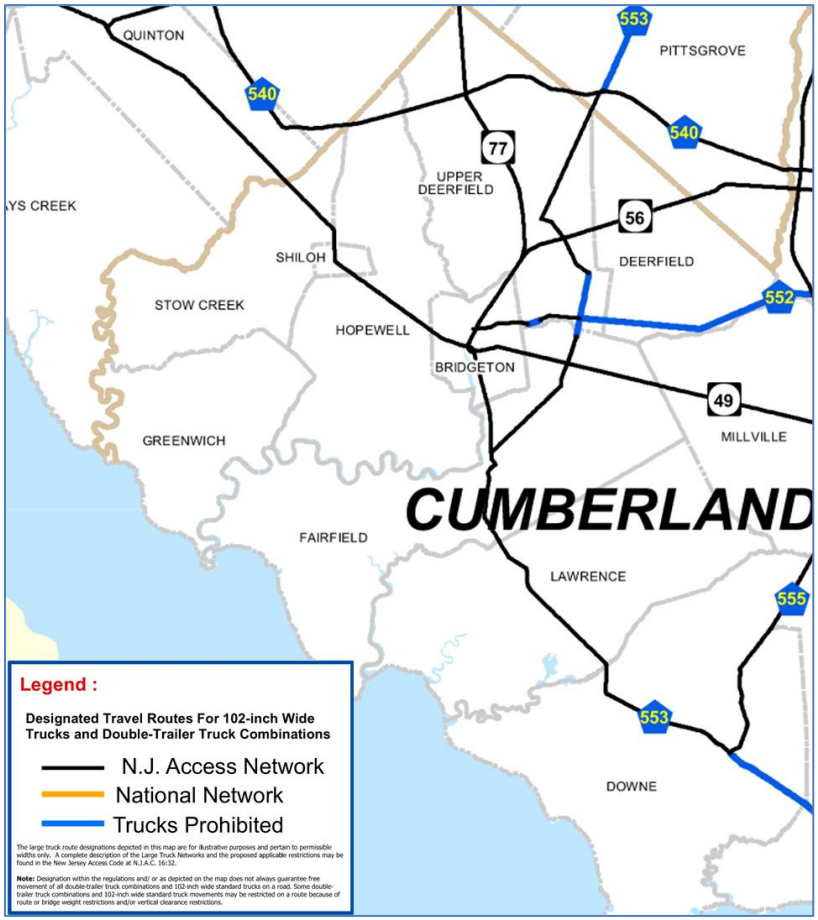
This report developed a three-stage blueprint which focused on maintaining the existing core industries and strengths, followed by improving industry through targeted improvements to infrastructure and policy, and finally expanding investments into new products, services, modes, and delivery. Stage One improvements are primarily highway-related, while Stage Two is primarily rail-related, and Stage Three is primarily marine. There were no targeted improvements identified within Western Cumberland County.

NJDOT Large Truck Map for the State of New Jersey

The map[1] provides a general overview for "Designated Travel Routes for 102-inch Wide Trucks and Double-Trailer Truck Combinations."

Within Western Cumberland County at the time of publication, NJ Access Network Routes include NJ 49, NJ 56, NJ 77, CR 540, and CR 555. Portions of CR 552 and 553 are also designated as NJ Access Routes. Other portions of CR 552 and CR 553 are designated as areas where such large trucks are prohibited.

Exhibit 3. NJ Large Truck Map within Cumberland County



[1] Western Cumberland County large truck travel routes taken from the NJDOT Large Truck Map (2018)

Cumberland County Transportation Plan

Truck freight is a large component of Cumberland County's economy, both in employment and industry share. But the trucking industry is constrained by the two-lane road network within the County and the County's relative remoteness from larger markets to the North and West.

One of the major industries in the County is agriculture which brings a unique set of challenges to goods movement. Agricultural freight has a strong seasonal component. Most agricultural food products grown in South Jersey are perishable, resulting in a high demand on trucking within the County.[2]

There are possibilities to expand the trucking industry in the County despite the limitations of the road network. The County's trucking industry is dispersed somewhat widely across the northern half of the County. This reduces the effectiveness of overall warehouse space in the County in terms of attracting storage markets. On the positive side, the County has a healthy warehouse capacity in its four urban industrial parks.[3]

The plan developed 15strategies to promote improvements and changes to the transportation system. Several strategies had a relationship with freight which identified opportunities including development on intermodal terminals along existing tracks at industrial parks, and possible improvements to NJ 55 with a new exchange at South Millville Industrial Park for better rail service and accessibility.

The Cumberland Economic Development Corporation has proposed a new regional business park with a major distribution center in Upper Deerfield Township on NJ 77 adjacent to a Winchester & Western railroad spur. It is imperative to establish an inter-modal rail-truck terminal for Cumberland County to compete in the increasingly high-tech goods movement industry.

Exhibit 4. Goods Movement Assessment within Cumberland County

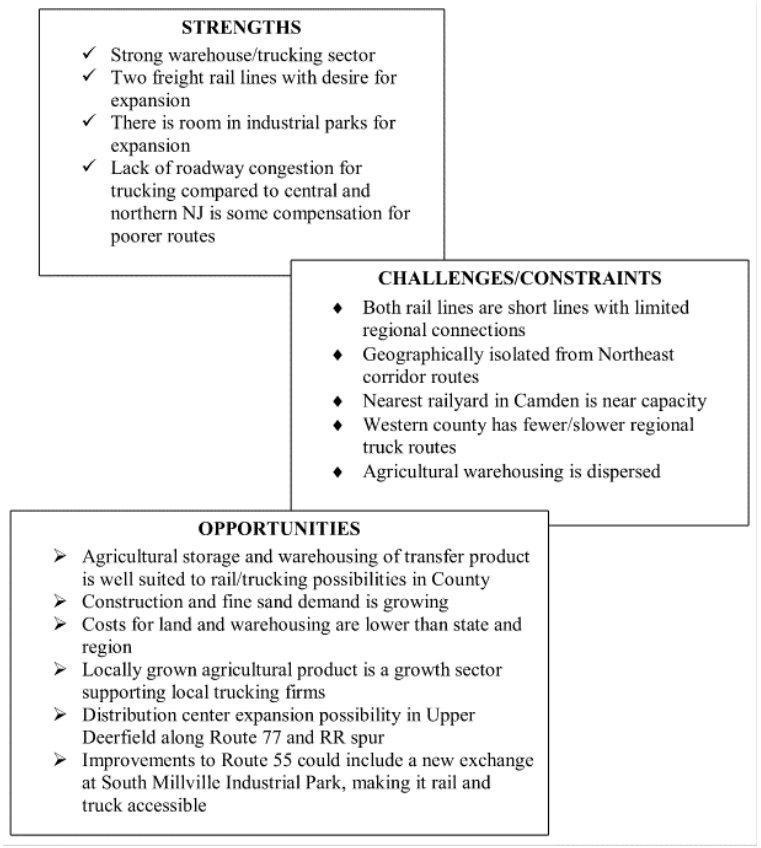


Exhibit 5. Major Industrial Parks Identified within Cumberland County

NAME	CITY	SQ. FT. STORAGE	PRIMARY ACCESS
Vineland Industrial Parks	Vineland	2,000,000	NJ Route 55, Exit 35
Bridgeton Industrial Parks	Bridgeton	750,000	NJ Route 49, NJ Route 77
Millville Airport Industrial Park	Millville	600,000	Local roads (4 miles) to NJ Route 55, Exit 4
South Millville Industrial Parks	Millville	2,500,000	NJ Route 55, Exit 4

Source: NJDOT South Jersey Freight Transportation & Economic Development Assessment (Tech. App.)

[2] Goods Movement Assessment shown from page 52 of the 2013 Transportation Plan Cumberland County
[3] Figure 23 from the 2013 Transportation Plan Cumberland County

Bridgeton Master Plan Reexamination Report

This report reexamined the 2008 Master Plan. Transportation and Circulation improvements/issues were identified, including implementing intersection improvements and bridge repairs at designated "hot spots" of NJ Routes 77 and 49, Cohansey River bridges, and the industrial park/prison area of Burlington Road. One identified transportation issue dealt with tractor trailer traffic issues in residential areas, further reviewed in the 2018 Southeast Gateway Neighborhood Strategic Plan.

Bridgeton lacks a lot of developable or redevelopable industrial land by acreage. As of publication, there were about 20 industrial or commercial areas remaining on tracts in the southeastern part of the City. The Office of Development and Planning prepared a 2016 Economic Development Action Agenda report and real estate marketing literature for these sites to encourage development and redevelopment. The available industrial parcels identified included approximately 12 acres zoned industrial on North/West Industrial Boulevard and an additional three (3) acres zoned industrial located in the Hope VI Redevelopment Area.

Bridgeton Southeast Gateway Plan

The 2018 Southeast Gateway Neighborhood plan was facilitated by a local planning committee and staff from the Gateway Community Action Partnership. The Southeast Gateway Neighborhood encompasses the area generally bound by the Cohansey River, Rocaps Run, the Winchester & Western Railroad, and NJ 49, which includes the Florida Avenue Industrial Park. The plan established three (3) principal goals - Enhance Public Safety; Advance Community and Economic Development; Ensure Creativity and Sustainability – with a range of projects and initiatives for each. In terms of freight, the plan expressed interest in rerouting truck traffic away from residential streets[4] and expanding the Florida Avenue Industrial Park[5].

Exhibit 6. Proposed New Truck Routes

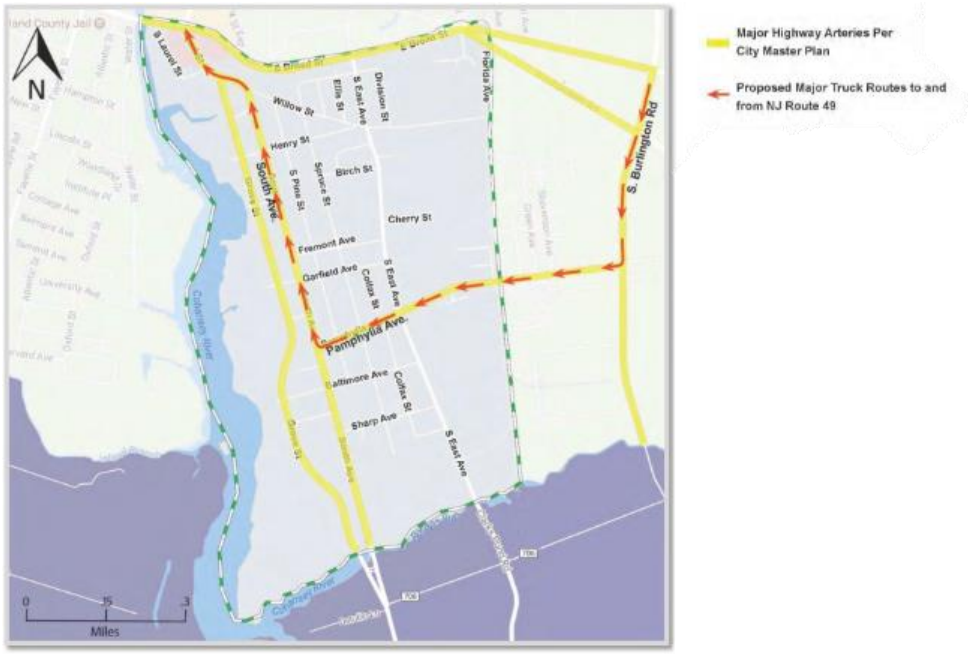


Exhibit 7. Proposed Industrial Park Expansion

[4] Map 22 from page 67 of the Southeast Gateway Neighborhood Strategic Plan (2018)
[5] Map 25 from page 74 of the Southeast Gateway Neighborhood Strategic Plan (2018)

Deerfield Township Zoning Map

Zoning specifically for agricultural uses is prevalent throughout the Township. Zoning for agricultural, industrial & commercial overlay uses are concentrated in the southeastern portion of the Township near Bridgeton Avenue, Mason Avenue and Lebanon Road. Zoning for center industrial/business uses are generally located near the center of the Township, especially in between Landis Avenue and Vineland Avenue.

Downe Township Master Plan

The Master Plan recommended that the Township should allow large industrial uses in areas where natural characteristics of the land use are suitable and where the infrastructure is in place to accommodate such uses.

Industrial and Commercial land uses are the largest, traditional types of heavy industry in the community. Sand companies own about 4,800 acres comprising 14% of land in the municipality. The Township wants to encourage more sand mining activities in and around existing operations and encourage light industry to locate in the community.

Fairfield Township Master Plan

The Master Plan was created in response to the ongoing development in the Township to accommodate new developments in a way that will notably encourage the retention of the agricultural business and maintain local food production. The plan conveys the main objectives and recommendations of Master Plans and Master Plan Reexamination Reports for the Township dating back to 1976.

Greenwich Township Master Plan Reexamination

The 1978 Future Land Use Plan called for the Township to diversify its economic base by encouraging industrial development that does not adversely impact Greenwich's rural/historic character.

Greenwich contains over 2,000 acres of permanently preserved farmland, comprising nearly 20% of the municipality's total land mass. Per the 1981 Right-to-Farm Ordinance, the Township protects commercial farm operations from nuisance actions and identified farming and its ancillary services as a permitted use everywhere in the Township regardless of zoning. This report recommended the creation and inclusion of a notification clause within the Township's existing Right-to-Farm Ordinance.

Hopewell Township Master Plan Statement

Hopewell is an agricultural community with 74% of its lands enrolled in farmland assessment. Approximately 70% of the township's land area is in agricultural production. Most such farms are in the Agricultural Zone (A), the largest zoning district in the Township. The zoning district permits agricultural use, and no new roads are permitted to be constructed in the Agricultural Zone.

There are no suggested changes to this current district and land use preservation efforts should continue to occur. It is also the location of the future sending area in which landowners will be provided incentives to sell their developmental rights, or credits, to a receiving area, thus preserving the farmland in perpetuity. Regarding commercial and industrial uses, the current zoning on Shiloh Pike will result in a suburbanization of the highway and undermine the character of the Township with excessive traffic. The Highway Commercial and Light Industry zoning district along Shiloh Pike should be replaced with an office and light industrial district at a low density.

Non-Residential uses are permitted in zoning districts along the Shiloh Pike corridor, NJ Route 49. The western section adjoining the Town of Shiloh is zoned Highway Commercial and Light Industry (HCI).

A third north-south connection, south of Shiloh Pike, was to be considered for the future near the Bridgeton border for traffic heading east towards Bridgeton and to avoid excessive traffic in the proposed town center. Within the new neighborhoods, traffic would be evenly distributed on streets to avoid overuse of any one intersection. New roads would connect to existing roads, when possible, to provide a complete circulation route. The design of Shiloh Pike should be reevaluated, and options included bump-outs, chokers, and other traffic-calming devices.

Lawrence Township Master Plan Reexamination

The Township seeks to promote a mix of agricultural and industrial uses within the village of Cedarville. To preserve its open space and woodlands, the Township seeks to limit growth in traditionally agricultural areas.

The Industrial zoning district "M-1" is centrally located along Sawmill Road, Cedarville-Millville Road and Factory Road. The Board believes that it makes sense to extend the M-1 zoning district along Factory Road and the railroad tracks and rezone the targeted areas accordingly. The Board also believes that the M-1 district could extend further to the southeast towards Newport Centre Grove Road in the future due to consolidation in the existing zoning district.

Stow Creek Township Zoning Map

The Zoning Map conveys the zoning districts located within Stow Creek Township as of publication. Most of the Township is designated as an Agriculture zone. The Agriculture zone extends from the southwest to northeast corner of the Township. The area bounded by NJ State Route 49, Jericho Road and Old Cohansey Road in the northeast portion of the Township is zoned for Agriculture/Commercial.

Upper Deerfield Township Traffic Plan

Within the plan is an "Immediate Action Program" that includes locations within the Township that represent (as of the publication) existing traffic problems that require immediate attention and could be improved by actions that can be implemented in the short or near term. Most of the problems listed in the plan have since been completed.

One notable list item that cannot be determined without further inquiry to have been corrected is the intersection of NJ Route 56, Woodruff Road (CR 553), and Centerton-Woodruff Road (CR 687). The plan noted that signal optimization could decrease delays to an acceptable level, and involve taking green time from NJ Route 56 and giving it to Woodruff Road (CR 553). However, the report notes that at the time of publication NJDOT was not likely to approve the change in timing, so the intersection should be monitored during ongoing development.

The plan called for the following roadway links to be added to the system:

1. A new bypass of the Deerfield area via a two-lane road to the east or west of NJ Route 77 from Friesburg-Deerfield Road to about 1,100 feet south of Polk Lane;
2. Provide a connector road from Big Oak Road (CR 658) west through the Bench property and continuing south to Cornwell Pike where it will connect opposite the extension of Park Drive. The road should follow the Deerfield Running Track on its east side.

Upper Deerfield Master Plan Reexamination Report

The intent of the report is to advance the aims of the New Jersey Municipal Land Use Law, and includes providing sufficient space as appropriate for a variety of agricultural and industrial uses, both public and private. It also includes encouraging the location and design of transportation routes that will promote the free flow of traffic while discouraging locations of such facilities and routes which result in congestion or blight.

2010 Master Plan recommendations and statuses (as of 2010) were listed in the report, and included:

1. Rezoning a portion of the northwest side of Deerfield Village between Friesburg Road and West Deerfield Road as Agriculture Zone;
2. Rezoning an area adjacent to the eastern boundary with Deerfield Township north of Richard's Road as Agriculture Zone.

These revisions were made to the Zoning Map for 2017 Reexamination Report.

Initial Route Screening

The initial route screening focused on identifying the county roadway system within the geographic focus study area and reviewing readily available vehicle classification traffic data. Based on a review of the New Jersey Department of Transportation's (NJDOT's) Straight Line Diagrams (SLD), the county roadway system within the geographic focus study area consists of 51 County routes totaling approximately 337 of county roadway system.

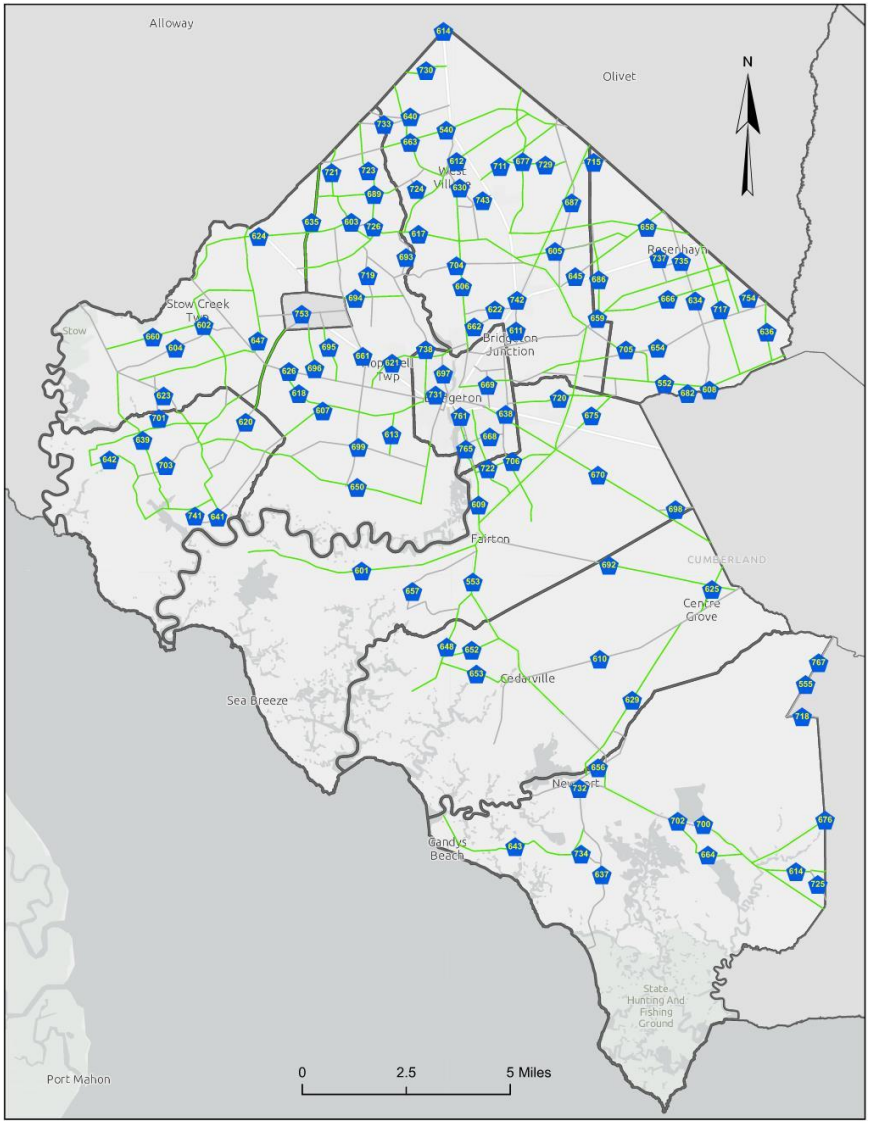
The initial route screening removed county roadways where 48-hour short-term vehicle classification counts from NJDOT's Traffic Monitoring System showed less than 10% daily large truck volumes along the county road. County roadways that did not have short-term vehicle classification counts were included for further analysis.

The screening list was then further filtered based on coordination with County staff to remove county roadways that are not ideal candidates, such as routes not providing a linkage to freight nodes, routes having an established truck prohibition, or routes being scheduled for capital improvement. The resultant list considered 40 candidate County routes within the study area for further evaluation and study.

51 COUNTY ROUTES

337 MILES

Figure 3. Initial List of County Routes within the Focus Area

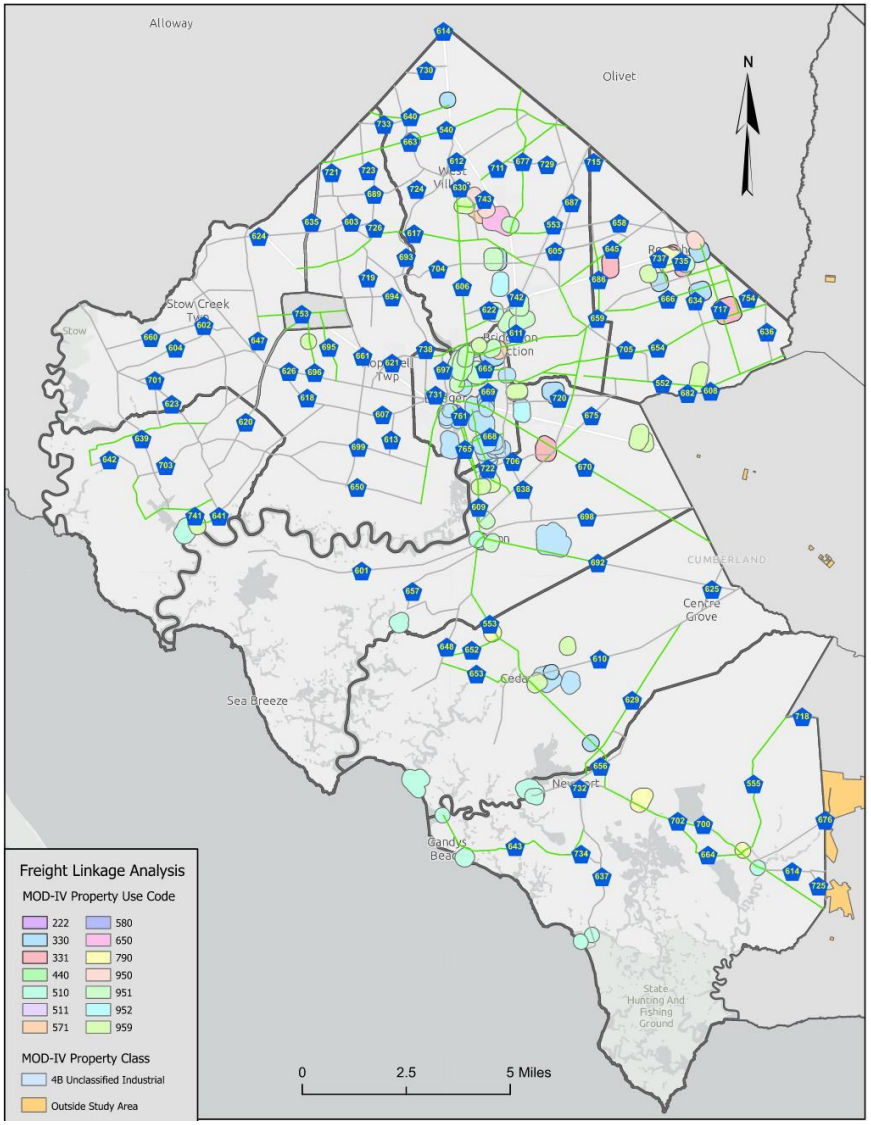


Freight Linkage Analysis

To demonstrate that a county roadway meets the established criterion of providing access to a freight node, the Consultant Team developed a methodology to correlate property tax parcel records data with electronic geographic information system (GIS) map layers to identify freight land uses. Relevant data points were extracted from the New Jersey Property Tax System, known as MOD-IV, which provides for the uniform preparation, maintenance, presentation and storage of the property tax information. The following outlines the methodology used to determine potential freight land use connections:

1. Download multi-municipal electronic property tax parcel records (MOD IV data) from the State's tax assessment records website and remove all unnecessary data fields.
2. Extract the following Property Use Codes from MOD IV data:
   a. 222 Greenhouse/Nursery
   b. 33X Industrial
   c. 440 Lumber Yard
   d. 51X Marina
   e. 571 Food and Beverage Processing
   f. 580 Quarry – Stone/Sand
   g. 650 Recycling Facility
   h. 79X Trucking
   i. 95X Warehouse
3. Correlate MOD IV data with available GIS map layers to provide each tax parcel with a unique GIS tax parcel identification number.
4. Conduct a 0.25-mile buffer analysis between the extracted MOD IV data and the county roadways.
5. Identify county roadways that "buffer" a "freight node" and demonstrate that they meet the criterion of providing access to a freight node.

Figure 4. Freight Land Use Connections



Traffic Count Program

Traffic vehicle classification counts were conducted with automatic traffic recorders (ATR) on each initial route screening listed county roadway in order to identify county roadways that would be eligible for funding based on the LFIF criteria of at least 10% daily large truck volume.

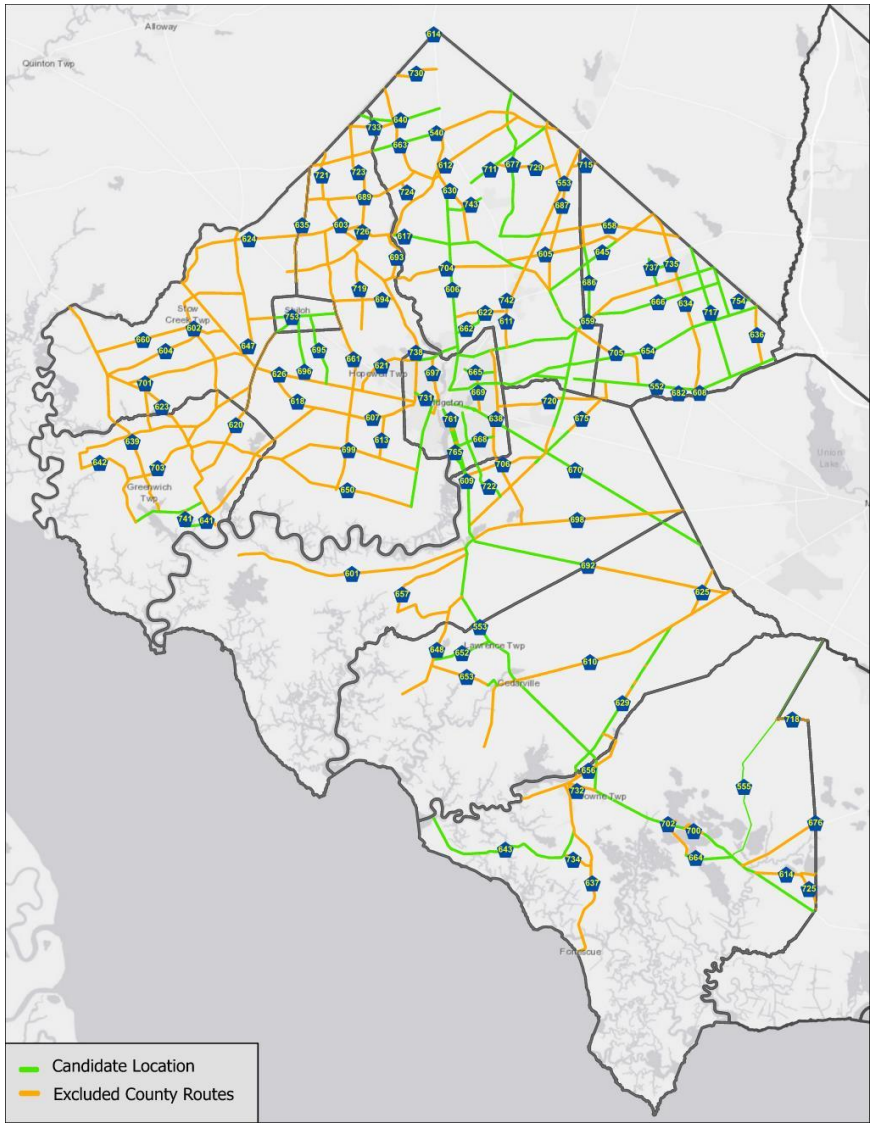
The data collected hourly directional traffic flow data and vehicle classification for a 7-day period pursuant to the procedures and criteria for data collection as outlined in NJDOT's Local Freight Impact Fund Handbook. Large trucks are defined by the LFIF program as medium or heavy trucks, excluding buses and motor homes, with a gross vehicle rating (GVWR) greater than 5 tons (10,000 pounds).

The traffic count program commenced in April 2021 and included a survey of 40 candidate locations. For study purposes, the vehicle classification data followed the 13 vehicle category classifications used by FHWA and considered Classes 5-13 as large trucks. Based on the traffic count program, 36 county routes within the geographic focus area met the requirement of at least 10% daily large trucks.

40 COUNT LOCATIONS

36 COUNTY ROUTES DEEMED ELIGIBLE

Figure 5. Traffic Count Program Locations



Preliminary List of Eligible Routes

Based on the findings from the traffic count program and freight linkage analysis, along with input from the County, 36 county routes within the geographic focus area were identified as eligible routes for future pursuit of funding through NJDOT's Local Freight Impact Funds (LFIF) Grant program.

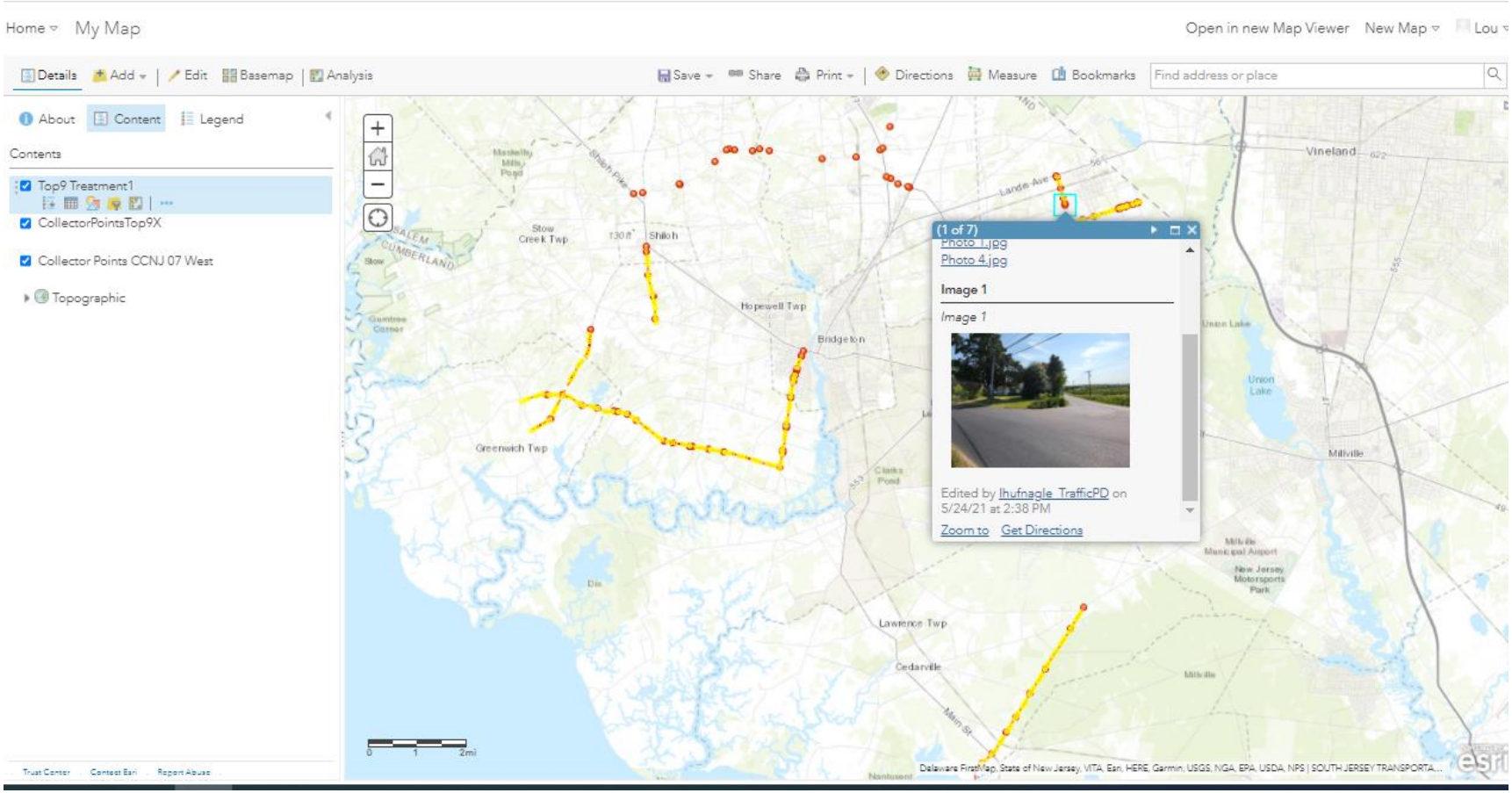
Exhibit 8. Preliminary List of Eligible Routes within the Focus Area

County Route	Start MP	End MP	Total Mileage	County Route	Start MP	End MP	Total Mileage
CR 540	18.95	24.95	6.00	CR 658	0.00	0.99	0.99
CR 552	0.00	2.89	2.89	CR 659	0.00	4.10	4.10
CR 555	0.00	6.05	6.05	CR 659	5.77	7.90	2.13
CR 606	0.00	4.95	4.95	CR 662	0.00	0.84	0.84
CR 609	0.00	2.94	2.94	CR 664	0.00	2.07	2.07
CR 617	0.00	6.18	6.18	CR 665	0.00	0.75	0.75
CR 620	0.00	2.49	2.49	CR 666	0.00	3.06	3.06
CR 622	0.00	1.17	1.17	CR 670	0.00	7.20	7.20
CR 629	0.00	4.38	4.38	CR 675	0.00	2.38	2.38
CR 637	0.00	4.48	4.48	CR 677	0.00	3.65	3.65
CR 640	0.00	2.00	2.00	CR 686	0.00	2.24	2.24
CR 641	0.00	0.67	0.67	CR 692	0.00	6.23	6.23
CR 642	0.00	7.64	7.64	CR 696	0.00	1.20	1.20
CR 643	0.00	4.43	4.43	CR 711	0.00	2.23	2.23
CR 645	0.00	1.90	1.90	CR 717	0.00	3.29	3.29
CR 650	0.00	8.10	8.10	CR 735	0.00	0.52	0.52
CR 652	0.00	1.43	1.43	CR 737	0.00	0.65	0.65
CR 653	0.00	1.78	1.78	CR 743	0.00	0.87	0.87
CR 654	0.00	5.66	5.66	CR 753	0.00	0.65	0.65

Field Reconnaissance

Once the more refined list of routes was established, the Consultant Team conducted field reconnaissance to view and evaluate existing conditions related to truck usage of these roadways focused on identifying critical infrastructure impediments. The field reconnaissance consisted of photo documenting and field videoing each roadway while completing visual windshield identification of key obstructions and truck impediments such as narrow turning radii at intersections, weight restrictions, vertical clearances, steep grades and roadside hazards. The field reconnaissance data were supplemented using Collector for ArcGIS, a mobile data collection application, so the information could be correlated to electronic geographic information system (GIS) map layers.

Exhibit 9. Screenshot from Collected Field Reconnaissance Data using Collector ArcGIS



Regional Pavement Condition Data

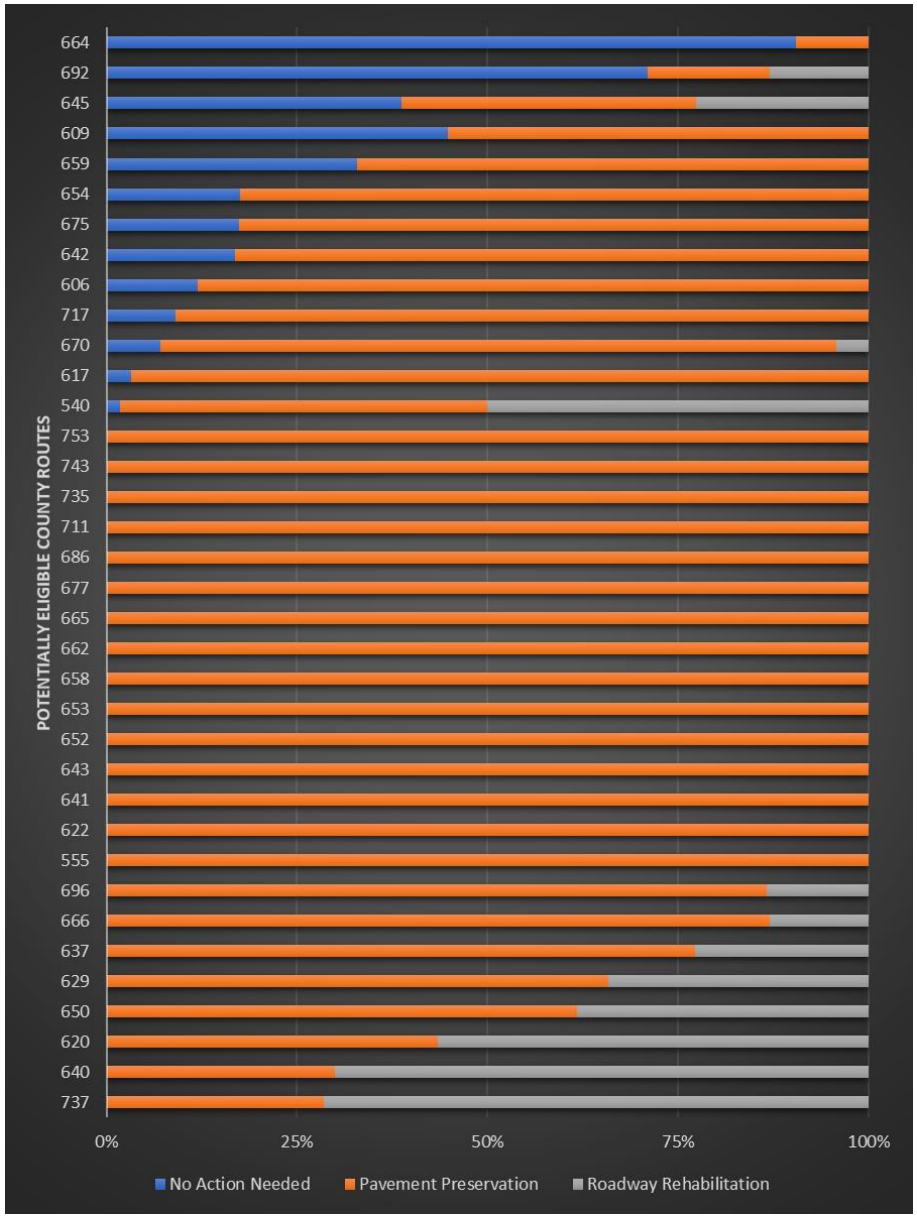
In 2018/2019, the South Jersey Transportation Planning Organization (SJTPO) contracted with a consultant team to conduct a regional pavement data collection throughout the planning region covering Atlantic, Cape May, Cumberland, and Salem counties. As part of the SJTPO Regional Pavement Condition Data Collection Project, the consultant team, led by Advanced Infrastructure Design, Inc., collected pavement conditions within SJTPO's counties including International Roughness Index (IRI), Surface Distress Index (SDI), cracking percentages, and rut depths.

The project developed six treatment alternative programs based on the conditions that were classified into three categories:

- No Action Needed
- Pavement Preservation
  - Crack Seal
  - Slurry Seal
  - Micromill with High Performance Thin Overlay
- Rehabilitation
  - Mill and Pave
  - Structural Rehabilitation

The information related to the treatment alternative programs were extracted from the data provided by SJTPO for the refined list of routes. The data were utilized to prioritize the preliminary list of eligible routes. Some modifications were made to the dataset based on input from the County Engineer to account for projects that occurred or are scheduled to occur since the SJTPO project data was collected which would impact the pavement condition and subsequent treatment.

Figure 6. Percentage of Pavement Treatments by Category



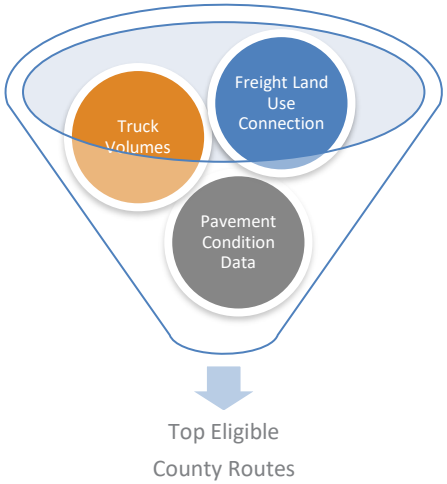
Findings & Recommendations

Findings and Recommendations

This study identified the eligible routes in the county roadway system within the geographic focus study area that meet the requirements for funding under the NJDOT Local Freight Impact Fund (LFIF) program and provide important truck linkage and access to freight-specific land uses. Providing critical infrastructure improvements to the eligible routes will ensure that the county roadway system in the western part of Cumberland County can continue to support the vital freight industry for the region.

Eligible Route Prioritization

While the findings from the freight linkage analysis and traffic count program provided a basis for a list of eligible routes within the geographic focus study area, it was important to further refine the list of routes since the LFIF program limits the number of applications the County can submit to two each fiscal year.

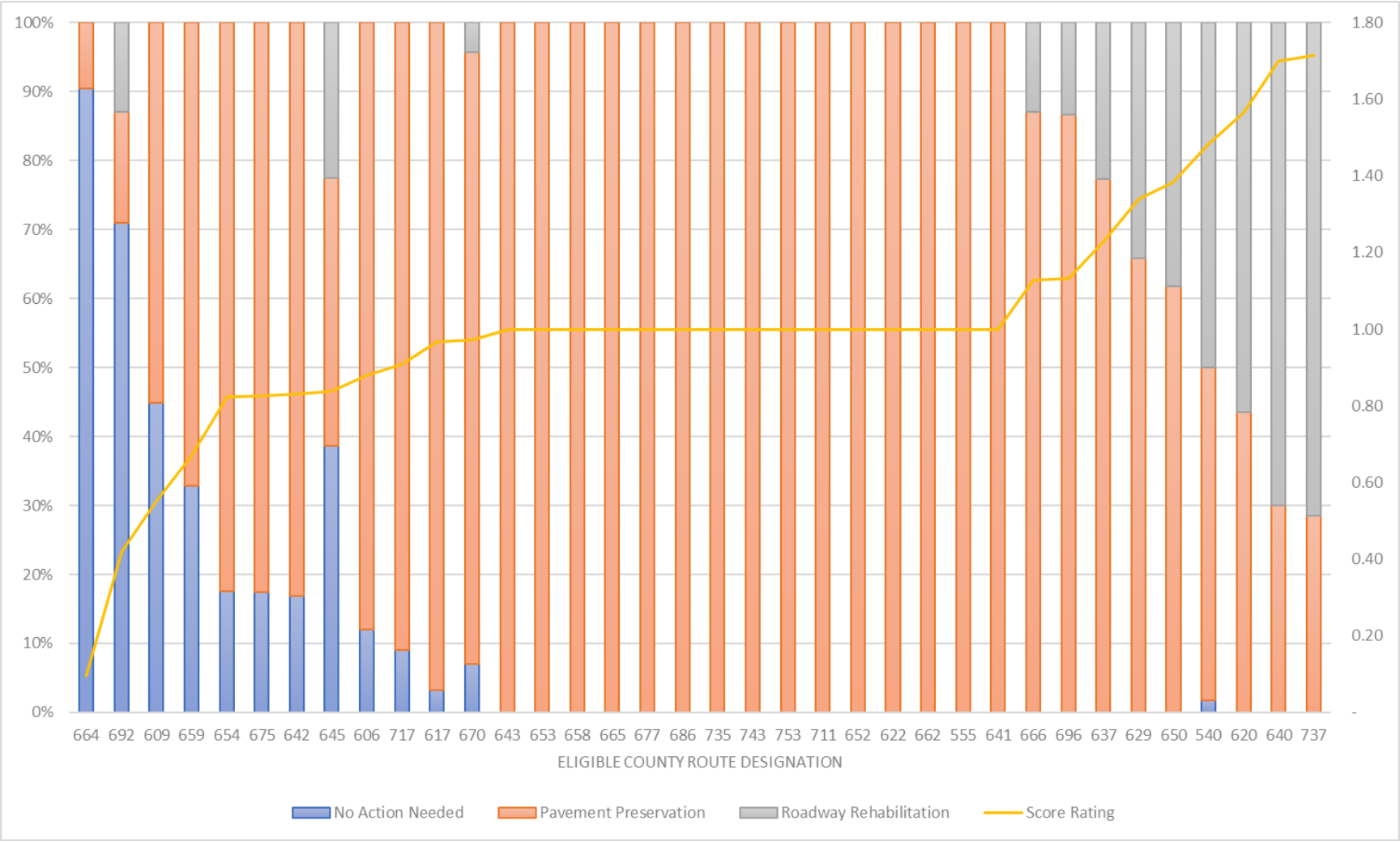


Since most previously awarded projects under the LFIF program were classified as pavement projects, the extracted data from the SJTPO Regional Pavement Condition Data Collection Project was utilized as a barometer to rank the eligible routes. A scoring mechanism was derived by assigning a point value to the three pavement treatment categories: 0 points for No Action Needed, 1 point for Pavement Preservation, and 2 points for Rehabilitation. The results of the scoring yielded a ranking list of the eligible routes that provides a basis for the County to pursue future LFIF funding applications.

Top Eligible Routes:

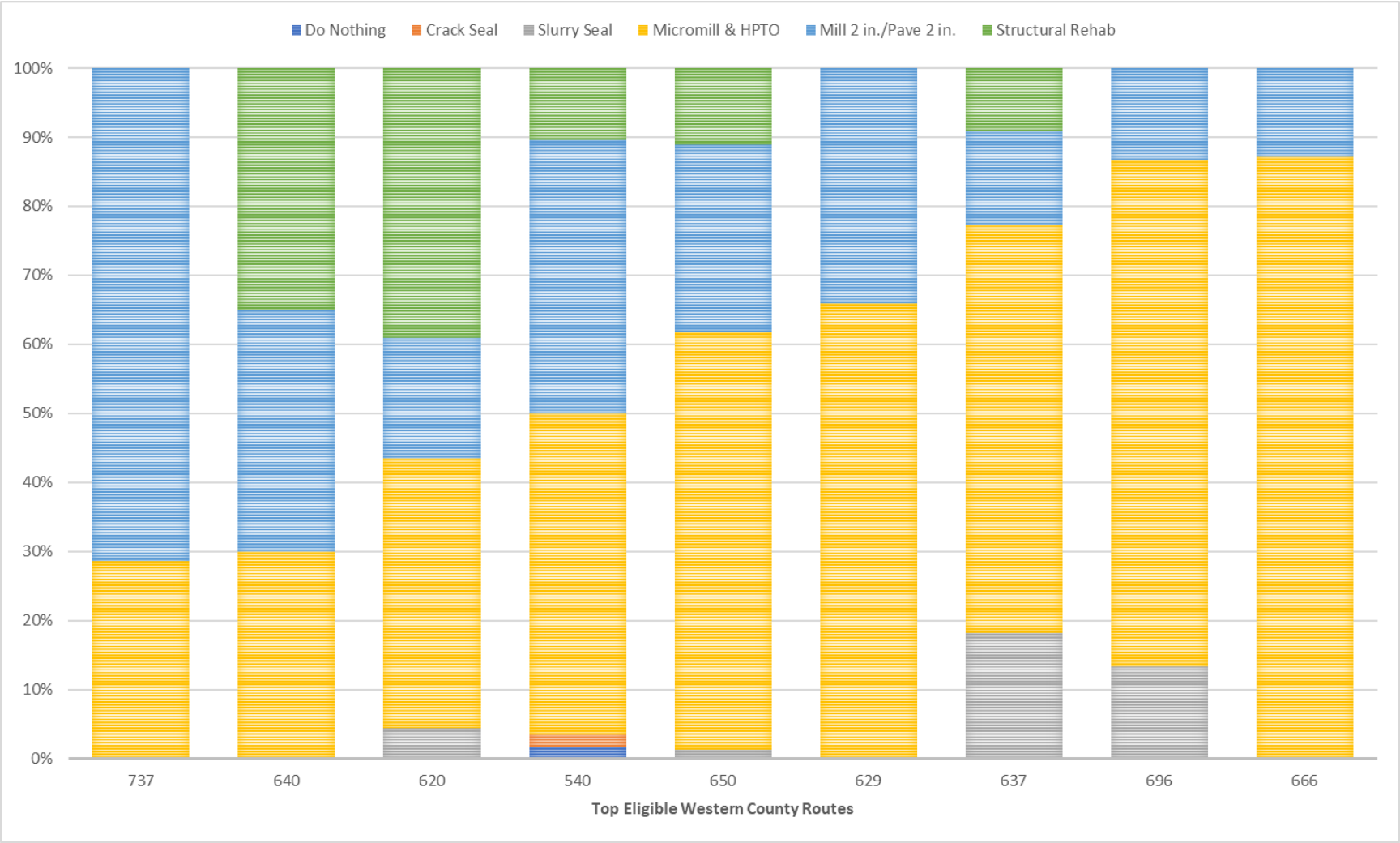
- County Route 540 – MP 18.95 to MP 24.95 (Hopewell Township / Upper Deerfield Township)
- County Route 620 – MP 0.00 to MP 2.49 (Greenwich Township / Stow Creek Township)
- County Route 629 – MP 0.00 to MP 4.38 (Downe Township / Lawrence Township)
- County Route 637 – MP 0.00 to MP 4.48 (Downe Township)
- County Route 640 – MP 0.00 to MP 2.00 (Hopewell Township / Upper Deerfield Township)
- County Route 650 – MP 0.00 to MP 8.10 (Greenwich Township / Hopewell Township / Bridgeton City)
- County Route 666 – MP 0.00 to MP 3.06 (Deerfield Township)
- County Route 696 – MP 0.00 to MP 1.20 (Hopewell Township)
- County Route 737 – MP 0.00 to MP 0.65 (Deerfield Township)

Exhibit 10. Score Rating for Eligible County Routes within the Focus Area



Note: Treatments modified based on input from County Engineering regarding projects occurring after the SJTPO project that impacted pavement conditions.

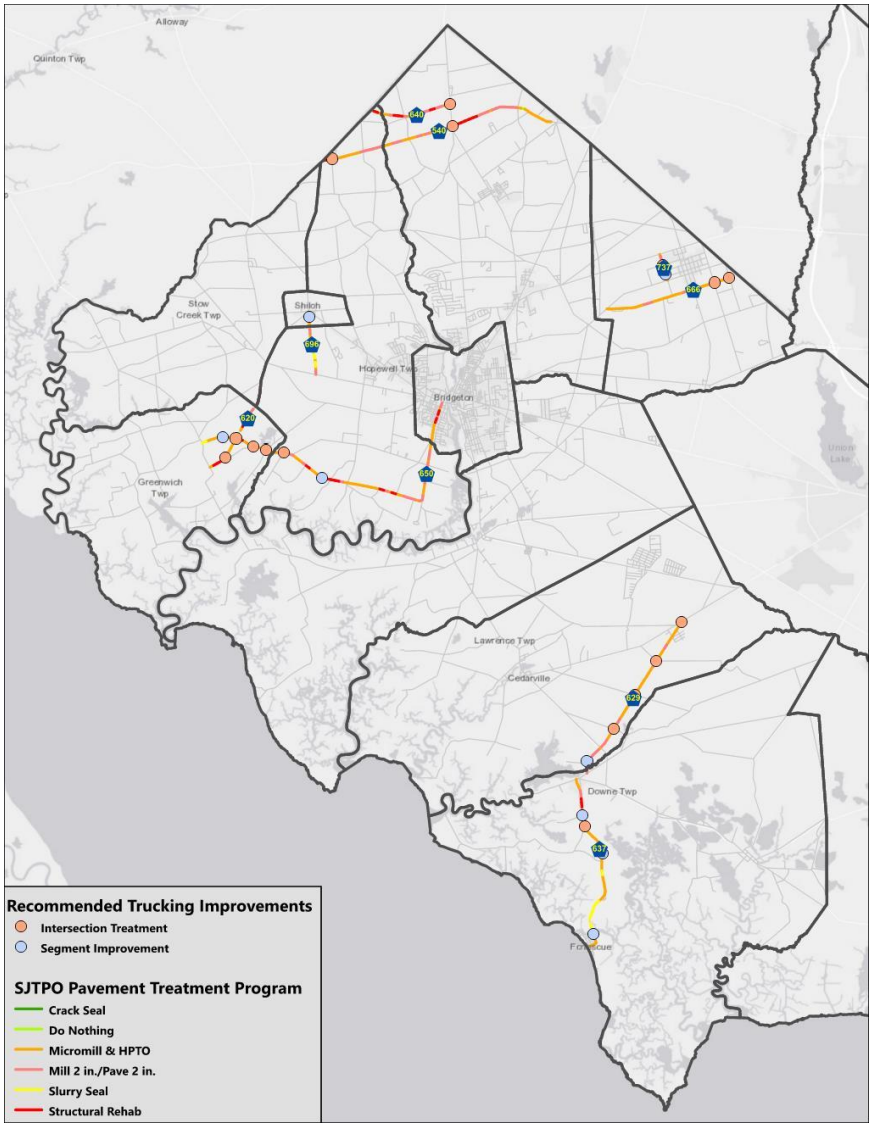
Exhibit 11. Pavement Treatments for Prioritized List of County Routes



Note: Treatments modified based on input from County Engineering regarding projects occurring after the SJTPO project that impacted pavement conditions.

Identified Impediments and Recommended Solutions

Figure 7. Potential Project Scopes for the Top Eligible County Routes[6]



The route prioritization also provided the ability to review the truck impediments more closely along the Top Eligible County Routes and recommend solutions to address truck mobility. Based on the more in-depth review of the Top Eligible County Routes list, potential project scopes for future funding applications were formulated.

The potential scopes focused on two primary categories:

Pavement Treatments I Truck Mobility Improvements

The pavement treatments for the Top Eligible County Routes lists includes, by total percentage of length:

No Action Needed	Pavement Preservation	Pavement Rehabilitation
14%	74%	12%

The truck mobility improvements centered on solutions that provide the most efficient benefits to regional truck connectivity.

16 INTERSECTION IMPROVEMENTS

7 SEGMENT IMPROVEMENTS

[6] Pavement Treatment Data Source: SJTPO and URS, modified based on input from County Engineering regarding projects occurring after the SJTPO project that impacted pavement conditions.

Exhibit 12. Recommended Intersection and Segment Treatments

Route	Treatment Type	Treatment Description	Identifier	Longitude	Latitude
CR 540	Intersection	Intersection Realignment	CR 540.1	-75.235916	39.523878
		Radius Improvement	CR 540.2	-75.289934	39.51223
CR 620	Intersection	Horizontal Curve and Intersection Warning Treatment	CR 620.1	-75.336651	39.40771
		Intersection Warning Treatment	CR 620.2	-75.331962	39.414422
CR 629	Segment	Intersection Warning Treatment	CR 629.4	-75.16141	39.314226
	Intersection	Horizontal Curve Treatment	CR 629.1	-75.173183	39.303119
		Intersection Realignment	CR 629.2	-75.131163	39.351762
		Radius Improvements	CR 629.3	-75.151911	39.326114
		Intersection Warning Treatment	CR 629.4	-75.142345	39.338139
CR 637	Intersection	Intersection Warning Treatment	CR 637.3	-75.173899	39.280299
	Segment	Guiderail Improvements	CR 637.1	-75.174939	39.284086
		Guiderail Improvements	CR 637.2	-75.169696	39.242811
		Horizontal Curve Treatment	CR 637.4	-75.165878	39.270944
CR 640	Intersection	Radius Improvements	CR 640.1	-75.236924	39.531699
CR 650	Segment	Horizontal Curve Treatment	CR 650.2	-75.293186	39.401016
	Intersection	Vegetation Maintenance	CR 650.1	-75.337923	39.414789
		Intersection Sight Line Improvements	CR 650.3	-75.318507	39.410653
		Intersection Warning and Drainage Improvements	CR 650.4	-75.310319	39.409602
		Horizontal Curve and Intersection Warning Treatment	CR 650.5	-75.324149	39.411576
CR 666	Intersection	Radius Improvements	CR 666.1	-75.117527	39.470122
		Radius Improvements	CR 666.2	-75.11076	39.471764
CR 696	Segment	Edge Line Treatment	CR 696.1	-75.299512	39.457085
CR 737	Segment	Edge Line Treatment	CR 737.1	-75.139492	39.4728
	Intersection	RR Markings and Signage	CR 737.2	-75.140634	39.476057

Figure 8. Intersection Treatment CR 540.1

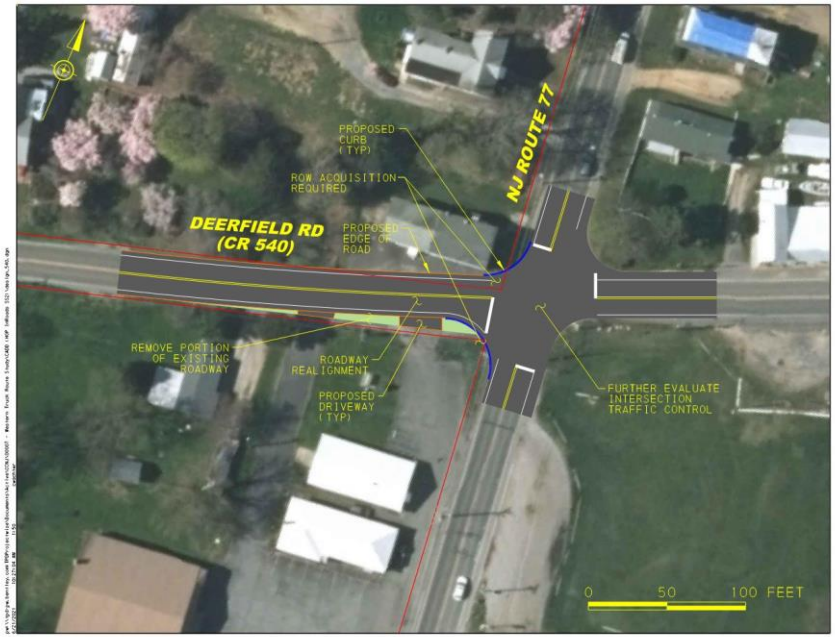


Figure 9. Intersection Treatment CR 540.2

County Route 540 at NJ Route 77 (Upper Deerfield Township)

Identified Impediment: The Deerfield Road (CR 540) approaches are offset from each other at the intersection with NJ Route 77, which presents operational issues with interlocking left turn movements and limited available gaps for vehicles on CR 540.

Recommended Solution: The CR 540 approaches should be aligned to remove the interlocking left turn movements. In addition, the intersection should be studied further to determine if traffic signal warrant are satisfied.

County Route 540 at County Route 721 (Hopewell Township)

Identified Impediment: The intersection of Harmony Road (CR 721) and CR 540 is skewed, which requires trucks to cross into oncoming travel lanes when making the right turn movement on the acute angle on the northeast corner of the intersection.

Recommended Solution: Provide radius improvements to the northeast corner of the interseciton to facilitate truck turning movements without the need for trucks to encroach into oncoming travel lanes.

Figure 10. Intersection Treatment CR 629.2

Figure 11. Intersection Treatment CR 629.3

County Route 629 at County Route 610 (Lawrence Township)

Identified Impediment: CR 629 intersects CR 610 at an acute angle, which makes turning movements for all vehicle types difficult and restricts sight distance. A worn path indicates that vehicles regularly cut through the grass area to the west of CR 629.

Recommended Solution: It is recommended that the CR 629 approach be realigned to intersect CR 610 at ninety degrees.

County Route 629 at Factory Road (Lawrence Township)

Identified Impediment: Factory Road intersects CR 629 at an acute angle, which requires trucks to encroach beyond the edge of pavement on the southwest corner and/or into the oncoming travel lane on CR 629 to negotiation the right turn movement from Factory Road onto CR 629.

Recommended Solution: It is recommended minor radius improvement be made at the intersection to better facilitate truck movements.

Figure 12. Intersection Treatment CR 640.1

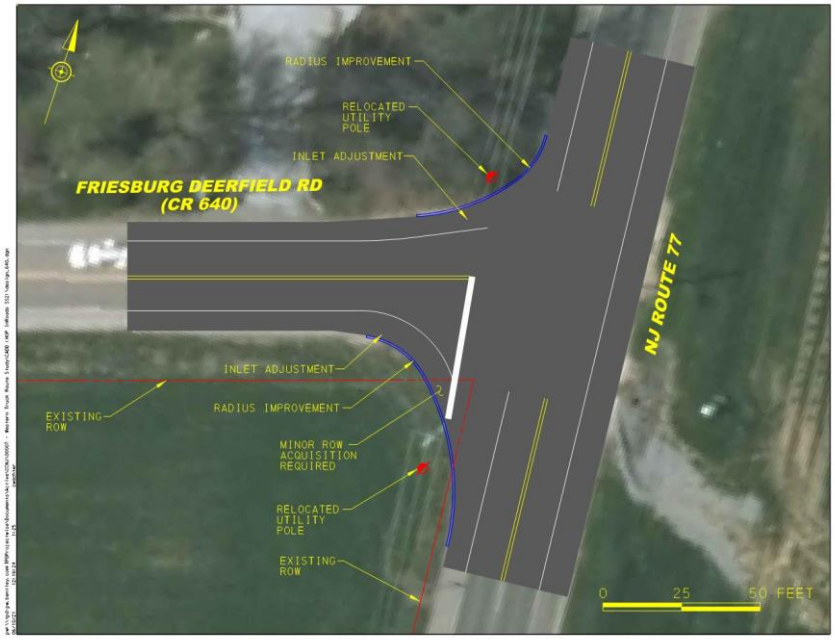
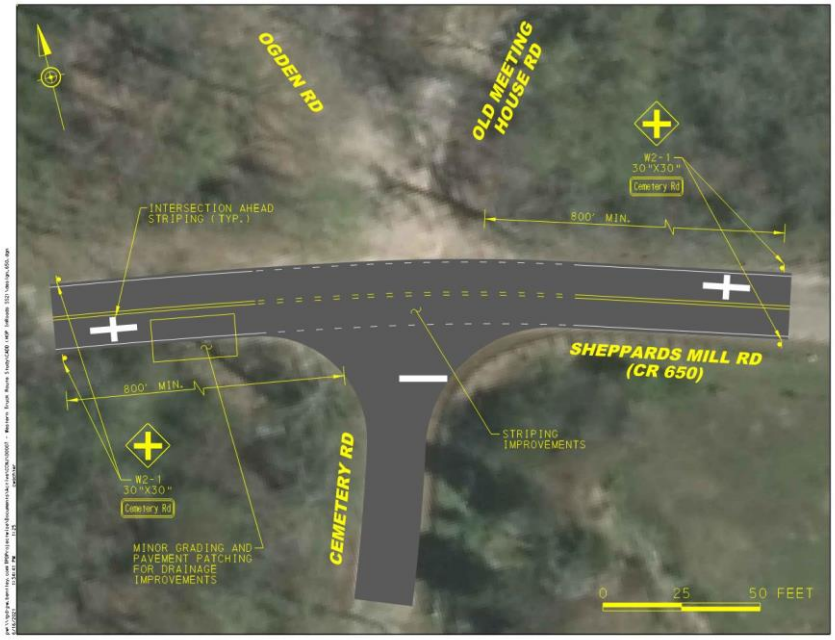


Figure 13. Intersection Treatment CR 650.4



County Route 640 at NJ Route 77 (Upper Deerfield Township)

Identified Impediment: The intersection of CR 640 and NJ 77 is slightly skewed and small corner radii are provided, which requires trucks to encroach into oncoming travel lanes when turning. In addition, larger, two-way gaps are required on NJ 77 to accommodate the turning movements since trucks need to encroach into oncoming travel lanes.

Recommended Solution: Radius improvements are recommended to better facilitate truck movements.

County Route 650 at Cemetery Road (Hopewell Township)

Identified Impediment: Cemetery Road intersects CR 650 on a reverse curve with guiderail located close to the edge of road on both sides of CR 650. Due to the roadway geometry, the guiderail appears to extend into the natural travel path for vehicles traveling eastbound on CR 650. In addition, there is a wet area causing pavement degradation located near the southwest corner of the intersection.

Recommended Solution: It is recommended that minor widening, signing, and pavement markings be installed along CR 650 to improve the alignment. Minor pavement repair and regrading to improve drainage are also recommended.

Figure 14. Intersection Treatment CR 666.1

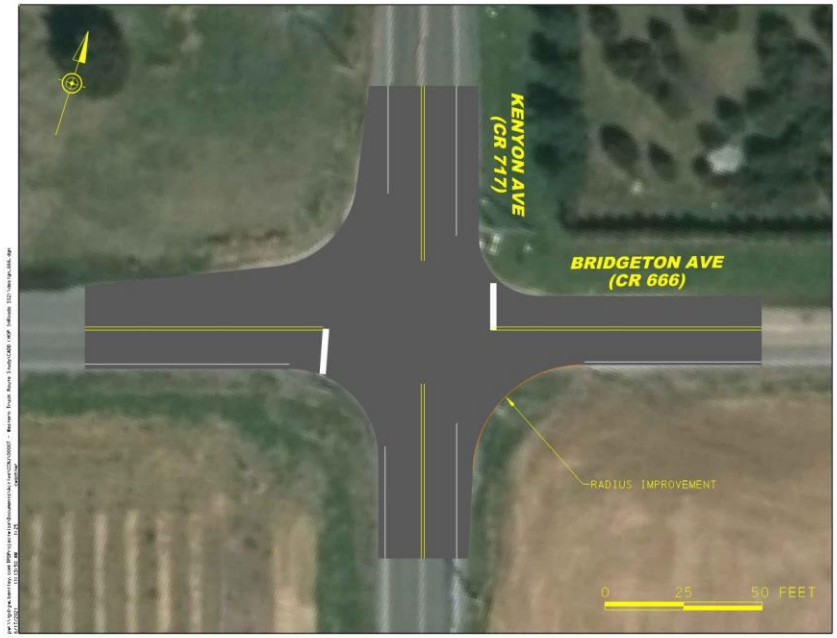


Figure 15. Intersection Treatment CR 666.2

County Route 666 at County Route 717 (Deerfield Township)

Identified Impediment: Small corner radii are provided at the intersection of Bridgeton Avenue (CR 666) and Kenyon Avenue (CR 717), which requires trucks to off-track beyond the edge of pavement when turning.

Recommended Solution: Radius improvements are recommended to better facilitate truck movements.

County Route 666 at Stillman Avenue (Deerfield Township)

Identified Impediment: Small corner radii are provided at the intersection of Bridgeton Avenue (CR 666) and Stillman Avenue with a utility pole located close to the edge of road on the northwest corner, which requires trucks to encroach into oncoming travel lanes when turning.

Recommended Solution: Radius improvements and utility pole relocation are recommended to better facilitate truck movements.

Figure 16. Intersection Treatment CR 678.3

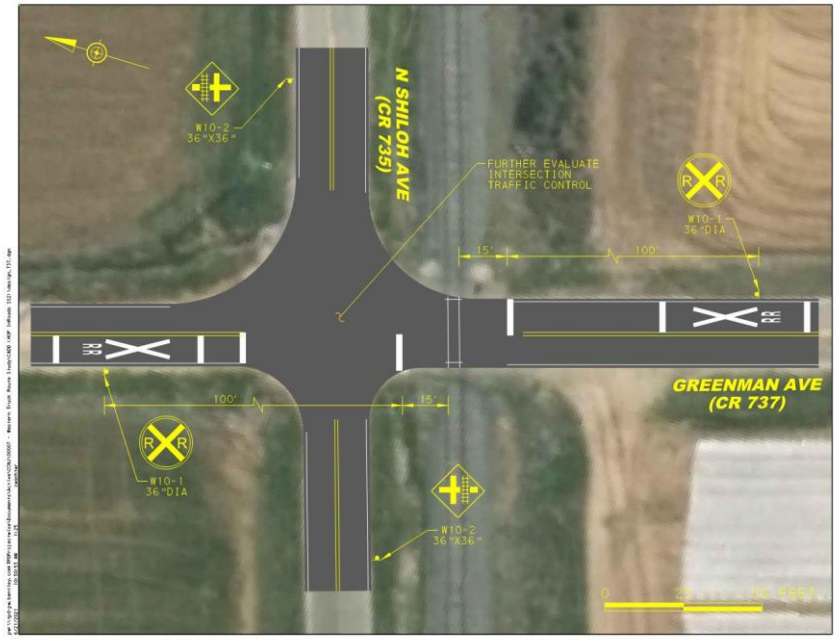
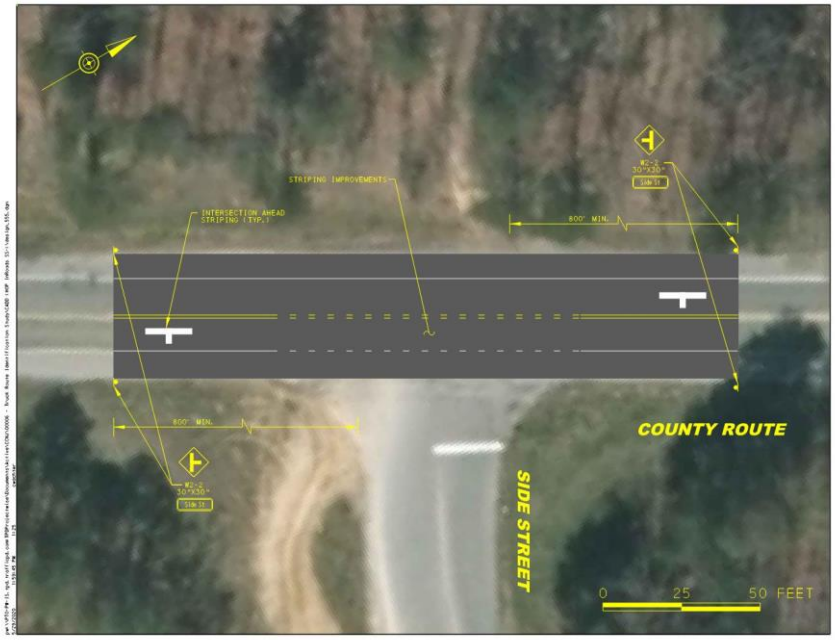


Figure 17. Intersection Treatment – Advanced Intersection Warning



County Route 737 at County Route 735 (Deerfield Township)

Identified Impediment: The intersection of CR 737 and CR 735 is located adjacent to a railroad crossing. While signage is provided for the railroad crossing, it is not clear that a road intersection is immediately adjacent to the railroad, particularly for vehicles traveling northbound on CR 737. In addition, trucks on the northbound approach waiting to turn onto or cross CR 735 extend onto the railroad tracks. Furthermore, a drainage ditch is located between the CR 735 and the railroad.

Recommended Solution: Signage and pavement marking improvements are recommended. In addition, the intersection control and drainage should be further evaluated.

Various Locations within Geographic Study Area

Identified Impediment: There are several intersections within the study area that are hidden or have very wide pavement areas with limited or no pavement markings to define travel lanes.

Recommended Solution: It is recommended that advance intersection warning signs and pavement markings be proivded where intersections are hidden or unexpected. In additon, pavement markings should be provided for intersections with wide pavement areas to define travel lanes and improve intersection visibilty.

Figure 18. Segment Treatment – Horizontal Curve Warning

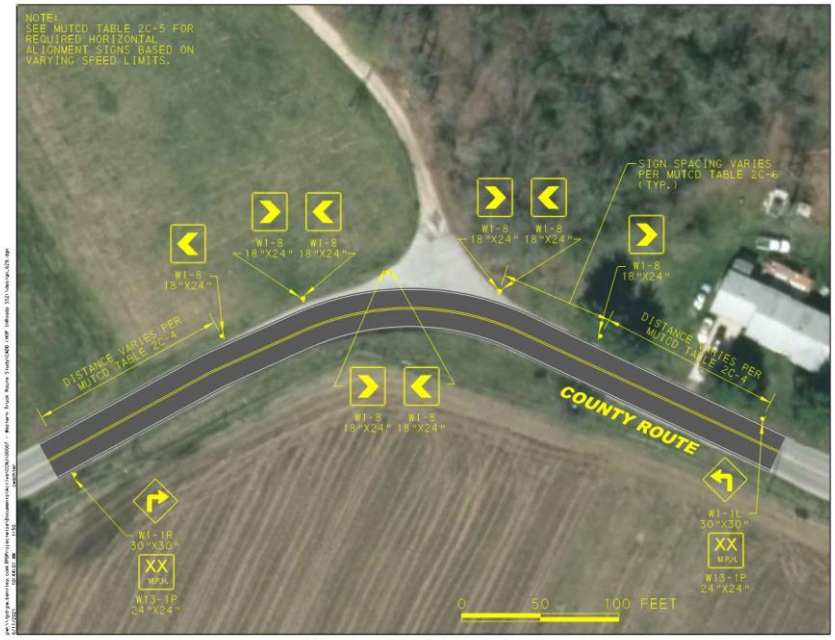


Figure 19. Segment Treatment – Edge Line Pavement Markings

Various Locations within Geographic Study Area

Identified Impediment: There are several sharp curves within the study area with limited or no warning signage, which can make it difficult to negotiate the curves, particularly at nighttime.

Recommended Solution: Curve warning signage is recommended for the sharp curves in the study area.

Various Locations within Geographic Study Area

Identified Impediment: There are several roads within the study with no edge lines or worn edge lines, which can lead to poor visibility at nighttime and during inclement weather.

Recommended Solution: White edge lines are recommended on all roads in the study area that are of sufficient width.

Preliminary Cost Estimates

Preliminary order of magnitude cost estimates were developed for each of the Top Eligible County Routes. The costs were derived from the latest NJDOT bid price report and information contained in the NJDOT Cost Estimating Guideline. The cost estimate was broken down into four specific items:

Pavement Preservation I Pavement Rehabilitation I Segment Treatments I Intersection Treatments

The cost estimates identified $7.4 million in pavement preservation, $9.6 million in pavement rehabilitation, and $0.7 million in specific segment and intersection treatments – totaling **$17.7 million in roadway infrastructure improvement for the Top Eligible County Routes within the Western Cumberland County geographic study area.**

Exhibit 13. Preliminary Cost Estimates for Top Eligible County Routes

	CR 540	CR 620	CR 629	CR 637	CR 640	CR 650	CR 666	CR 696	CR 737
Pavement Preservation Items [1] [2]	$674,000	$214,500	$720,000	$785,500	$174,000	$1,162,000	$808,000	$260,000	$46,000
Pavement Rehabilitation Items [1] [2] [3]	$1,258,500	$977,500	$394,000	$636,500	$930,000	$1,807,000	$117,000	$56,500	$121,500
Segment Treatment Items [4] [5]		$7,500	$7,500	$10,000		$20,000		$20,000	$7,500
Intersection Treatment Items [4] [5]	$60,000	$20,000	$75,000	$17,500	$120,000	$32,500	$60,000		$2,500
Item Sub Total	$1,992,500	$1,219,500	$1,196,500	$1,449,500	$1,224,000	$3,021,500	$985,000	$336,500	$177,500
Contingency [6]	$398,500	$244,000	$239,500	$290,000	$245,000	$604,500	$197,000	$67,500	$35,500
Traffic Control [7]	$139,500	$85,500	$84,000	$101,500	$86,000	$212,000	$69,000	$24,000	$12,500
Mobilization [8]	$159,500	$98,000	$96,000	$116,000	$98,000	$242,000	$79,000	$27,000	$14,500
Construction Inspection and Material Testing [9]	$359,000	$220,000	$215,500	$261,000	$220,500	$544,000	$177,500	$61,000	$32,000
Total Construction Estimate	$3,049,000	$1,867,000	$1,831,500	$2,218,000	$1,873,500	$4,624,000	$1,507,500	$516,000	$272,000

Tables Notes:

(1) Quantities and selected treatments for Pavement Items derived from information contained in the SJTPO Regional Pavement Condition Data Collection Project.

(2) Cartway widths estimated based on available data contained in NJDOT Straight Line Diagrams.

(3) Pavement box for reconstruction assumed to match County pavement specification.

(4) Treatment Items include known items and lump sum estimates for potentially impacted aboveground utilities. Property acquisition is not included.

(5) Horizontal Curve and Advanced Intersection Warning Items include lump sum estimates for a typical intersection treatment including enhanced signage and pavement markings.

(6) Contingency Item for preliminary concepts is 20% of construction items.

(7) Traffic Control is estimated at 7% of construction items based on NJDOT Cost Estimating Guideline.

(8) Mobilization is estimated at 8% of construction items based on NJDOT Cost Estimating Guideline..

(9) Construction Inspection and Material Testing is 15% of construction subtotal.

(10) All estimates based on available aerial imagery and digitized information.


Appendix