



TECHNICAL MEMORANDUM

Date: Tuesday, September 28, 2021 rev. Tuesday, October 12, 2021

Project: Mulberry Knoll Road Extension Planning and Environmental Linkages (PEL) Study

Subject: Purpose and Need and Screening Criteria

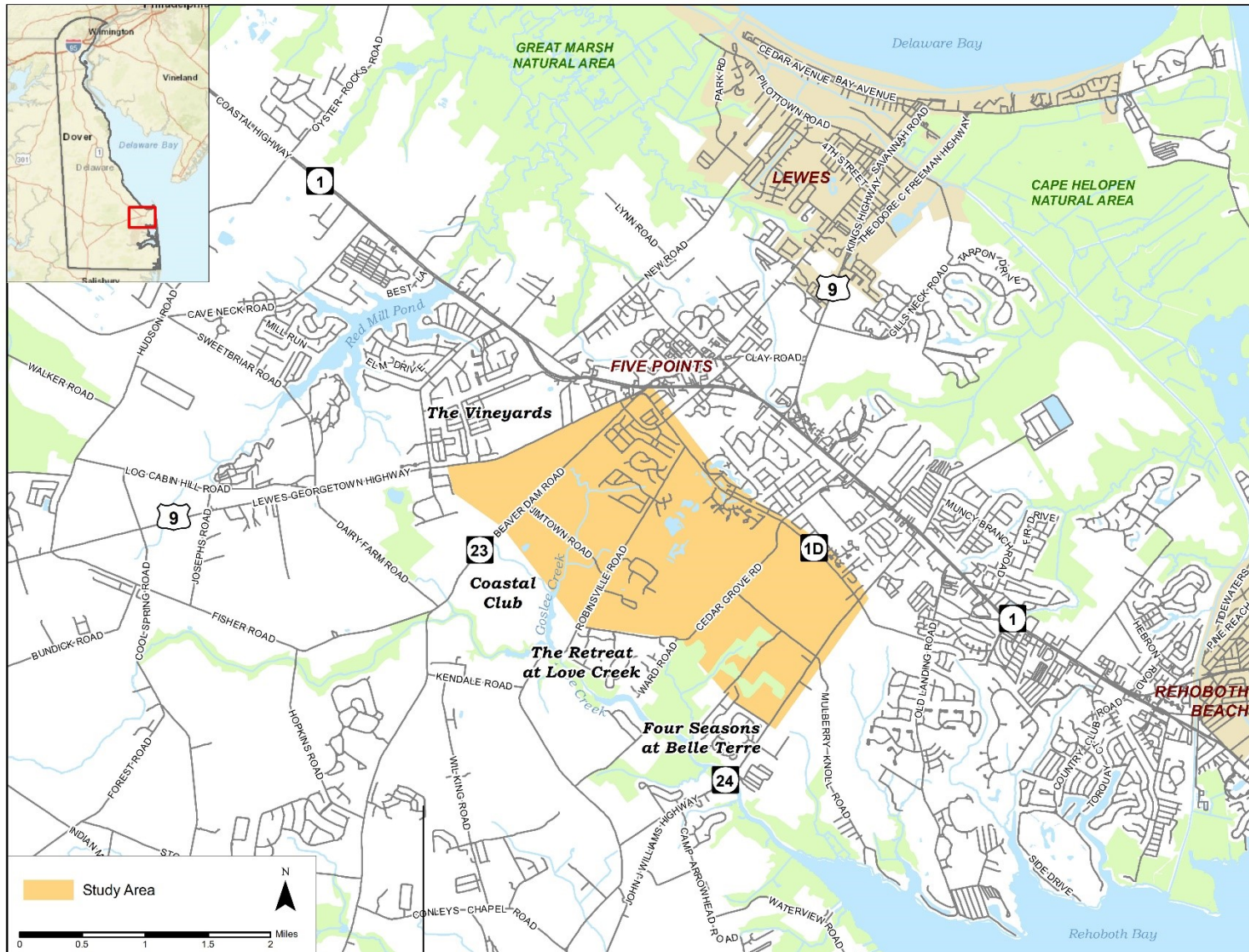
In order to inform the development of the Delaware Department of Transportation’s (DeIDOT) Mulberry Knoll Road Extension Planning and Environmental Linkages (PEL) Study and associated summary report, the following documentation has been developed to briefly describe the study area that serves as the focus for the PEL study, define the preliminary Purpose and Need for identifying potential transportation solutions to be evaluated in the study area, and establish the initial screening criteria for consideration in the evaluation of potential transportation improvement concept.

This study focuses on the north-south corridor that parallels Coastal Highway (SR 1) between Lewes Georgetown Highway (US 9) and John J Williams Highway (SR 24) and is generally bound by Plantation Road (SR 1D) to the east and to the west by the residential developments along Love Creek (see **Figure 1**). The study area is approximately five miles west of Rehoboth and Dewey Beaches and just south of the area known as Five Points, at the intersection of US 9 and SR 1. SR 1 represents one of the most congested areas in Sussex County, due to its proximity to the beaches and adjacent shopping outlets and other tourist attractions (DeIDOT, 2017). In addition to the area’s popularity as a tourist destination and for the commercial development along SR 1, this portion of eastern Sussex County is also an increasingly attractive area for full time residents. Commercial development established along SR 1, residential growth for seasonal dwellings, and people permanently relocating to the area drive the continued growth and development of undeveloped properties to the south and west of the SR 1 corridor. This continued growth presents challenges for the efficient movement of traffic through the study area for both residents and visitors during the summer peak season and throughout the remaining months of the year.

The study area encompasses approximately 4.3 square miles that includes a mix of suburban residential developments interspersed among farm fields and open space as well as sensitive natural areas surrounding Love Creek, Goslee Creek, and their tributaries. The study area is characterized by low-lying areas of the Atlantic Coastal Plain Physiographic Province, with elevations that range up to 25 feet above sea level.



Figure 1: Study Area Location



1.0 PURPOSE AND NEED

Consistent with historic trends in Sussex County, the study area for the Mulberry Knoll Extension PEL Study has experienced continued growth and development at a substantial rate, resulting in increased development and traffic volumes on the local roadway network. **Table 1** shows the historic trends for population and housing data in the study area, compared to Delaware and Sussex County. Between 2000 and 2018, the study area has consistently exhibited a higher growth rate in total population and housing units as compared to Delaware and Sussex County. From 2000 to 2018, the study area's population notably grew by 84 percent; similarly, the total number of housing units in the study area increased by 72 percent.

Table 1: Total Population and Housing Units

	2000	2010	2018	%Δ 2000 - 2018
Total Population				
Delaware	783,600	897,934	973,764	24%
%Δ From Previous Analysis Year		15%	8%	-
Sussex County	156,638	197,145	234,225	50%
%Δ From Previous Analysis Year		26%	19%	-
Study Area	13,742	18,882	25,230	84%
%Δ From Previous Analysis Year		37%	34%	-
Housing Units				
Delaware	343,072	405,885	428,251	25%
%Δ From Previous Analysis Year		18%	6%	-
Sussex County	93,070	123,036	135,529	46%
%Δ From Previous Analysis Year		32%	10%	-
Study Area	9,748	14,397	16,801	72%
%Δ From Previous Analysis Year		48%	17%	-

Sources: U.S. Census Bureau, 2000 (DEC Summary File [Tables P001 and H001]); U.S. Census Bureau, 2012 (Table 1); and U.S. Census Bureau, 2019 (Detailed Tables [Tables S0101 and B25001])

Note: Study area calculation includes Census Tracts within or adjacent to study area (Census Tracts 508.02, 510.04, 510.05, 510.06, 510.07 and equivalent geographical areas [Census Tracts 508.2, 510.01, and 510.02] for 2000 Census)

In the study area and surrounding vicinity, this population growth and development can reasonably be expected to continue. The Delaware Population Consortium (DPC), which is comprised of representatives from state agencies, regional planning organizations, and localities, annually prepares a set of 30-year population projections for the state, counties, and selected municipalities. Based on the DPC's latest population and housing forecasts, the population in Sussex County is expected to grow to 285,658 by 2050 (an increase of 22 percent from 2018). Similarly, housing units in Sussex County are expected to increase by 23 percent, compared to 2018, to 166,226 (DPC, 2019). Based on the population projections and development trends for Sussex County, it is likely that the study area will also continue to grow at a notable rate into the future.

As the population and development in the study area continues to grow, efficient traffic movement through the study area will remain a challenge for residents, as well as visitors, and it is expected that traffic congestion will increase into the future.

The purpose of the Mulberry Knoll Extension PEL Study is to identify transportation improvements that reduce congestion for local and regional traffic and increase system linkages, while improving

access to designated development areas to support economic vitality and sustained growth in the study area. Following is a description of each of the needs that have been identified for the study area.

1.1 Reduce Congestion for Local and Regional Traffic and Increase System Linkages

Table 2 shows the current and forecasted congestion within the study area, represented by the overall Level of Service (LOS)¹ for signalized and unsignalized intersections within the study area. Existing conditions are listed based on 2017 traffic data, derived from the Henlopen Transportation Improvement District (TID) study, which included seasonal adjustments and adjustments to account for specific development sites and employment that had occurred since the traffic data were collected (DelDOT, 2018b). As listed in **Table 2** and shown in **Figure 2**, six of the 16 intersections analyzed in the study area currently operate with volumes at or exceeding the capacity of the roadway system resulting in stoppages and delays for long periods of time. LOS F operations indicate volumes exceeding capacity on multiple approaches to an intersection with motorists waiting through multiple signal cycles to travel through the intersection. During LOS F conditions, queues will continue to grow throughout the duration of at-capacity conditions, extend beyond the turn lanes, and cause blockages of upstream intersections and access points.

By 2045, LOS in the study area is expected to worsen compared to existing conditions. Based on future traffic forecasts, 13 of the 16 intersections analyzed in the study area are expected to operate at or beyond capacity. Illustrated in **Figure 3**, the 2045 analysis assumes the implementation of all committed transportation improvement projects in the study area that are included in DelDOT’s Capital Transportation Program (CTP) for Fiscal Years (FY) 2019-2024. Operational improvements along Plantation Road from SR 24 to US 9, including turn lanes and other intersection modifications, median turn lanes for residential entrances, and bicycle and pedestrian facilities along the corridor, are included among the programmed projects assumed under the 2045 analysis scenario. Even with the implementation of these improvements, the operational conditions of the study area are expected to be degraded, as noted in **Table 2**, which demonstrates a need for additional improvements in the study area to improve congestion and increase system linkages.

Table 2: Intersection Capacity Summary

Intersection	Intersection Type	2017		2045	
		AM	PM	AM	PM
Lewes Georgetown Hwy (US 9) at Coastal Hwy (SR 1)	Signalized	LOS E or F	LOS D or Better	LOS E or F	LOS E or F
Lewes Georgetown Hwy (US 9) at Belltown Rd	Signalized	LOS D or Better	LOS E or F	LOS D or Better	LOS D or Better
Belltown Rd at Beaver Dam Rd (SR 23)	Two-Way Stop-Controlled*	LOS D or Better	LOS D or Better	LOS E or F	LOS E or F
Lewes Georgetown Hwy (US 9) at Nassau Commons Blvd	Two-Way Stop-Controlled	LOS D or Better	LOS E or F	LOS E or F	LOS E or F

¹ LOS is a qualitative measure of operational conditions based on criteria such as speed, travel delay, freedom to maneuver, traffic interruptions, comfort, and convenience. LOS A reflects free flow traffic conditions with minimal delays and vehicles unimpeded in their ability to maneuver; whereas LOS E or LOS F reflects traffic volumes at or exceeding the capacity of the roadway system resulting in stoppages and delays for long periods of time.

Intersection	Intersection Type	2017		2045	
		AM	PM	AM	PM
Lewes Georgetown Hwy (US 9) at Minos Conaway Rd	Two-Way Stop-Controlled	LOS D or Better	LOS D or Better	LOS E or F	LOS E or F
Beaver Dam Rd (SR 23) at Jimtown Rd	Two-Way Stop-Controlled	LOS D or Better	LOS D or Better	LOS E or F	LOS E or F
Jimtown Rd at Robinsonville Rd	Two-Way Stop-Controlled	LOS D or Better	LOS D or Better	LOS D or Better	LOS D or Better
Robinsonville Rd at Cedar Grove Rd	Two-Way Stop-Controlled	LOS D or Better	LOS D or Better	LOS D or Better	LOS E or F
Cedar Grove Rd at Ward Rd	Two-Way Stop-Controlled	LOS D or Better	LOS D or Better	LOS D or Better	LOS D or Better
Cedar Grove Rd at Mulberry Knoll Rd	Two-Way Stop-Controlled	LOS D or Better	LOS D or Better	LOS E or F	LOS E or F
John J Williams Hwy (SR 24) at Beacon Middle School	Signalized	LOS D or Better	LOS D or Better	LOS E or F	LOS E or F
John J Williams Hwy (SR 24) at Mulberry Knoll Rd	Two-Way Stop-Controlled	LOS E or F	LOS E or F	LOS E or F	LOS E or F
John J Williams Hwy (SR 24) at Plantation Rd (SR 1D)	Signalized	LOS D or Better	LOS E or F	LOS E or F	LOS E or F
Plantation Rd (SR 1D) at Cedar Grove Rd	Signalized	LOS D or Better	LOS D or Better	LOS D or Better	LOS E or F
Plantation Rd (SR 1D) at Robinsonville Rd	Two-Way Stop-Controlled	LOS D or Better	LOS D or Better	LOS E or F	LOS E or F
Plantation Rd (SR 1D) at Shady Rd	Signalized	LOS D or Better	LOS E or F	LOS E or F	LOS E or F

Source: DeIDOT, 2018b

Figure 2: 2017 AM and PM Peak Period LOS

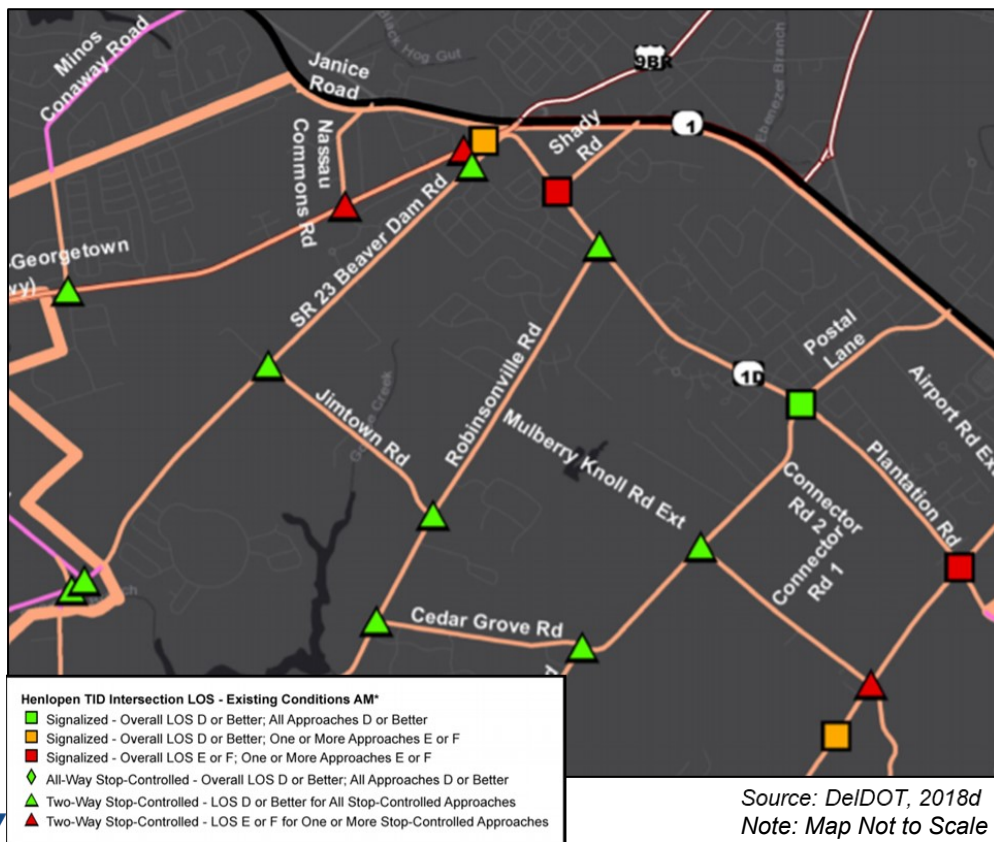
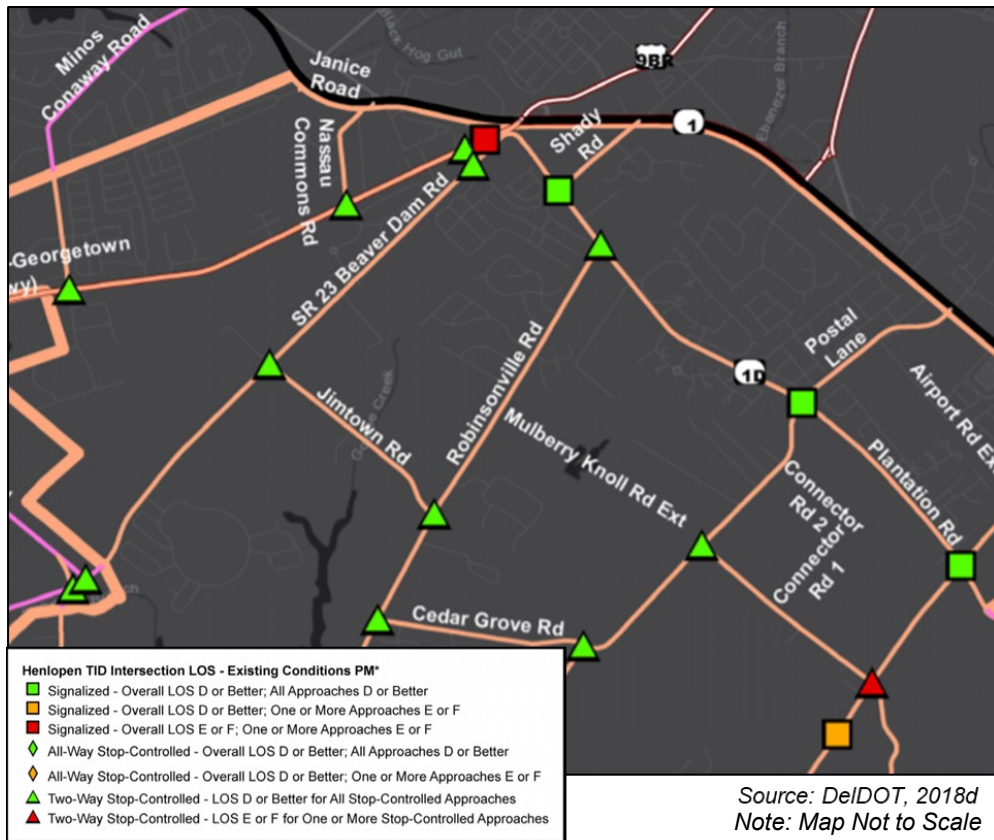
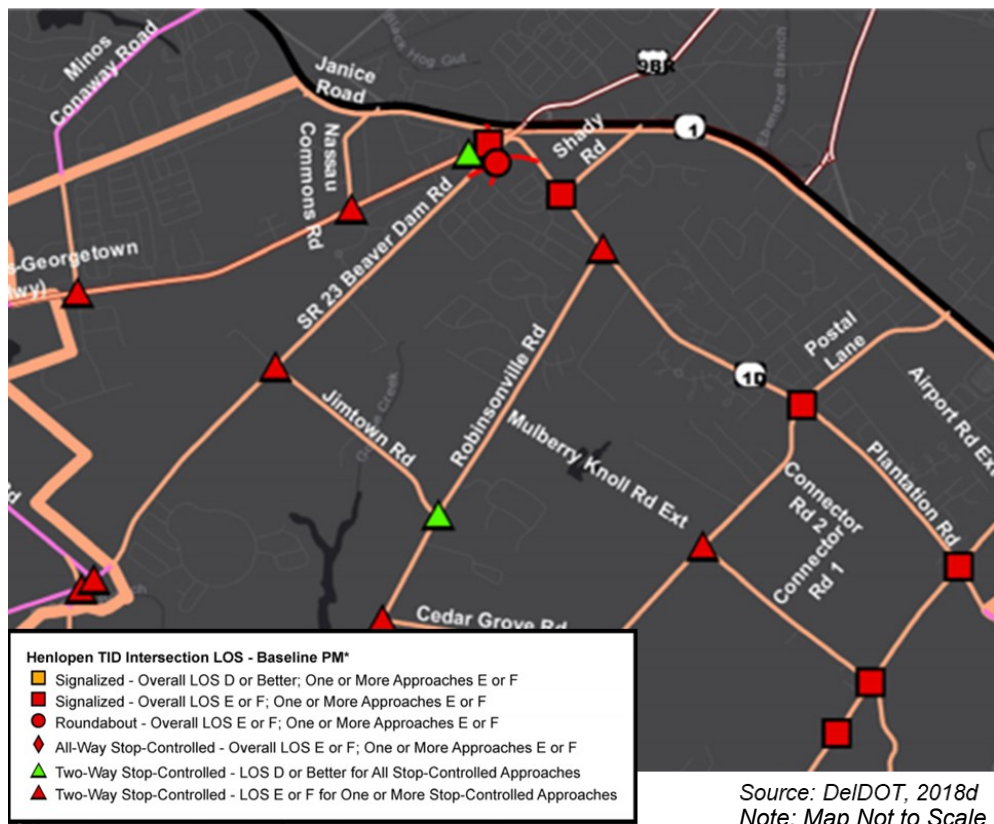
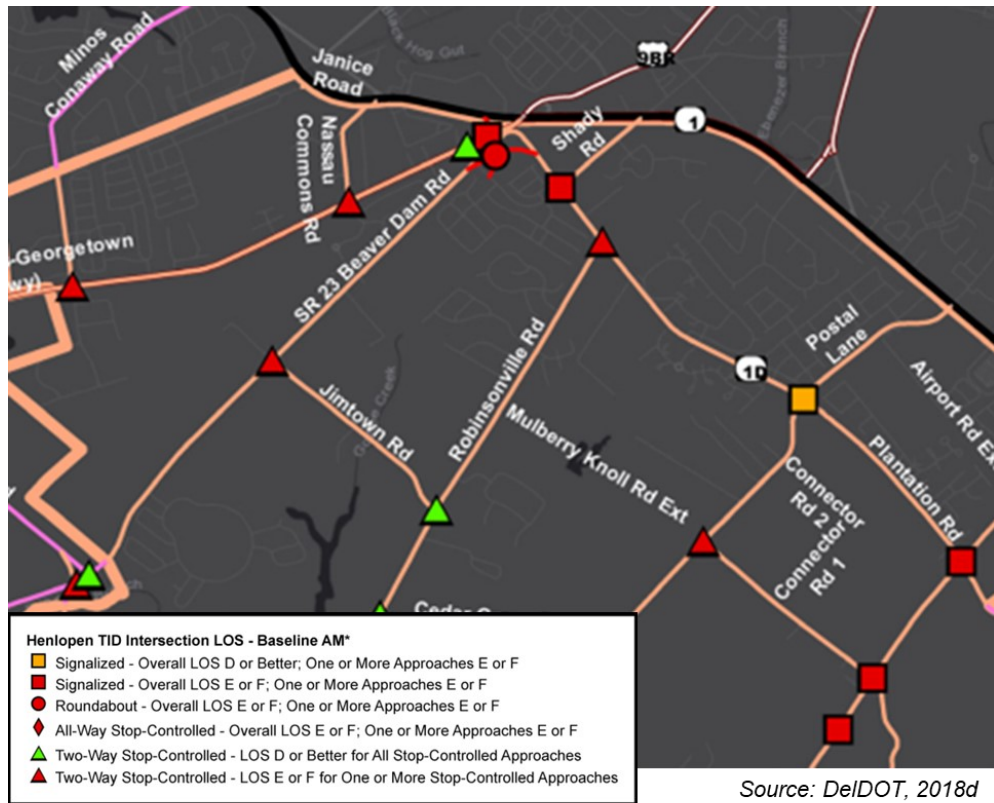


Figure 3: 2045 AM and PM Peak Period LOS



1.2 Accommodate Planned and Approved Local Development

Eastern Sussex County and the study area vicinity have been among the most rapidly growing areas of Delaware for many years. Since the early 2000s, land use under commercial and residential development has increased by over 26 percent, as illustrated in **Figure 4**. Nearly the entire study area is zoned to allow for single- or multi-family dwelling units on individual lots, so the continued increase of development, particularly in the residential sector, is reasonably foreseeable into the future. Adapted from the Henlopen TID study, **Figure 5** shows the parcels and anticipated number of residential units and commercial square footage expected within the study area vicinity by 2045. In order to support current and future growth in the area, improved access and increased roadway capacity is needed within the study area. This need is also identified in the *Sussex County Comprehensive Plan*, which recommends an improved or new connector road for local traffic west of Lewes and Rehoboth Beach between US 9 and SR 24 (Sussex County, 2019).

Figure 4: Historic Land Use

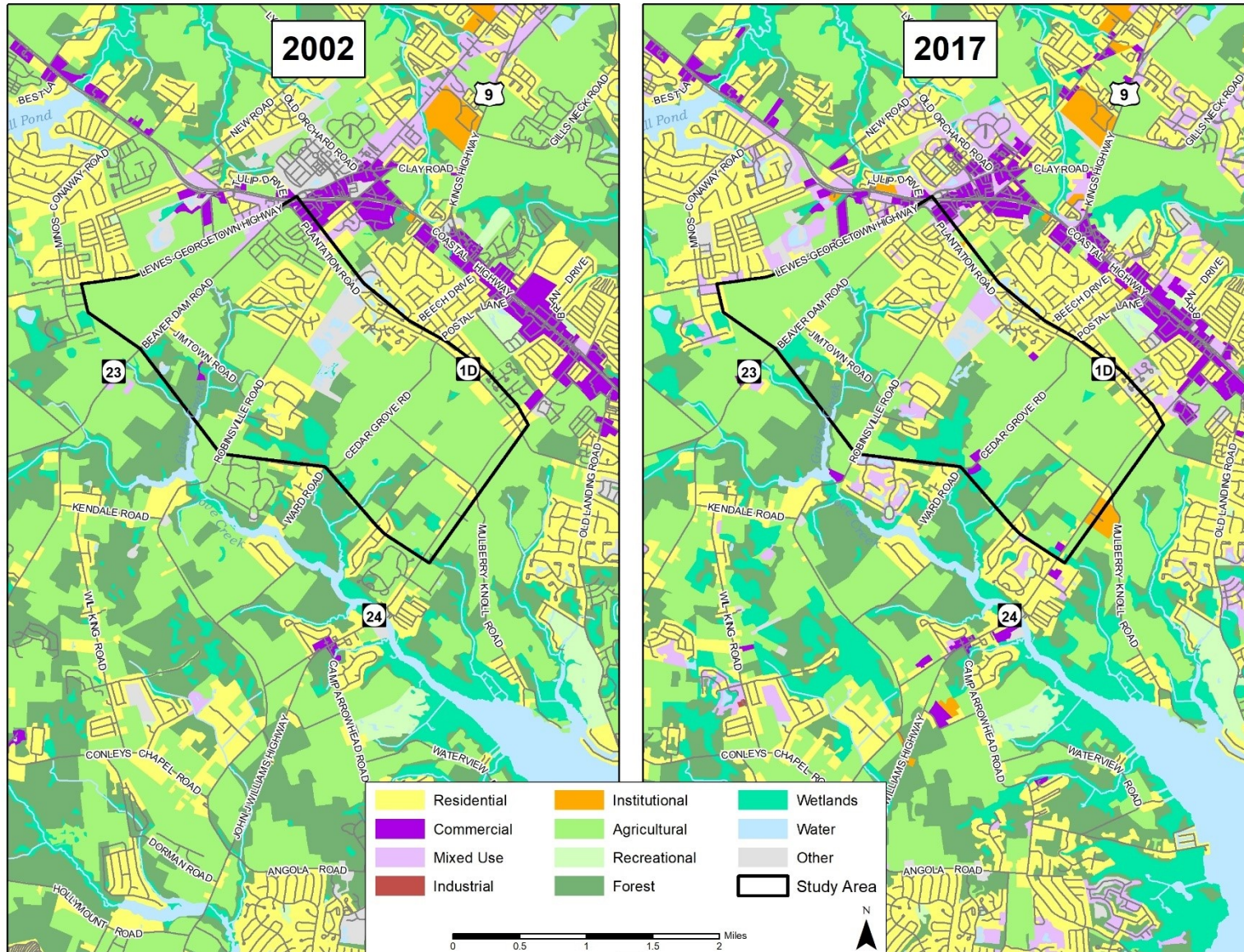
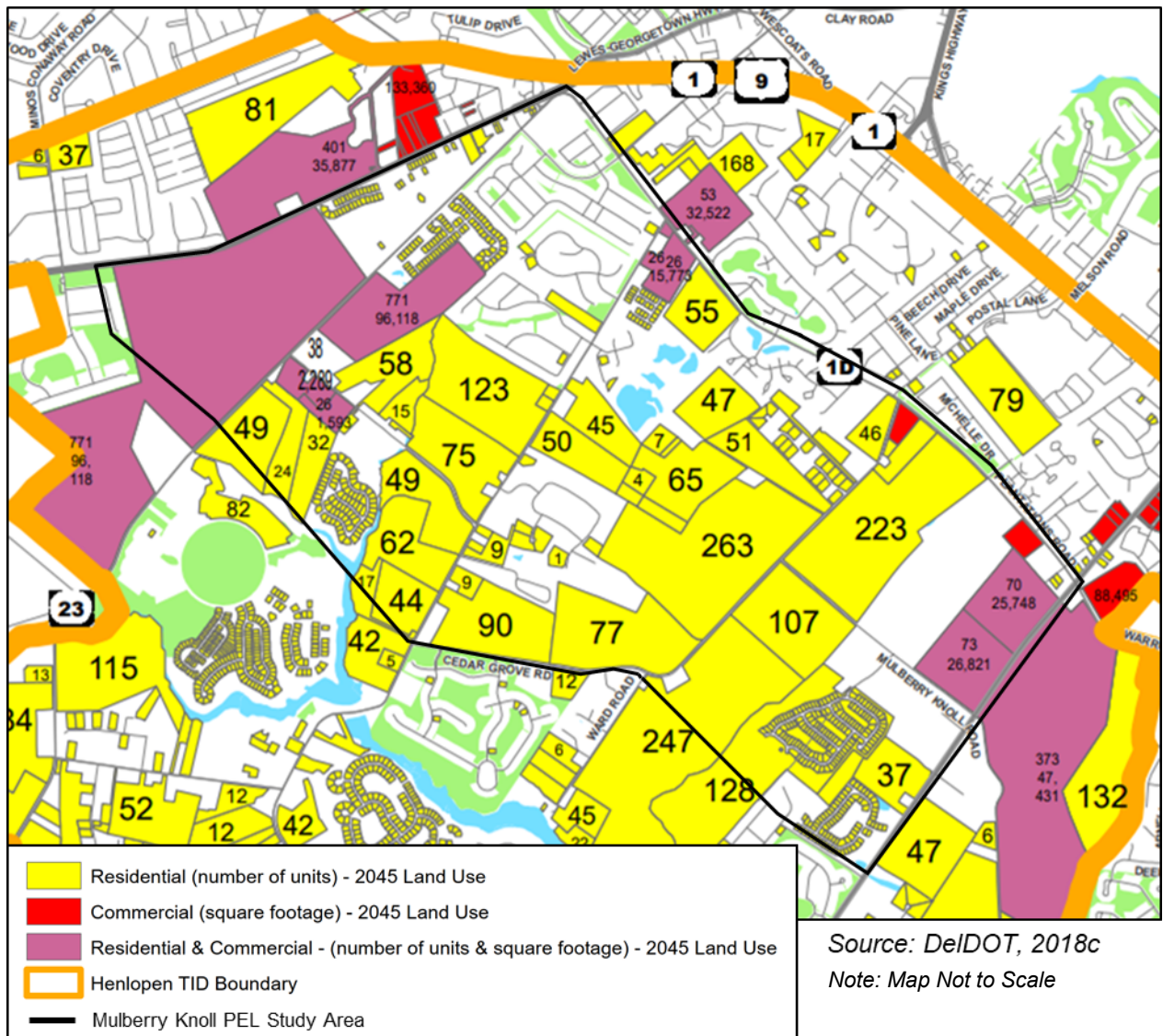


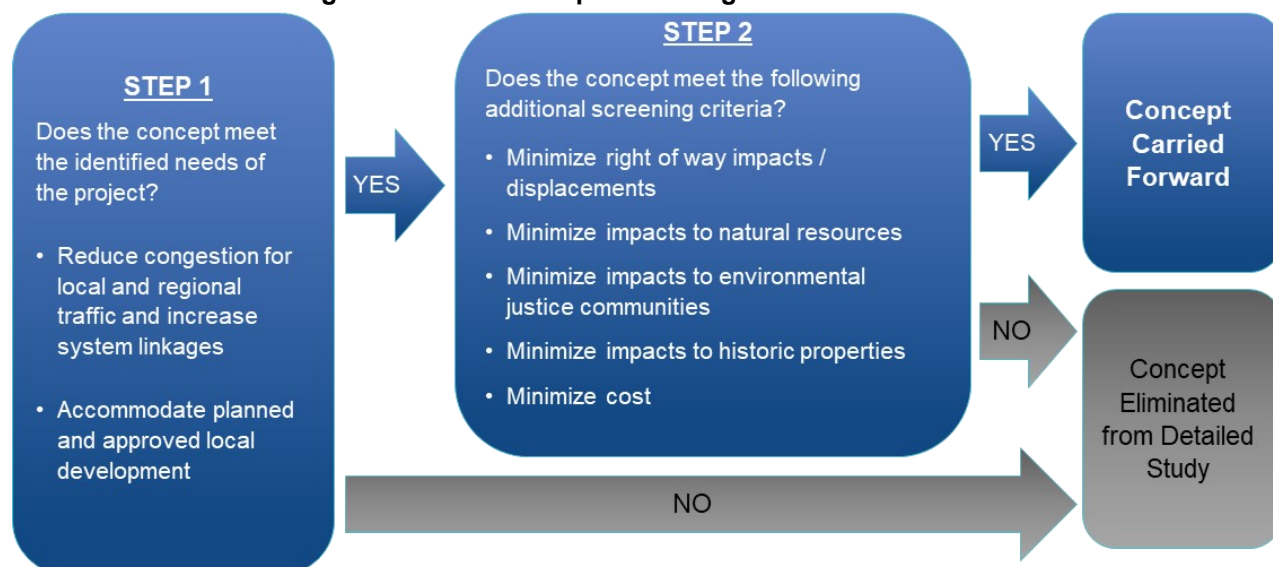
Figure 5: 2045 Land Use



2.0 INITIAL CONCEPT SCREENING CRITERIA

Conceptual transportation improvements that could potentially address the Purpose and Need for the study will be developed and then screened following the two-step process illustrated in **Figure 6**.

Figure 6: Initial Concept Screening Process Flow Chart



2.1 Step 1: Does the Concept Meet the Identified Needs of the Project?

The Purpose and Need for the Mulberry Knoll Road Extension PEL Study is the primary criterion in the development of concepts to address the identified transportation needs. The ability of a transportation improvement concepts to meet the Purpose and Need will be assessed based on the following screening criteria:

- **Reduce congestion for local and regional traffic and Increase System Linkages** – The effectiveness of a concept in meeting this need element will be measured in the forecasted LOS within the study area with the implementation of the conceptual transportation improvement, compared to existing and anticipated future conditions in the absence of any improvements.
- **Accommodate planned and approved local development** – As shown in **Figure 5**, there are many properties identified within the study area for future development. To accommodate planned and approved development, the number of properties identified for future development adjacent to the alignment should be maximized.

2.2 Step 2: Does the Concept Meet Additional Screening Criteria?

In addition to consideration of the Purpose and Need, and taking into account input from the public and agencies, transportation improvement concepts that meet the needs of the project will be evaluated based on the following screening criteria and other factors relevant to evaluating the reasonableness of each transportation improvement concept.

- **Minimize Right of Way Impacts / Displacements** – Widening an existing roadway and constructing a new roadway would require right of way takings and could require the displacement of existing residences or businesses. While takings and displacements are

unavoidable, these impacts should be minimized to minimize property impacts. Reducing these impacts also helps to reduce the cost of the project.

- **Minimize Impacts to Natural Resources** – US Environmental Protection Agency (EPA) 404(b)(1) Guidelines state that “no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.” The Guidelines further state that an “alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.” Therefore, impacts to wetlands, open waters, and streams should be minimized to the greatest extent practicable, while taking into consideration constructability, cost, and the overall purpose and need. In addition, impacts to forests, designated agricultural lands, and designated natural areas should be minimized in accordance with the Delaware Forest Conservation Act (Delaware State Senate Bill #324), Delaware’s Agricultural Lands Preservation Program, and the 1978 National Areas Preservation System (7 Del. Code, Chapter 73).
- **Minimize Impacts to Environmental Justice Communities** – Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994) seeks to ensure federal programs do not result in disproportionately high and adverse environmental or health impacts to minority populations and low-income populations. Additionally, consistent with Title VI of the Civil Rights Act of 1964 which prohibits discrimination on the basis of race, color, or national origin in programs and activities receiving federal financial assistance, DelDOT is committed to ensuring that no person is excluded from, denied the benefits of, or discriminated against in their programs and activities on the basis of race, color, or national origin. Therefore, potential impacts to low-income or minority populations or communities identified within the study area will be avoided or minimized. Low-income or minority populations or communities may be identified through minority population or household income data maintained by U.S. Census Bureau or through coordination with agencies, organizations and businesses as well as public outreach.
- **Minimize Impacts to Historic Properties** – Section 106 of the of the National Historic Preservation Act of 1966, as amended (NHPA) requires federal agencies to consider a project’s effect on historic properties and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.
- **Minimize Cost** – A planning-level cost estimate will be developed in standard DelDOT format. Cost may be used as a screening parameter for comparing conceptual improvements relative to others that address the identified Purpose and Need.

A summary table will be prepared to summarize the details of each transportation improvement concept and the associated impacts and will include the following information:

- Properties affected
- Residences displaced
- Socioeconomic and Environmental Justice communities affected
- Wetland impacts
- Stream impacts
- Forest impacts
- Designated agricultural land impacts
- Designated natural area impacts
- Historic structure impacts
- Adjacent parcels identified for development
- Planning-level cost estimate

3.0 REFERENCES

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